Manfred SCHRENK, Vasily V. POPOVICH, Peter ZEILE, Pietro ELISEI (Eds.)

RE-MIXING THE CITY

TOWARDS SUSTAINABILITY AND RESILIENCE?

REAL CORP 2012

17th International Conference on Urban Planning, Regional Development and Information Society

PROCEEDINGS
TAGUNGSBAND

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There is nothing permanent except change. (Heraclitus)

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Edited by

Manfred SCHRENK, Vasily V. POPOVICH, Peter ZEILE, Pietro ELISEI

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Πάντα ῥεῖ καὶ οὐδὲν μένει.
There is nothing permanent except change. (Heraclitus)

PREFACE

Manfred SCHRENK,

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Vice President ISOCARP – International Society of City and Regional Planners

WELCOME to REAL CORP 2012, the 17th International Conference on Urban & Regional Development and Spatial Planning in the Information Society!

Cities worldwide are facing rapid social, economic, environmental, technological and cultural changes such as rapid urbanisation, aging of society, security issues, housing emergency, new solutions on mobility, integration of immigrants, food and water shortage, etc.

Especially in times of economic crisis and demographic changes in cities, it is necessary to think about how to best handle the available resources, therefore this year's conference motto is **"RE-MIXING THE CITY"**.

How can planners deal with mixed city structures? Isn't the major aim of spatial planning to define usage structures by sorting different types of land use in space. Can mixed use or a mixed city be planned anyway? Or can planners only set up a framework of basic conditions so that the mixed use of the city can grow on its own? How can planners influence existing city structures, for example turn a former monofunctional industrial area into new town quarter a full of prospering city life?

Well, of course we must be aware that "re-mixing" – as all other approaches – can not be the one and only solution for any kind of urban tasks. But in the core areas, in the hearts of our cities, there is a need for multi-functional, mixed structures allowing life to take place without the need to cover long distances.

Some of the topics that we will be dealing with during the next 3 days are

- Can "mixed cities" be more sustainable and resilient?
- Living, working, learning, relaxing, enjoying, shopping, ... – anything anywhere & anytime?
- Is it the purpose of spatial planning to "sort land uses in space"?
- Do the urban patterns and structure of our cities still meet the needs of the people in their everyday life?
- How do urban, transport and environmental technologies and solutions shape our cities?
- New faces, new approaches, new ideas – does and can migration re-mix the city?
- Time-space patterns of the 24/7 city

Additional special topics of REAL CORP 2012

- Urban, Transport & Environmental Technologies and Solutions
- Urban Ambient Assisted Living (AAL)/intelligent urban environments
- Resilience, Safety & Security

The **conference venue Multiversum Schwechat** is an outstanding key project for an urban intermix. The versatile sports, event, fair, concert… hall with its perfect transport connection – directly opposite the railway station and only 10 minutes from the airport – makes it an ideal location for any kind of urban event.

Schwechat is and outstanding example of a "(Re-)Mixed City": it is Vienna's "airport city", directly neighbouring Vienna, situated between Vienna and Bratislava, the motorways A4 and S1 are crossing here, it hosts Austria's largest rail shunting yard and the Danube harbour and the oil and gas pipelines to the industrial complexes in the city complete the unique"5-modal Central European transportation hub".

Schwechat is not only an industrial city with a long tradition (there are more people working than living here), but Schwechat is also a small town which offers excellent quality of life with a good variety of shops and business opportunities, high quality social and educational infrastructure, an extensive green system and leisure facilities – and last, but not least, Schwechat is Austria's top sports city. The Werner Schlager Academy – part of the Multiversum – is one of the world's leading table tennis training institutions.

Last but not least the city of Schwechat has energetic and innovative city leaders who are willing to take up the challenges of the future and make the best for the city and its people – not only in the current situation, but also to prepare the ground for long-term successful development of the city.

REAL CORP 2012 in Schwechat offers the possibility to discuss a wide range of topics in different panel groups and workshops. It is a great pleasure and honour that **the world's four most reputated planners' organisations** are represented by their leading representatives at REAL CORP 2012 and take an active role in the conference:

- International Society of City and Regional Planners (ISOCARP, www.isocarp.org),
- International Federation for Housing and Planning (IFHP, www.ifhp.org),
- International Urban Development Association (INTA, www.inta-aivn.org), and
- Association of European Schools of Planning (AESOP, www.aesop-planning.eu)

For the first time, REAL CORP is accompanied by an independent exhibition and trade fair: "CORP EXPO 2012" on the topic "Livable City" collects the key enterprises for urban development, mobility, environment, energy and the field of Urban Ambient Assisted Living (U-AAL).

REAL CORP 2012 brings together almost 500 experts from different fields and from all over the world and provides the stage for meeting and learning from each other how to deal with city structures and prepare them for a sustainable future enhancing their resilience.

REAL CORP 2012 covers many different topics in about 200 presentations. The proceedings comprise about 1,500 pages of hand-picked knowledge for planners and for cities.

Since our first conference in 1996, REAL CORP has turned into a real interdisciplinary and international event. This year again we bring together people from 5 continents, from around the globe. During the upcoming three days, Schwechat will be the host of an incredible exchange of planning knowledge, face to face networking and development of new thoughts, ideas and projects.

Welcome to Schwechat, Austria, and the outstanding conference site Multiversum!

Have a great conference!

Manfred SCHRENK & the REAL CORP Team

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Table of contents – Inhaltsverzeichnis:

reviewed paper

A New Urban Sensing and Monitoring Approach: Tagging the City with the RADAR SENSING App

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1 ABSTRACT

Focal point of this conference is to examine urban patterns and city structures regarding the changing needs of people in their everyday life. In order to do so, involved stakeholders such as planners and decision makers need to have precise information about citizens' needs and feelings concerning actual difficulties or tasks. Thus, approaches are needed to identify such topics, and to evaluate urban processes. One potential for this can be seen in new developments like Ubiquitous Computing and pervasive sensing with mobile devices which can act as small and connected sensors in the spatial environment. Due to the increasing prevalence of such mobile devices, more and more geospatial data is being produced, and some of it allows for inferring information about people's behaviour in specific areas. The main problems in these tasks are on one side that the processing of such data is a difficult task, due to the heterogeneity of interfaces and used data formats, but also because of the absence of a target-oriented question and the overlook of the potential for spatial and urban planning. We consider mobile crowdsourcing approaches to gather data in combination with the potentials of ubiquitous computing via new generation smartphones with the RADAR SENSING app as a promising approach. This app is a target-oriented software application that allows non-experts and citizens of a city to easily provide location based data just by using their mobile device and to attach urban spaces with specific planning relevant information. The presented test study was conducted in Kaiserslautern and aimed at validating methods to process and analyse localised tags in an urban area with the RADAR infrastructure. Hence, this study is an elaboration of the potential of new sensing and monitoring methods for urban areas.

2 INTRODUCTION

As mentioned in the conference title, the changes in cities and urban areas are inevitable phenomena with a high relevance for urban planning. It is thus important to create a sense of understanding for monitoring the various spatial patterns of a city, and there is a need to develop tools and methods for this purpose. From a planning perspective, the RADAR SENSING app and the associated RADAR infrastructure can be seen as a real-time monitoring tool. With these technologies, it is possible to install a monitoring system for the observation of a phenomenon in a chronological sequence. With the help of sensor technology, it is possible to install so called deductive monitoring systems. Main characteristic of these monitoring systems is that a public or private authority in a top-down process with a specific task initiates them. The opposite of deductive monitoring is "inductive monitoring", where no fixed top-down oriented infrastructure is given. The main idea behind inductive monitoring is that expressions and statements regarding a special topic are collected, but without being initiated by in a traditional, organisationally driven top-down process. So people aren't instructed to observe preselected phenomena that shall be examined. Examples are .g., postings and other traces that people leave when interacting with digital media and respective devices can be important information sources for planners. Some promising approaches for such bottom-up driven, mobile apps are "next hamburg mobile"[1] and "leerstandsmelder"[2] in the city of Hamburg. These apps were designed for only one specific task in one specific area, and they are top down initiated. However, for our solution, it was important to have a tool which is able to detect new urban spatial patterns. So a mobile application was developed that allows citizens to easily contribute information about the quality of arbitrary places in a city. Therefore, a number of predefined "urban categories" was provided. Each of these predefined categories can be rated as "positive" or "negative" for the selected location. Additionally, users can add own categories. The information is stored in a generic geodata infrastructure with various means for data analysis and visualisation. Hence, it can be used by planners for an analysis of spatial-temporal interactions and be embedded in the planning process. First results of these approaches were gathered within a sound

[1] See "next hamburg mobile" for iPhone (Source: http://www.nexthamburg.de/mobile.php)
[2] See "Leerstandsmelder online" (Source: http://www.leerstandsmelder.de/)

propagation project (compare Paper "Sensing the City", Bergner et al. 2012) where a group of test persons tried to identify noise hotspots, and also provided related "city parameters" using the newly developed smartphone app in the city of Kaiserslautern.

The paper is into three major parts. Whereas the state of research presented in Section 3 will give insights about developments like ubiquitous computing, monitoring, and humans as sensors, the Section 4 will explain the RADAR infrastructure and the RADAR Sensing app. The study set-up described in Section 5 will provide information about the field study including results and further research approaches. We conclude with a a summary and an outlook on future work.

3 STATE OF RESEARCH

3.1 Ubiquitous computing and pervasive sensing

New technologies like smartphones and sensors as well as the prevalence of wireless access to the Internet and will induce lots of changes for urban planners. With the rapid development of mobile communication devices, the postulated vision of ubiquitous computing as already predicted by Mark Weiser in 1991 seems to come true. This means that all devices are mutually connected and able to share data in order to create an additional value for its users. Smartphones in this context have to be considered as pioneers of a new era of computers that allow the user to share data and to participate, simply by using their Internet connection (Zeile, 2010). These small, connected, flexible sensors build the basis for pervasive sensing approaches of urban areas (Martino et al., 2010). Mobile communication devices are small, smart, and flexible, and the functionalities they offer will be constantly enhanced in the future. GPS-tagged pictures or sound files are just some simple examples. In contrast to ordinary sensor networks, where all measurement devices are constituted in a top-down-approach, lots of new potentials will emerge around crowdsourcing approaches as predicted by O'Reilly (2005). If those bottom-up-approaches are producing geospatial content, they are described with the term "Volunteered Geographical Information" (VGI) (Goodchild, 2007). Hence, it will be possible for citizens to interact with their electronic devices as a sensing unit together with their urban environment.

Smartphones equipped with various kinds of sensors could be considered as perfect sensors for spatial planning issues. These sensors can be subdivided in sensors for self-location (for example a GPS-Tracker) or position detecting, (Streich, 2011). Other available technologies are data collecting methods with the assistance of visual sensors (like digital cameras), audio sensors or with the help of newly developed and additional sensors, the measurement of the degree of pollution. A general classification in sensor types can be stated as follows: sensors for state variables and material properties, sensors for geometrical and mechanical parameters, electromagnetic and optical sensors and other possibilities for image processing (Schanz, 2007) or especially for psychophysiological monitoring purposes in spatial planning like it is done by the skin conductance and the skin temperature (Bergner et al., 2012). The sensors produce mostly quantifiable data and could be used in different planning related issues. Hence, the crucial point is to organise these complex and heterogeneous data sets together with new technologies and to develop new planning methods for their administration, organisation, and management. In order to show the potential of combined data flows, the SENSEable City Lab at the MIT in Boston followed a promising approach with the "Copenhagen Wheel" project. In In this project, bikes were used as mobile sensors in which environmental conditions like carbon monoxide or nitrogen concentration, temperature, noise, and humidity were directly measured by built-in sensors during the biker's city tours. With the help of these data, a thematic map of different ecological values (Outram et al., 2010) can be produced. Foci in these cases were particularly citywide sensory data, data management and the integrated real time visualisation, which embeds the bikers as dynamic and connected urban sensors. This example shows the huge potential of involving humans in a sensing process for urban planning purposes.

Generally, sensing units in sensing systems for urban planning issues with mobile devices can be divided into two main subcategories:

1. Mobile devices as (location based) communication units

One approach is the use of smartphones primarily as communication devices in order provide and share information. Predominant function is the use of various kinds of channels in order to provide an explicit statement for a specific location. The localised statements are called location-based tags. Besides the GPS-

sensor of the smartphone and the timestamp, the use of other sensor technologies is not necessary. The RADAR system could be considered as such an approach to collect and provide people's explicit statements regarding specific locations in the urban area. Features to share and provide data are often provided via common social media apps like Facebook or Twitter. Other good examples of apps, which are collecting people's explicit comments on the environment, are the previously mentioned app "NextHamburgMobile" or "trendsmap"[3], which maps the twitter-activity of users. With "NextHamburgMobile", it is possible to set up localised addendums in the urban area related to urban planning topics. Due to the use of interfaces, the gained data could also be used by third-party-developers for own specific research questions. E.g., Fabian Neuhaus from UC London created Twitter density maps, which allow detecting locations with a high concentration of Twitter posts (Neuhaus, 2012). As an example, the map of San Francisco shows that geolocated Twitter messages are also reflecting the urban area of the Bay Area in California.

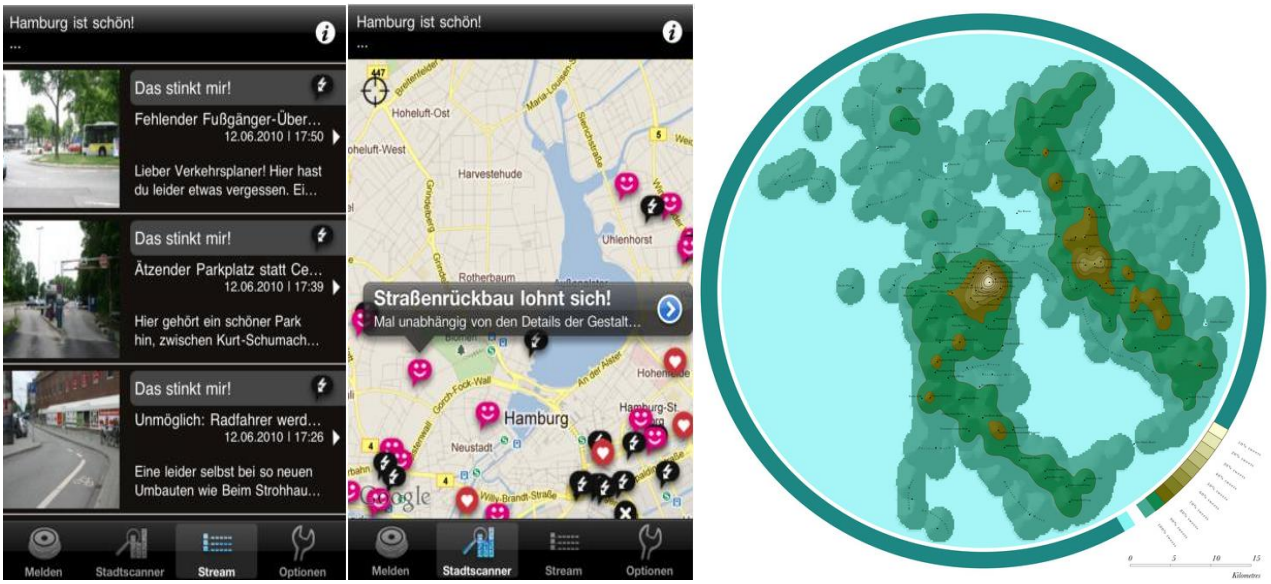

Fig. 1: iPhone App "NextHamburg Mobile" & Twitter heatmap San Francisco

2. Mobile devices as sensor units

As stated before, smartphones are multisensory devices and could be used as mobile urban sensors. The variety of embedded sensors like GPS or noise level recorder, and the possibility to dock on additional sensors open a wide range of opportunities for creating additional geospatial data.

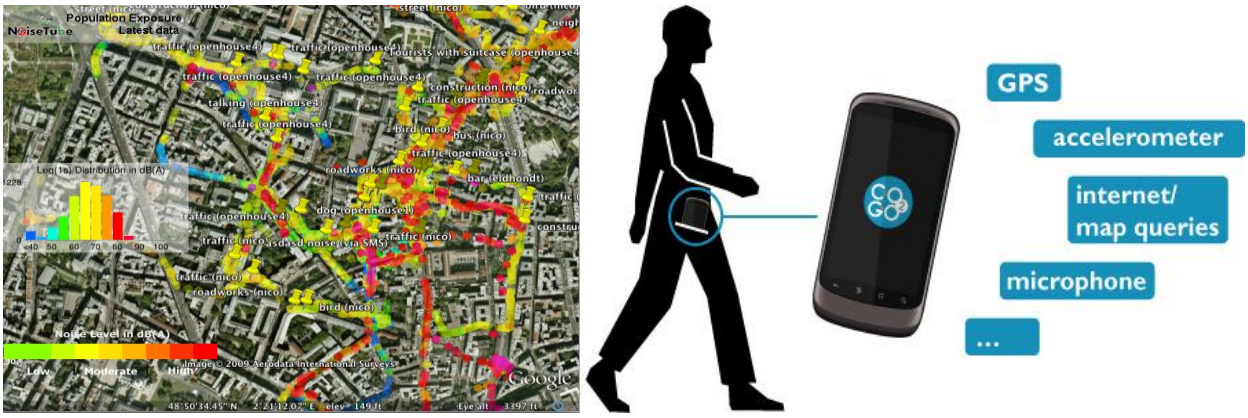

Fig. 2: App "Noisetube" & App "CO2GO"

Another value of this concept lies in the ability to aggregate those different data streams to gain new insights. E.g., the app "Noisetube"[4] is able to create a noise load level map just with a smartphone. The app "CO2GO"[5] from the SENSEable City Lab at MIT uses a combination of the GPS tracks and the

[3] See Trendsmaps online (Source: http://trendsmap.com/)
[4] See App "Noisetube" (Source: http://noisetube.net/)
[5] See App "CO2GO" (Source: http://senseable.mit.edu/co2go/)

smartphone's acceleration sensor to calculate a carbon footprint. The already mentioned project "Copenhagen Wheel" pursues a similar approach. In this project, local bikes are equipped with a wide range of sensing devices. With a smartphone app, all the integrated sensors could be observed and maintained to see the actual concentration of pollution or the prevailing weather conditions. All equipped sensor bikes also send these data to a server which is calculating the conditions in the whole city.

3. Sensing systems

With these devices and applications, it is necessary to develop holistic methods to create systems, which will function as a city wide sensing network. The development towards Smart Cities is an approach where such networks are top-down-oriented and planned by an authority, organisation or enterprise. If a deeper collaboration with citizens is intended, it should easily be possible for people to embed their device and data into the system and as well to share and access already existing data. Besides the technological hurdles, there also has to be an intuitive, easily understandable and attractive system for users to encourage them to participate and contribute with own data. This is crucial in order to create an additional value for users and a city. The RADAR[6] infrastructure is such an approach, because it allows integrating geocontents from a variety of different sources, and it also provides means to organise, aggregate and visualise this data via a web based user interface as well as a smartphone app. In addition to that, RADAR enables the user to also go deeper into analysing the data, which, e.g., is possible by using heatmap visualisations for tags. Another comprehensive approach is SMART-Singapore which is a project that could be classified as a Smart City initiative. The setup of this project is an opportunistic monitoring approach including various deployed sensors in the city with an inductive approach. Various data streams are provided on a platform which makes it possible for citizens and developers, to create their own apps to use this data in order to create data with an additional value for city and community (Ratti, 2011).

3.2 Monitoring

Monitoring comes from the Latin word "monitor", which means some kind of surveillance or observation. Hence, essential point is the observation of a phenomenon over a longer period, with the result of using the gained forecasts for a reactive or constructive control. This also embraces data collection, analysis and interpretation in a systematic way in order to have data as a basis for decisions and further observations. Thus, a monitoring system consists of two elements: One part is the approach to gather and process data, the other is the infrastructure needed collect and manage the considered data. Monitoring systems are the basis for forecasts, which makes them important especially in the working field of spatial planning (Streich, 2011).

Web 2.0 and associated technological opportunities already had an influence on monitoring approaches, and they will continue to do so in the future. Monitoring approaches were historically initiated in top-down approaches by mostly public authorities and organisations. With the development of pervasive sensing, the fertile ground for bottom-up approaches was set. Hence, with the empowerment of non-experts to create, analyse, visualise and publish geospatial information, there will be a new mode for monitoring issues in spatial planning. Due to the mentioned elaborations, monitoring has to be distinguished between deductive monitoring (top-down) and inductive monitoring (bottom-up) approaches. Deductive monitoring is an approach, which is mainly top-down oriented and composed of data generated by time series analysis: People collect data sets, with or without the awareness that they wear a sensor device and collect data. Or data were collected unconsciously, e.g., by cell phone carriers or hardware developers with the help of the cell phones internet connection and ability to access and store data. The use of the data gained by sensor networks like climatologic measurements is such an approach. The gained data could be used for various purposes and it has a large potential, not only for spatial planning. Opportunistic sensing could also be part of a deductive monitoring system. Regardless of the way these monitoring technologies deal with personal data and data security, the continuous recording of this kind of data has a large potential, not only for spatial planning.

Mobile devices give users the possibility to create this data in an explicit way related to a specific situation. So it is an active use of a smart device as "communication unit" and as "sensor unit". If this bottom-up approach is making use of mobile devices to collect and share data, it is considered as participatory sensing.

[6] See RADAR Project (Source http://radar-project.de)

However, if such systems are aiming to involve citizens into participatory monitoring projects, there has to be some kind of incentive mechanism to encourage them to participate in the project.

3.3 Humans as sensors

As previously mentioned, the consideration of new sensor technologies for urban planning purposes will be more important in the future. In 2010, "The Economist" stated that "Everything will become a sensor, and humans may be the best of all" (The Economist 2010). It thus has to be elaborated how a person senses its environment, and how these impressions and emotions could be measured in an objective way. This ensures that citizens, who should be the focal point of any planning consideration, could act as active sensors for the urban environment. The synchronised multi-sensor „human" thus should be considered as the most important sensor for urban planning issues (Exner et al., 2011). Due to the technological development in mobile device technologies, the combination of smartphones and human interaction will provide huge potential in planners' everyday work because the generated data could be used for monitoring purposes in urban planning. Hence, crowdsourcing and inductive monitoring integrates an entirely new mode of participation in processes of urban discussion for geospatial data gathering (Exner et al. 2011). The study project „Sensing the City" at TU Kaiserslautern shows the potential of this approach, because it combines the mentioned sensor technologies with both implicitly and explicitly generated crowdsourcing data of the test persons. Whereas the implicit emotions of the test persons were recorded via psychophysiological monitoring with a SMART-Band for measuring skin arousal and stress, the test persons were equipped with mobile phones and a tagging app that allowed them to tag their surrounding area making use of several predefined criteria. Exploiting the above mentioned potentials given by smartphones and monitoring approaches, and using the new RADAR technology that will now be introduced, it is possible to gain new insights for defining the quality of an urban place in order to show the potentials of psychophysiological monitoring and prospects for their use in urban planning like it has been done in the project "Sensing the city" (Bergner et al., 2012).

4 THE RADAR INFRASTRUCTURE AND THE RADAR SENSING APP

RADAR[7] (Resource Annotation and Delivery for Mobile Augmented Reality Services) was a one-year project initiated in 2010 at the Knowledge Management department of the German Research Center for Artificial Intelligence in Kaiserslautern. The aim was to realize an open and flexible infrastructure that allows users to contribute and manage arbitrary types of geocontents. On the one hand, the RADAR infrastructure is able to process very simple representations of geocontents; on the other hand, it is also be possible to use more complex and multidimensional objects.

The RADAR infrastructure consists of two main components:

- The RADAR Web Interface is an intuitive, web based GUI for comfortable contribution, sharing, and management of arbitrary geocontents. It is based on DFKI's ALOE[8] infrastructure and offers a plenitude of social media features.
- The RADAR Web Service realises a rich Web Service API and thus allows integrating RADAR contents and functionalities in different contexts and applications, such as the RADAR SENSING App.

For different scenarios, specific RADAR instances can be set up, thus allowing the realisation of controlled and closed as well as open and collaborative scenarios. Figure 1 provides a coarse overview of the RADAR main components. For a detailed description of the system architecture as well as system features please refer to (Memmel 2012).

To address the needs of inductive monitoring approaches, a specific instance of the RADAR infrastructure (RADAR-SENSING) was set up. In addition to the usual RADAR functionalities, means to analyse user contributions by means of heatmaps are offered on this instance. The RADAR SENSING app was developed for Android-based devices and connects to the RADAR-SENSING backend where all information such as user data, user contributions, etc is stored in a respective database. As exchange format, JSON was chosen because it allows for efficient processing of information while still providing means to exchange arbitrary data types.

[7] See http://radar-project.de
[8] See http://aloe-project.de

To take part in experiments on this platform, users first have to register using the RADAR-SENSING Web frontend. After installing the RADAR SENSING app, they have to provide the respective credentials and can then provide positive and negative votes for a set of predefined categories. Optionally, a free category can also be entered. After submitting these votes, the app tries to estimate the user's position by means of several sensors (preferably GPS) and shows this position on a map. The users then have the possibility to change this position in case the sensors were not able to retrieve the precise location.

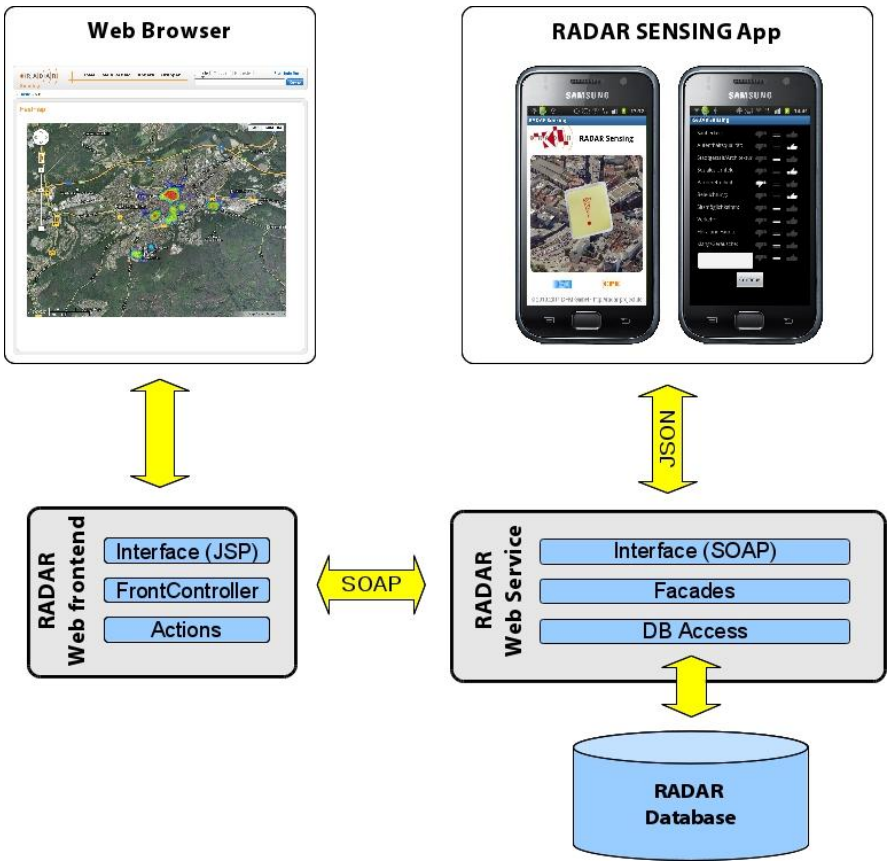

Fig. 3: Simplified architecture of the RADAR infrastructure

Furthermore, it is possible to get first impressions about the tagged attributes by means of a tag cloud accessible through the RADAR Web Interface. However, the most helpful tool for spatial planning is the interactive heatmap of the tagged points. Here, users can select which attributes to take into account for the generation of the heatmap, and whether only positive, negative or both votes are used. The heatmap is then displayed on an interactive map where users can drag and zoom. Furthermore, it is possible to provide further parameters to filter the used data (e.g., time restrictions), and the heatmap can optionally be refreshed automatically in case new relevant data for the heatmap shall be displayed on-the-fly.

5 STUDY SET-UP

Accompanying to the project „Sensing the City – How to identify Recreational Benefits of Urban Green Areas with the Help of Sensor Technology", the "tagging the city" –project (attribute tagging) should consolidate the findings of the above mentioned study (compare Bergner et al., 2012): In this study, the topic was to identify urban retreat areas against the background of the EU environmental noise directive with the help of psychophysiological measurements. Parameters like the subjective perception were measured by using SMART-Bands. The SMART-Bands record through Skin Conductance Level and Skin Temperature, which allow doing a statement about people's arousal in the city. , The study was in addition supported by traditional, 5 level ICBEN-questionnaire (International commission on biological effects of noise), which described the perception of noise pollution.

In support of this set-up, it was possible to record volunteers' impressions in the city with the help of RADAR SENSING App. The collected data support the plausibility check of planning and it can be seen as a combination of implicit human emotions (stress measured vie SMART-Bands) and explicit emotions (Tags and questionnaires). During the measurement period, the test persons were able to tag points with noise, or

points where is silent in the city. Additionally it is possible to give ratings about other urban properties, like cleanliness, attractiveness of urban areas, urban design, accessibility, lighting, seating, traffic and flora/fauna. These tagged points can deliver hints for planners, where it is a pressure to act.

5.1 Findings

Within the test period of two weeks, the test persons collected almost 1900 tagged places, spread over 20 micro places at the city of Kaiserslautern. A distinction was made by the following categories, because these values are highly relevant for urban planners.

	Sojourn quality (+)	Sojourn quality (-)	Accessibility (+)	Accessibility (-)	Lighting (+)	Lighting (-)	Flora & Fauna (+)	Flora & Fauna (-)	Sound / Noise (+)	Sound / Noise (-)	Cleanliness (+)	Cleanliness (-)	Seating (+)	Seating (-)	Social Environment (+)	Social Environment (-)	Urban Design (+)	Urban Design (-)	Traffic (+)	Traffic (-)
Tags	149	63	187	35	98	28	120	85	128	79	176	35	158	77	100	55	120	47	86	129

Fig. 4: Totalised values of the "tagging the city" project

The upcoming figure shows this for the attribute "noise" (Fig. 5).

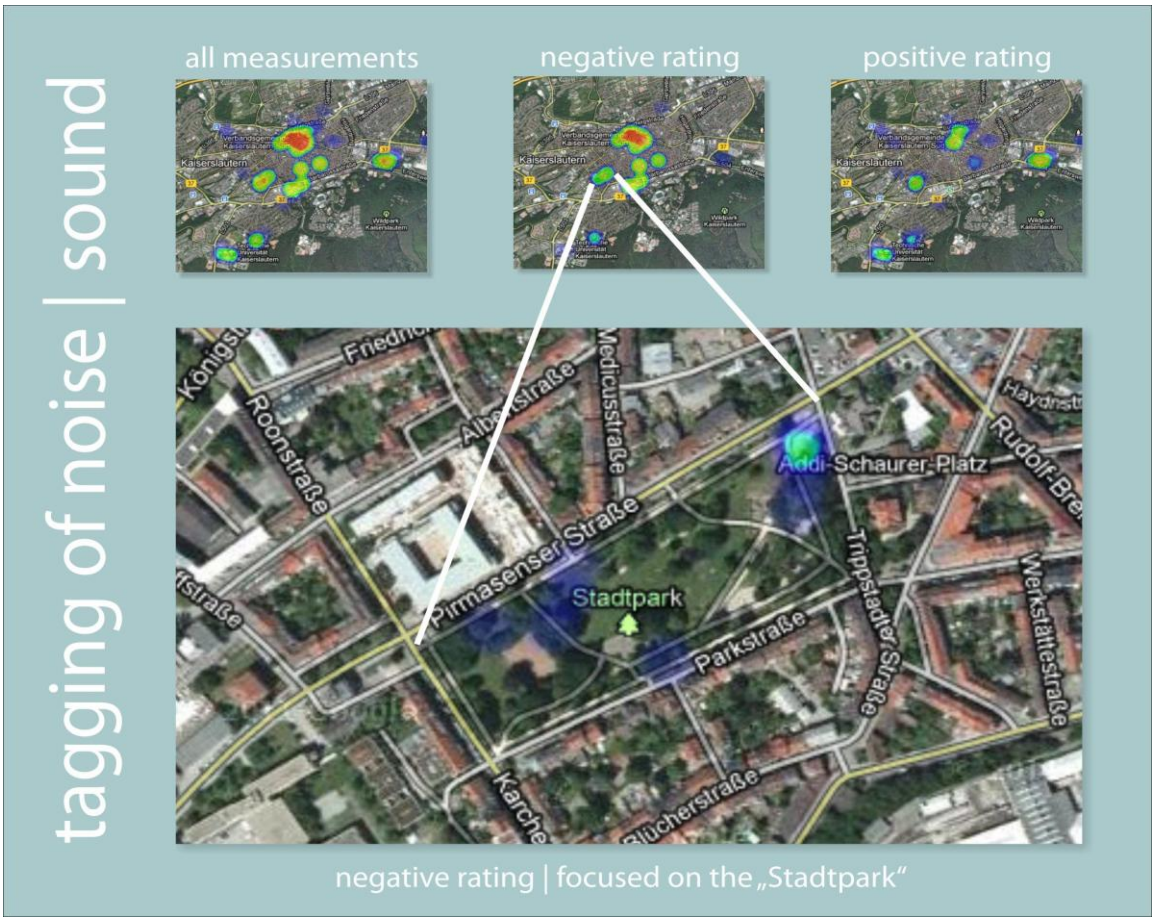

Fig. 5: Real-time heatmaps of the collected tag "noise" (own figure, based on Google Maps)

A full validation of the results for the location "Stadtpark" within the "Sensing the City"- project (compare Bergner et al., 2012), is not possible in the moment in fact of to less tagged points in the test area. But it can be observed, that the negative comments about the noise level were mostly done on the street sides of the park and not in the calmer centre.

Besides for the tagged attributes, it is now possible to produce specific heatmaps, even for the newly developed attributes. The system will also display this data in real-time. Another important value for urban planners is the accessibility of public open areas, especially for those ones with retreat function. If accessibility has to be considered (in German: Barrierefreiheit), it is possible just by choosing the parameter

accessibility. After closing the first study period, it was remarkable, that a place called “Stadtplatane” was identified by the heatmap visualisation which has an insufficient accessibility level compared to other places. This small inner-city recreational area with its six park benches is just accessible via stairs which would be a big hurdle for wheelchair users. With the help of the respective heatmap, this important point could be identified.

Fig. 6: Bad accessibility at location “Stadtplatane” (own figure, based on Google Maps)

5.2 Problems and Questions

One problem of the present study is the homogeneity of the group. It is necessary to have a heterogeneous volunteer group that represents the cross-section of the public. Furthermore, tagging and also questionnaires are explicit expression. Hence, it could be interesting to combine those data with implicitly gained data, for example via emotional mapping with SMART-Bands in order to make a cross-validation. Methods and approaches to merge these two types of data have to be developed and get maturity in order to have resilient data for the planning process. Another important point will be the detection of “wrong” data. This could be on the one hand a bad GPS-signal but also manipulative entries of users. Methods for additional validation have to be developed in order to get the guarantee that the gained data is reliable in terms of technology and content-relation. Questions about how to delete “wrong” data and when to delete older data which isn’t needed anymore (e.g. because of a repaired trashcan which was tagged as broken). Furthermore, especially when it comes to the point of visualizing data with heatmaps, it has to considered, that the chosen way complies with the set standards and the has to be an awareness of the manipulative elements of maps with for example simple elements like positive or negative colour schemes.

6 CONCLUSION

From a technical perspective, there are several potentials which could be exploited for improved and enhanced analysis means in the future. E.g., it will be interesting to compare the different tagging timestamps to analyse how grievances and complaints appear in the urban space. With this approach, static phenomena at the specific location (e.g., accessibility for wheelchair users) and more dynamic phenomena (e.g., a broken trashcan) could be distinguished. Further options in displaying the datasets will help planners to derive demands for multi-layer analysis to gain better planning insights. E.g., there could be an overlay of the negative content of “noise“and “sojourn quality” which might lead to better results. In addition, it would be interesting to integrate information from other social media applications (e.g., Twitter or Facebook) and process this information for further analysis. And, at least, there will be the question about how to deal with this data and to interact with population and government. The question of the resilience of this kind of data will emerge and it has to fit demands of the various planning processes, like the integration in formal or informal processes. Hence urban planners have to be aware not only of potentials, but also of challenges and difficulties when using these new methods for the planning purpose. Without a basic understanding of the complex interactions, they won’t be able to use these new tools in the most promising way.

7 ACKNOWLEDGMENTS

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A Preliminary Study of the Impact of Urban Energy Consumption with Urban Form in Taiwan

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1 ABSTRACT

In recent years, because of the energy demanding increment, it will perhaps make energy dried up in the future. To view the status of the Taiwan's energy development, dependence on imported energy has reached up to 99.3% in 2007.It is limited in self-produced energy in Taiwan. Therefore, the energy subject became one of quite important topics. Many experts are beginning to look for renewable or alternative energy to solve the energy shortage. In the urban planning field, planners try to achieve the minimum energy consumption from the urban planning and management. In each kind of urban planning strategy, many scholars said that the compact city may save the energy under the high density centralism. But recently there is the research to point out that if excessively crowded, it will create more congestion costs, parking costs and energy consumption. There are the different characteristics between the different cities. There might be the different variables about energy consumption. The purpose of this study is attempt by the different urban form variables to find the affecting factors of the urban energy consumption. Final result is expected to provide preliminary conclusion to make a plan use urban energy more efficiently and achieve sustainable development.

2 DEVELOPMENT OF COMPACT CITY

Rickaby discusses the relatedness among the urban form, the energy use and the efficiency of the energy use. He discovered that no matter what kind of the urban development can save more energy consumption which compared to the original plan.(Rickaby,1987)The development of compact city started from the two schools dispute about the development of the urban form between the decentralized person (Decembrist) and the centralized person (Centrist). The centralized person advocated that the high-density urban development, and opposed the urban sprawl. It was most early in 1935, Le Corbusier proposed that enhanced the urban density to solve the congestion.Afterward in 1960, Jane Jacobs positioned to maintain the urban vigor and the urban multiplicity by the high density development.

The compact city appears clearly most early by George Dantzig and Thomas L. the Saaty.These two mathematicians proposed about the spatial form ,spatial characteristic and the function indicators of the compact city in 1973.But it still was fuzzy like sustainable development, it also belonged to the descriptive stage, In 1990, the urban environment green book , British policy guiding plan and so on research induced the concept of the compact city gradually. The compact city was one of the urban regulatory policy which proposed at that time.The original intention was that preserved the village land outside of the urban area. Thus the urban spatial development was limited, and there were more and more population.The compact city advocated that the city should raise the density toward the centralism development. At the same time, there were also many researchs pointed out that policy of the compact city, was helpful to reduce the transportation energy consumption because of the centralism. And they promoted to improve the utilization ratio of the public transportation.It reduced petrochemical energy consumption.Therefore they advocated the development of the compact city.

However the later period scholars pointed out that the excessively compact city possibly created the crowded phenomenon, the bad neighborhood effect , the healthy question and so on, instead caused more impacts ,energy consumption, air pollution and so on. Therefore recently the scholars starts to ponder the balance point of pro and con of the compact city.

The scholars pointed that urban stucture would impact the transportation energy consumption. Because of different attributes

The different cities has the different form and the scale, must have the different cities management

The impact of the trasportation enrgy consumption would be different with different compactnesss.And the impact would be different because the city has different the public transportation ,landuse zoning,infrustruction and so on.(Yeh kuang-yi, Huang kan-chung, Lee yung-lung,2003)

However it has not yet the research to point out that the “compact city” would consume transportation energy least under what kind of urban form.

3 STUDY AREA AND METHODOLOGY

This research reorganizes the different urban form variables, and discusses them to development influence of the compact city. Then it carries on the statistical examination, and it attempts to understand that what kind of city can cause the urban transportation energy disbursement to be least.

The covering scope includes the principal element like dense degree and the mix use that most scholars discusses from the compact city.Then it inducts the degree of the public transportation, information degree, knowledge degree,economy development as well as resources use. The expectation could find the urban variables affects urban energy use.

This research collects the data of Taiwan 22 cities to carry on the series scoring to analyze. Then it uses multiple regression analysis, carries on the examination in view of the urban form to influence of the energy use. First it calculates various cities energy use, then introduces the different urban form variable to analyze what kind of the urban form variable would affect the urban energy use. Next it divided to two groups according to the different urban density and the mix use degree, and then establish in each crowd of groups its model, gives to analyzes the comparison.

3.1 Study Area

Tainan County is located in the Southwest part of the island, an average density of 547.79 persons/km, and total area is approximately 2016 km2.The study areas are 22 cities in Taiwan. (See Figure 1)

Fig. 1. Study Area

3.2 Variables and Indicators

Compactness

There are a lot of ways to meature the compactness.The most complete way is the research from Burton in 2002.Burton measured the compactness in UK towns and cities.He said the better measures of compactness are needed for three reasons(Burton,2002) :

1. To assist research on the impacts of compactness, and thus to guide policy;

2. To enable measurement of progress towards sustainability;

3. For use as planning tools.

And he pointed out the compact city was usually described as one or other or all of three types of city, two that are related to `product':

1. the high-density city,

2. the mixed-use city,

and one that is related to `process':

3. the intensified city.

However,this research only discuss single year.It means that this research needs to ignore the `process' and only discuss the `product': the high-density and the mixed-use .

Energy

Peter W. G. Newman & Jeffrey R. Kenworthy (2007)used Gasoline use to measure the energy consumption.

Therefor,this research take the statistic of every gasoline station in Taiwan 22 cities to be the data measuring the energy consumption.

Urban Form

Urban form includes spatial elements and non-spatial elements.Except for compactness to describe the spatial attributes, this reseach still bring non-spatial elements into mearsuring the urban form.The variables are urban service function, development degree of transportation, information circulation,and knowledge education level.Th indicator of urban service function is industry and commerce factory number.It can describe the activity of the city.The indicator of the development degree of transportation is the utilization ratio of transportation. Because there were more people use publice transportation, and there were less energy consumed.The indicator of the information circulation is the rate of internet surfer.It was reseach pointed out that the rate of internet surfer was higher, the city was more advanced. It has the possibility to express to reduce more energy consumption. Table1 is all variables and the indicators.

Dimension	Variable	Indicator
Compactness	Density	Population per hectare
		Develop household of number the land per hectare
	Mix Use	The proportion of Housing and non-housing
		Entropy
		Retail trade number per hectare
Energy	Energy Consumption	Average each gasoline and diesel oil consumption
Urban Form	Urban Service Function	Industry and commerce factory number
	Development Degree of Transportation	The utilization ratio of Transportation
	Information circulation	The Rate of Internet Surfer
	Knowledge education level	Above 15 years old of education level structure - technical college population and above

Table 1: Variables and Indicators of this research

4 ANALYSIS AND RESULT

According to the indicators in table1,and collecting Taiwan 22 datas.It mainly divides into two parts, the first part surveys the Taiwan different compactness to realize the attributes in different cities, and analyze the energy consumption impact belong to urban compactness and urban form.The second part according to the compactness height classification.The purpose is to realize the difference of the impact of the energy consumption and urban form under the different compactness height classification.

4.1 Compactness of Taiwan Cities Development

There are twenty-two cities in Taiwan. The urban compactness and the average energy per person consumption, as we can see in Figure.2 and Figure.3.

By Figure.2, the higher compactness cities mainly distributes in the north and south two main cities.

By Figure.3, the higher energy consumption cities mainly distributes in the north and south two main cities.But it is not the same cities with the higher compactness cities in Figure.2.To compare these two figures,it appears that the higher compactness cities in Figure.2 instead is the average each person of energy use is lowest in Figure.3.

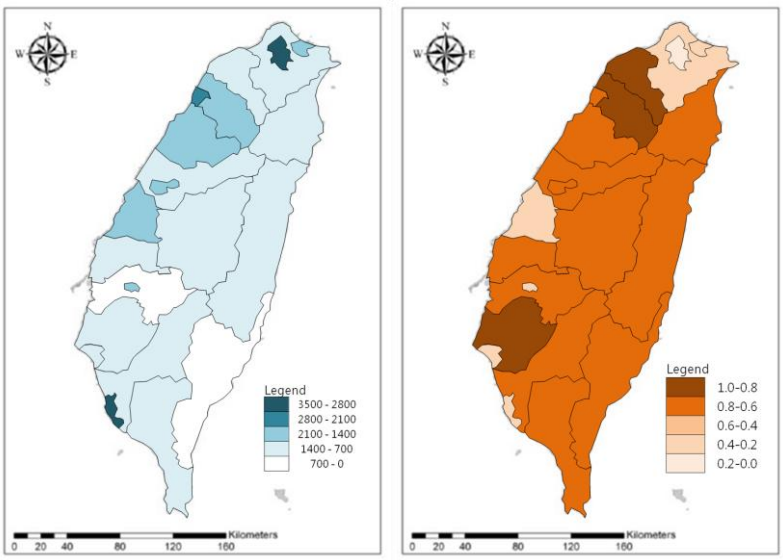


Fig.2 (left): Urban Compactness in Taiwan. Fig.3 (right): Average Energy per person Consumption in Taiwan

The compactness of various cities will divide into two groups, a group for the high compactness city, and a group for the low compactness city. In order to understand different compactness and the energy consume relations. (See Table2)By different compactness, in the high compactness, the many urban energy use is low.Therefore, whatever the compactness is higher or lower,the compactness and the energy consumption is negative correlation.

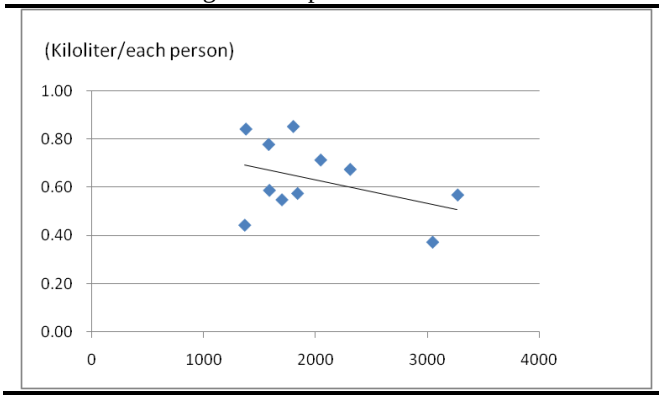
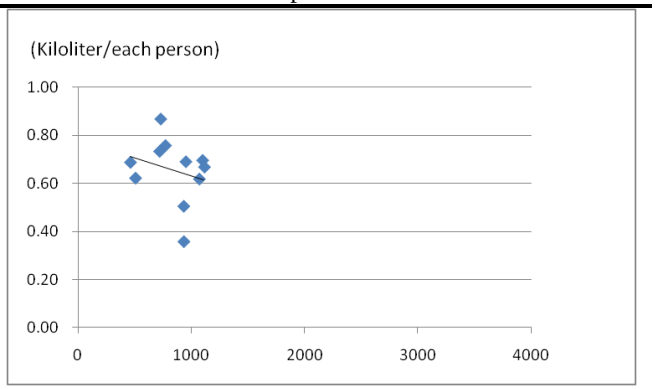
Higher Compactness of Cities	Lower Compactness of Cities
	

Table 2: The relation of Compact City energy consumption and the Compactness

4.2 Identification of Factors Affecting the Urban Energy Consumption of Urban form

Urban service function

By Table 3, its energy use is high. Extrapolated that the reason is the industry and commerce number are few, causes the trip times to increase. The trip times increase, the trip length to increase, causes the energy consumption to increase. They are negative correlation.

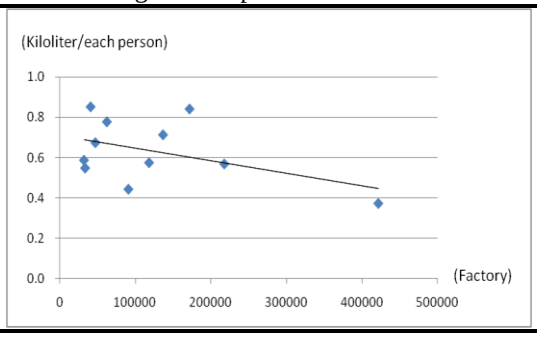
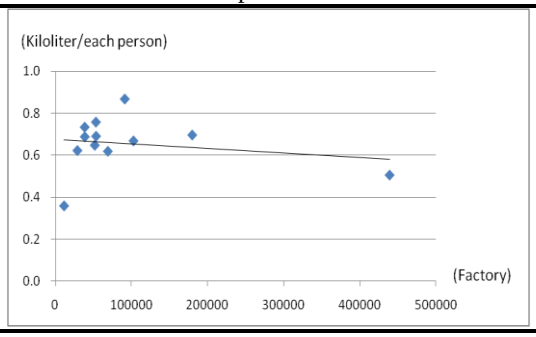
Dimension	Higher Compactness of Cities	Lower Compactness of Cities
Urban Service Function		

Table 3: Identification of Factors Affecting the Urban Energy Consumption of Urban form

Development degree of transportation

By Table 4, regardless of compact highly or low, the utilization ratio of public transportation is high, the energy use would be quite few.

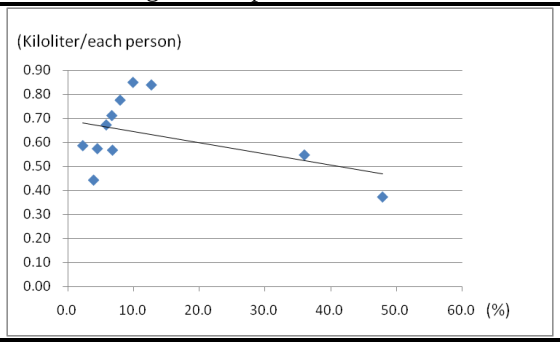
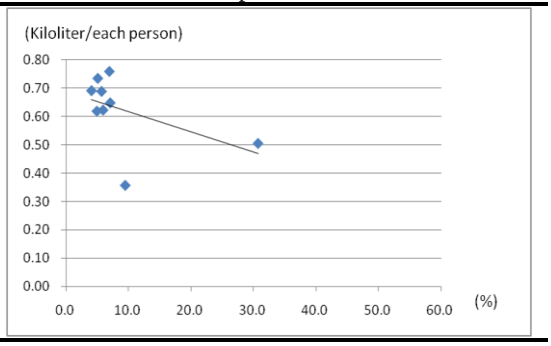
Dimension	Higher Compactness of Cities	Lower Compactness of Cities
Development Degree of Transportation		

Table 4: Identification of Factors Affecting the Urban Energy Consumption of Urban form

Information circulation

By Table 5, under different compactness, different information circulation has the different energy consumption. In the high compactness cities, information circulation is higher, the energy use are more. In the low compactness cities, information circulation is higher, and then the energy use is less.

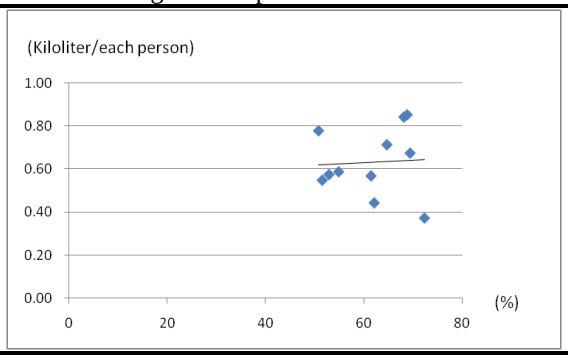
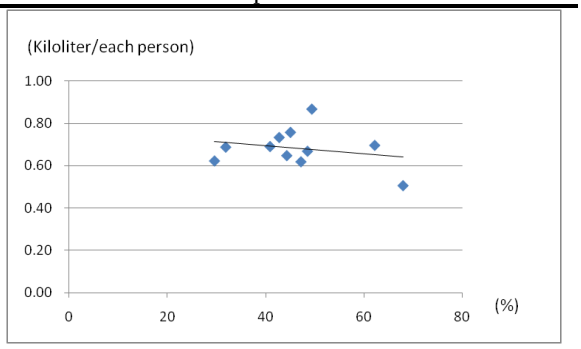
Dimension	Higher Compactness of Cities	Lower Compactness of Cities
Information circulation		

Table 5: Identification of Factors Affecting the Urban Energy Consumption of Urban form

Knowledge Education Level.

By Table 6, regardless of compact highly or low, knowledge education level is higher, the energy use will be few. The cities of high compactness are quite obvious.They are negative correlation.

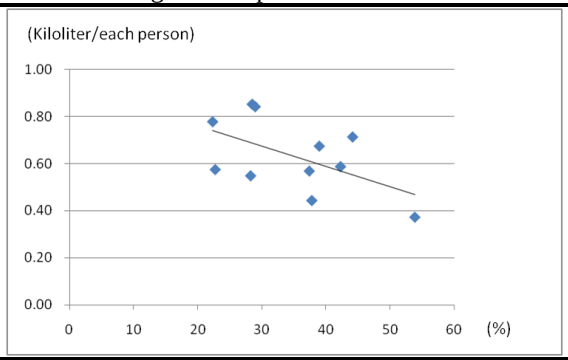
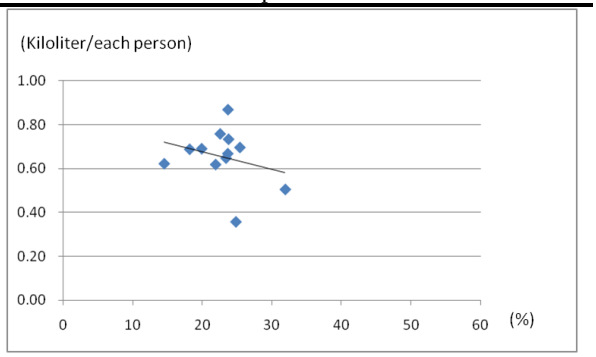
Dimension	Higher Compactness of Cities	Lower Compactness of Cities
Knowledge education level		

Table 6: Identification of Factors Affecting the Urban Energy Consumption of Urban form

5 CONCLUSION

According to the above result and the analysis, it may understand that the different urban form truly would affect the energy use. But in different compactness situation, it also will have the different influence energy consumption. In order to achieve sustainable development, it should probably consider the more urban

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variable in the future. Although this research is a preliminary study. For sustainable development,reducing more energy consumption is saving more energy.

Transportation is one of the major energy consumption department.Many experts advocate to use alternative energy.However,this research prove that various urban form and compactness would consume different energy.Therefore,when urban planner will make the urban planning, they should consider the energy consumption impact of the urban form and compactness.Then the city can achieve the sustainable development.

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Yeh kuang-yi, Huang kan-chung, Lee yung-lung, Advanced planning methodology, R.O.C (Taiwan), 2003

🏆 *reviewed paper*

A Spatial Assessment for Re-Mixing Buildings on the Rural Fringe of Spain

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1 ABSTRACT

This study presents a spatial approach with a methodology for re-mixing current rural buildings into landscape which will support stakeholders to make decisions within a unique environment. A spatial methodology described in this paper is coupling with geographic information systems (GIS), fuzzy logic and multi-criteria evaluation (MCE). The aim of this methodology which applies an overlay and index method involving several parameters is to evaluate the suitability of the study region, Hervás (Spain), in order to optimally plan a building integration with rural landscape. The analytical hierarchy process (AHP) is used to generate the alternative decisions using the multi-criteria evaluation techniques used, enhanced with fuzzy factor standardization. The parameters are categorized into five criterion groups: criterion group 1 includes parameters relevant to the physical environments; criterion group 2 comprises visual conditions which are divided into two states, external and internal state; criterion group 3 depicts economical situations; criterion group 4 incorporates social activities; criterion group 5 consists of environmental circumstances. Besides assigning weights to factors through the AHP, the simple additive weighting (SAW) method is applied to the calculation of final grading values in multiple criteria problem for the suitability re-mixing of the study area. The methodology will result in five intermediate suitability maps, physical, visual, economical, social, and environmental criterion. Combination of the five intermediate maps will result in the final composite suitability map for rural building integration with landscape.

2 INTRODUCTION

The appropriate integration of man-made rural buildings into their landscapes is a challenging task, as most of the times various controversial parameters should be considered. The integration of the building with rural landscape usually depends more on the right choice of location than on any other weighted factors. Geographic information systems (GIS) offers useful tools to study the location in depth when considering spatial planning limitations, opportunities, visual characteristics and the overall landscape scene (Hernández et al., 2004). The potential advantage of a GIS-based approach for siting arises from the fact that it not only reduces the time and cost of site selection but also provides a digital data bank for long-term monitoring of the site (Moeinaddini et al., 2010). The appropriate integration of rural constructions into their surroundings, however, is not a common consideration in general practices yet (Tassinari et al., 2007).

The siting of rural buildings into their landscape is a particular multi-criteria decision-making process. Multi-criteria evaluation (MCE) is one particular type of spatial planning to help decision makers explore and solve multiple and complicating problems (Malczewski, 1999). In general, this kind of process consists of three phases (Forman and Selly, 2001): identifying the problem, designing or identifying the alternative solutions to the problem, choosing the best alternative. Choosing the best alternative is the third phase of the decision making process. Decision-making includes choosing from various criteria and alternatives. The criteria usually have different importance and the alternatives in turn differ on users' preference for them on each criterion. We need a way to measure to make such tradeoffs and choices. Measuring needs a good understanding of the measurement methods as well as the different scales of measurement (Saaty, 1996; 2005). The analytic hierarchy process (AHP) is a widely accepted decision-making method (Gemitzi et al., 2006).

The present paper describes a method of determining site suitability for re-mixing buildings on the rural fringe, Hervás (Spain), using the AHP for multi-criteria evaluation (MCE) combined with fuzzy standardization and the simple additive weighting (SAW) (Eastman, 2003) in a GIS environment. The methodology presented herein evaluates the entire study area using a common grading scale, i.e., 0 to 100 byte grading value, where 0 values a site fully unsuitable for rural building integration while 100 values a site optimum for its integration. Evaluation criteria identify a spatial data treatment with a grading system

based on physical, visual, economical, social, and environmental aspects. In addition, the utilization of sophisticated spatial statistics methods is an innovation in the rural building siting process, giving some efforts in the analysis of the results, showing the tools provided by GIS and spatial statistics are very important. Finally, it ends indicating how the study is based on and developed from existing knowledge as well as presents the specific aims of the study.

3 SITING METHODOLOGY

A substantial multi-disciplinary evaluation process with multiple sets of criteria is required to identify the best available location or locations for a new rural building siting, the final goal of the present work. The research procedures are as follows:

- A digital geographical information system (GIS) database development which incorporates all spatial information;
- The evaluation criteria determination and hierarchical multi criteria structure formation;
- Determination of the relative importance weights of the criteria and sub-criteria by applying the analytic hierarchy process (AHP) method. By comparing pairs of criteria, decision makers can quantify their opinions about the criteria's magnitude;
- Aggregation of the criteria weights and attribute values to yield suitability scores of the areas; and
- A spatial clustering process implementation to represent the suitable areas.

The methodology presented here did not perform a primary screening, initially excluding unsuitable areas, and the whole region was evaluated for rural building siting. The methodology presented here did not exclude unsuitable areas called as a primary screening. The entire study region was evaluated for integration of rural buildings and their landscapes. The methodology, therefore, resulted as the land evaluation based on the suitability indexes. In a certain attribute map, the suitability grade assignment for every class is carried out in the ArcGIS software. In the study case area of Hervás (Spain), the suitability index is assessed as to use the simple additive weighting (SAW). This method is a widely utilized one to calculate the final grading values in multiple-criteria problems; Eq. (1) describes the mathematic formulation (Yoon and Hwang, 1995):

$$V_i = \sum_{j=1}^{n} w_j v_{ij} \quad (1)$$

where V_i is the suitability index for area i, w_j is the relative importance weight of criterion j, v_{ij} is the grading value of area i under criterion j, n is the total number of criteria.

3.1 Background information

Hervás, the proposed study area, has an area of 60 km2 located in the Ambroz Valley region of the northern Cáceres province (Extremadura) on the border of the Salamanca province (Castilla y León) and in the foothills of the Béjar and Gredos Sierra as shown in Fig. 1. Hervás is one of 8 municipalities in the Ambroz Valley region: Abadía, Aldeanueva del Camino, Baños de Montemayor, Casas del Monte, La Garganta, Gargantilla, Hervás, and Segura de Toro. In this region, deciduous forests, the outstanding species, with the chestnut tree is predominated. It gives an important nucleus of chestnut product companies. Also, water sources are very essential resources for both agrarian and leisure activities which attract touristic visitors (Jeong et al., 2011).

During 18th and 19th century, the traditional wood working and crafts was the most significant income source of this area. From the fifties to eighties, the abandonment, an enormous emigration to the cities, happened in this study area. In the early nineties, the introduction of several European initiatives in Extremadura occurred to change this region for the sustainable rural development (LEADER and PRODER projects). During the last decades, rural buildings' developments due to the holiday residences' growths and its natural environments has increased for tourist activities. These do, however, cause their consequent impacts. As some researchers have already described, the continuing development in urban and rural environments has caused substantial changes to land use which are reflected in the loss of traditional landscapes (Tassinari et al., 2008). In a very short period, it has resulted in the destabilization of the nature due to the accelerated land use changes associated with tourism and urbanisation. The recent response for the

current situation (LESOTEX, Law 15/2001 of land and landscape planning of Extremadura) cannot give the proper answer for this situation yet.

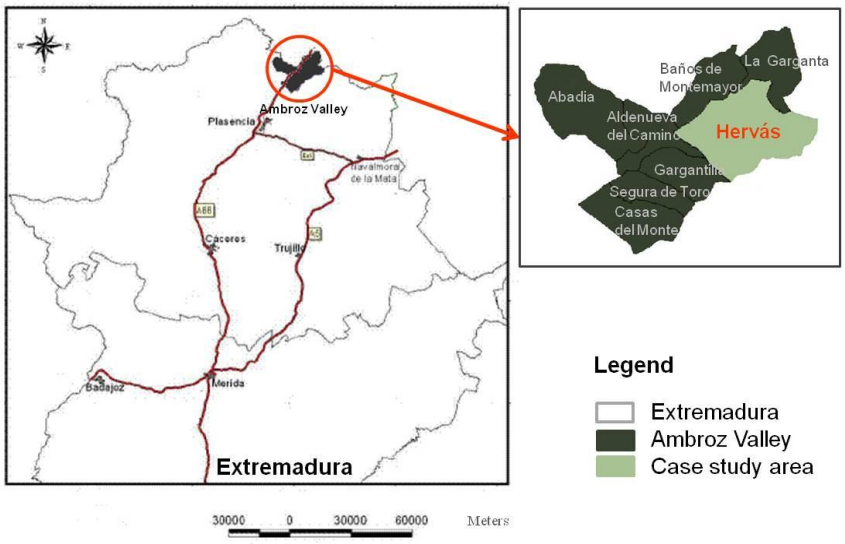

Fig. 1: The study area across Hervás (Extremadura province), Spain.

3.2 Identification of the decision-making criteria

The evaluation criteria used in this paper are classified into five main groups, as depicted in Fig. 2, namely physical, visual, environmental, social and economic criteria. The hierarchical structure of decision process consists of four levels: first level shows the main goal, rural building suitability; second level represents criteria which support the main goal; third level is subcriteria of each criterion; fourth level demonstrates the spatial attributes of each subcriterion. Fourteen factors are involved in the computation process, distinguished in five main groups according to the way they influence rural building integration to their landscapes. All criteria in the 5 groups are quantified in a common scale, i.e., 0 to 100 byte grading value. Each of these grid cells reveals a single site-sized land parcel for the purposes of further analysis. The grading value 0 is assigned to the least suitable areas and 100 to the most suitable ones, transforming the different measurement units of the factor images into comparable suitability values.

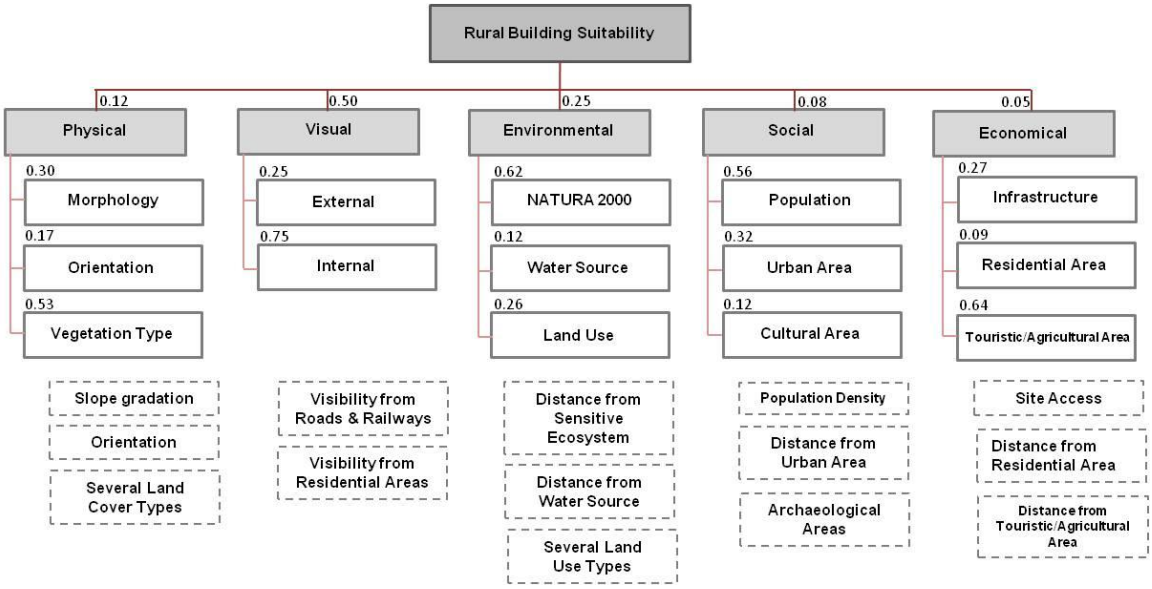

Fig. 2: Hierarchical structure of decision evaluation problem.

The following five criteria involved the computation process and selected on the relevant literatures, regional polices and European Union (EU) directives and described each issue are analyzed:

- Physical criteria: this category has three subcriteira, morphology; orientation; vegetation type.
- Visual criteria: this category has two subcriteria, external visibility; internal visibility.

- Environmental criteria: this category has three subcriteria, presence of sensitive ecosystem following European commission regulation for nature & biodiversity policy (NATURA 2000); presence of water source; land type.
- Social criteria: this category has three subcriteria, population density; proximity to urban area; proximity to cultural area.
- Economical criteria: this category has three subcriteria, site access; proximity to residential area; proximity to touristic and agricultural area.

3.3 Standardizing map layers

With a number of different approaches, the multi-criteria evaluation (MCE) has the need of the values included the criterion and subcriterion map layers and can be transformed to comparable units. Criterion and subcritieron maps can be classified on the basis of the types of available information for map construction. This classification is related to the distinction between deterministic decisions and uncertain decisions (Malczewski, 1999). Fuzzy functions can standardize map layers in GIS and evaluate the possibility of each pixel belonging to a fuzzy set by evaluating any of a series of fuzzy set membership functions. To apply fuzzy functions in the GIS environment in this case study, all the map layers are digitized or imported and converted to a raster format with 10m pixel size.

In this process, sigmoidal, also called as s-shaped, fuzzy membership functions are used and specified for each factor. The sigmoidal membership function is the most commonly used function in fuzzy set theory (Eastman 2003), offering a gradual variation from non-membership, i.e., 0, to complete membership, i.e., 1. The sigmoidal membership function can be specified by four parameters (a, membership rises above 0; b, membership becomes 1; c, membership falls below 1; d, membership becomes 0) as shown in Fig. 3.

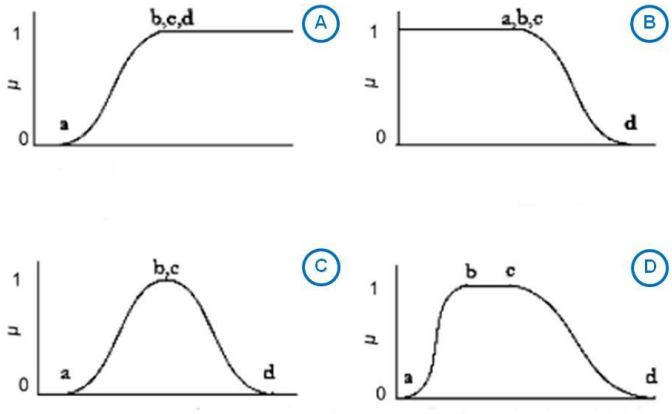

Fig. 3: The Sigmoidal fuzzy membership functions (A-monotonically increasing, B-monotonically decreasing, C and D-symmetric curves).

3.4 Evaluation of land suitability

The AHP method proposed by Saaty (1996) is an effective approach to extract the relative importance weights of the criteria in a specified decision making problem. One of the most important steps in any multiple criteria problem is the accurate estimation of the pertinent data. Although qualitative information about the criterion importance can be found, it is difficult to quantify it correctly. The AHP has steps including specifying the hierarchical structure, determining the relative importance weights of the criteria and sub-criteria, assigning preferred weights of each alternative and determining the final score (Fig.2).

The next stage is to specify the relative importance weights of the criteria and sub-criteria through pair-wise comparison. The AHP is based on pair-wise comparisons, which are used to determine the relative importance of each criterion as shown in Table 1. By comparing pairs of criteria at a time and using a verbal scale, decision makers can quantify their opinions about the criteria's magnitude.

Intensity of importance	Definition
1	Equal importance or preference
2	Equal to moderate importance or preference

3	Moderate importance or preference
4	Moderate to strong importance or preference
5	Strong importance or preference
6	Strong to very strong importance or preference
7	Very strong importance or preference
8	Very to extremely strong importance or preference
9	Extreme importance or preference

Table 1: Various states for pair-wise comparison and their numerical rates.

The pair-wise comparison matrix (PCM) formed by the decision makers in the previous step must obey the following attributes, $a_{ii} = 1$ and $a_{ij} = 1/a_{ji}$. The next step is the calculation of the criteria's relative importance weights implied by the previous comparisons. Saaty (1996) proposes the estimation of the right principal eigenvector of the PCM which can be approximated using the geometric mean of each row of the PCM. This mode is known as multiplicative AHP (Saaty and Millet, 2000) and was used in the present work. The calculated geometric means are then normalized and the relative importance weights are extracted as shown in Fig. 4. The AHP method allows slightly non-consistent pair-wise comparisons. If the PCM is perfectly consistent, then $a_{ij} = a_{ik} * a_{kj}$ for all possible combinations of comparisons in the PCM. It is rare to have a perfectly consistent PCM. The AHP method includes an index called consistency ratio (CR) that indicates the overall consistency of the PCM. According to Saaty (1996), the CR should have a value of less than 10%, indicating consistency of the matrix.

	1	2	3	4	5	W
1	1					.12
2	5	1				.50
3	3	1/3	1			.25
4	1/2	1/5	1/3	1		.08
5	1/3	1/7	1/5	1/2	1	.05
					C.R.	.03

Fig. 4: Sample calculation of preference weights in relation to the criteria (1 (Physical), 2 (Visual), 3 (Environmental), 4 (Social), and 5 (Economical)).

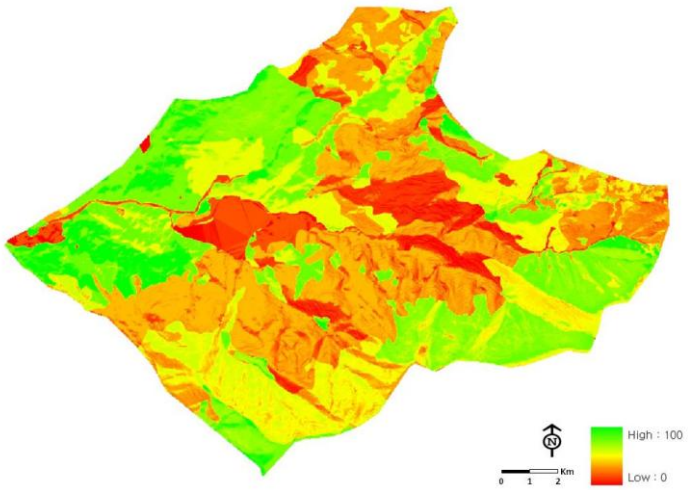

Fig. 5: Standardized suitability map of physical criteria combined with morphology, orientation and vegetation type factor.

The next step in the presented methodology is the application of the SAW method, shown in Eq. (1). Evaluation criteria were combined in a grid that contains all grades calculated from each of the separate grids (Fig. 5). The grading values for each evaluation criterion are included in the complex grid at the appropriate attribute field. The relative importance weights of the evaluation criteria are calculated by using the PCM matrix. The suitability index is computed by using the SAW method.

4 CONCLUSIONS

The methodology described in the present paper is an efficient approach in a rural building siting process considering its landscape. The methodology combines the evaluation abilities of multi-critera evaluation (MCE) methods and analytical tools of geographical information system (GIS). The MCE was utilized to form the siting problem into a decision structure of three hierarchical levels, namely, the goal (suitability), evaluation criteria/subcriteria and spatial attributes. The evaluation criteria were developed according to the relevant literatures, regional polices and EU directives. The AHP method was utilized to extract the relative importance weights of the evaluation criteria and the SAW method is utilized to calculate the suitability indexes, in order to solve the rural building integration problem with its landscape.

Future studies will be conducted in order to analyze the five intermediate suitability maps and then to combine these maps in the final composite suitability map for the rural building siting with its landscape. Thus, several updates could be performed in the methodology, the scene in which the rural building will be set needs to be investigated and analyzed so as to consider the visual elements of the scene that characterize the landscape in terms of number of stakeholder interests represented after selected a proposed location using this methodology (García et al., 2006) and various multiple criteria analysis methods such as compromise programming (Zeleny, 1982). The final decision regarding optimal sites will be based on social and political will. However, an integrated spatial decision support system, based on the methodology described in the present work, can be very useful in the final decision. It must be noted that the presented methodology is only a tool to help decision- makers but is not the decision itself.

5 ACKNOWLEDGEMENTS

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Addressing Environmental Problems in the Coastal Urban Area of Attica

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1 ABSTRACT

Nowadays a large proportion of the population lives in coastal urban areas. These areas face different environmental problems that degrade the natural and cultural resources. This leads to degradation of the quality of life of residents and threatens the viability of these areas.

This paper refers to the coastal urban area of Attica from the Bay of Faliro to the area of Vouliagmeni, which has witnessed great development in recent decades. The research focuses on how areas have developed, on local problems, as well as on the policies and measures that have been implemented until now for their protection of and upgrading.

The results show that the region faces a great number of environmental problems. Moreover, the public works that have been carried out in recent years have improved the overall situation and to some extent the quality of life of residents as well. However, further measures concerning land uses, exploitation of existing infrastructure and protection of the natural resources of the area, are necessary.

2 INTRODUCTION

Nowadays, it is a reality that there is an absolute relationship between the quality of life and the environment and the way that cities are shaped as well as the way they work (European Commission, 2007).

Changes in lifestyle, increasing dependence on cars, increasing per capita resource use, demographic changes, the increase in the number of households, the need for greater consumption of products, and others, are the main causes of environmental problems cities are facing today.

Some of the basic problems that cities are facing, are the poor quality of the built environment, derelict land, greenhouse gas emissions, urban sprawl, traffic congestion, noise pollution, degradation of air quality, creation of solid and wastewater.

However, the quality of life in urban areas depends additionally on the natural and cultural heritage, public spaces and the existing architectural heritage (buildings, traditional areas and other.) (Commission of the European Communities, 1997).

These environmental problems occur in most urban areas, but with different intensity. For example, the green spaces offered in the cities of Hanover, at Evora, and Brussels are more than 20% of their respective surfaces, while in the cities of Rotterdam and Madrid the percentage of green areas is 5% or less. At the same time, urban areas are more vulnerable to floods, heat and lack of water.

Nowadays the European Commission is promoting a set of indicators that could be used to collect data necessary for monitoring and evaluating the strategy for the urban environment. Thus, reports on the situation of the urban environment must cover the main environmental sectors (air, water, waste, noise, biodiversity), the priority areas of the thematic strategy (management, transport, design, construction) and finally issues related with the life and health standards.

3 METHODOLOGY

In order to carry out this research, in the coastal urban area of Faliro Bay, up to the Municipal District of Vouliagmeni, an evaluation of the status quo initially took place. At first we researched the mode of development of the coastal zone and its significance. Afterwards, the research focused on the urban environment and an attempt to evaluate the situation through indicators took place. Furthermore, a research in situ and interviews with relevant staff of the municipalities to identify problems, followed. Finally, an evaluation of the results took place and guidance on the sustainable development of the area and the addressing of environmental problems was provided.

4 CASE STUDY

As a search area the coastal urban area of Athens from the Faliro Bay until the area of Vouliagmeni is selected. The southern and western part includes the sandy beaches while the eastern area is limited by the Mount of Hymettus, which is crossed by small streams. The Northern area is bordering with the urban area of Athens. Kifissos and Ilissos rivers flow to the coastal marine zone. At the estuary of these rivers dunes and marshlands have formed. The climate of the area is temperate and Mediterranean.

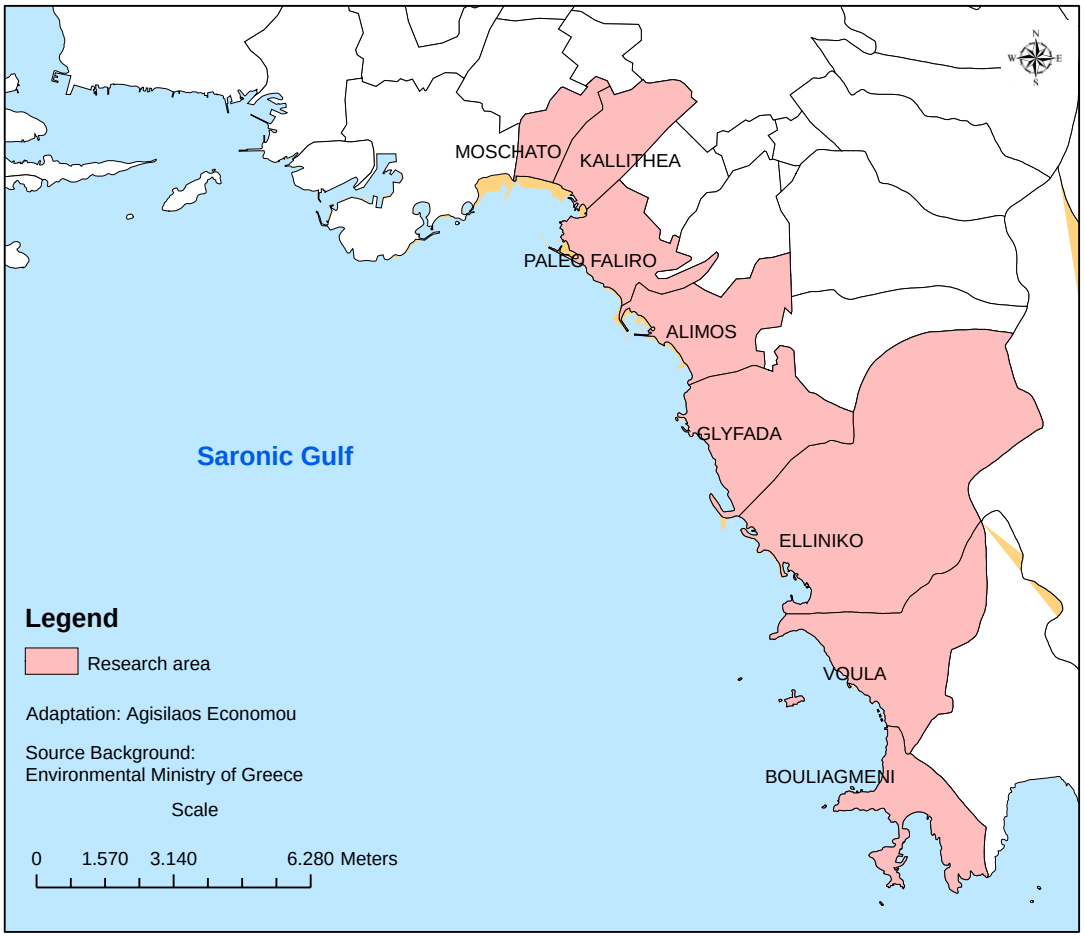

Fig.1:Map. Study area in the coastal urban area

The importance of the area

The region has important natural environment

- A significant variety of avifauna and fauna in the areas of the Delta of Ilisos and Kifissos
- The Delta of Ilissos river belongs to the list of important habitats in the Greek CORINE. While the avifauna is included in Annex I to Directive 79/409 EEC.
- In the area there are plant species that belong to the Natura list . For example, in the area of St. Kosmas the most important species are the Populus alba, eucalyptus, Tamarix sp., Pinus pinea, Cupressus seprervirens, palanus x hybrida), Olea europea, acacia (Albizia julbrissin), oleander (Neriym oleander), angelica (Pittosporum tobira), rosemary (Rosmarinuw officinalis). There are also shrubs (Viburnum, Ligustrum) (http://www.filotis.itia.ntua.gr).
- The coastal area of the Saronic Gulf presents a remarkable benthic ecosystem. Specifically, in the area of Agios Kosmas, there are Reefs (Natura code 11.70, CORINE code 11.2). Fotofilon algal biocoenosis. Species of green algae, brown algae and red algae. Underwater meadows of Posidonia (Natura code 11.20, Corine code 11.34) (Hellenic Centre for Marina Research, 1999)
- In addition to that , the study area has historical and cultural value. The specific coastal area was inhabited from the Bronze Age. In the point of St. Cosmas remarkable ruins of the Early Helladic and the late Helladic settlement, the Artemis Temple and necropolis of the Early Helladic years have

been found. There was also a monastery, dedicated to the namesake saint. In the area of Vouliagmeni there is the temple of Apollo Zoster.

- At the same time there are remarkable monuments of nature such as the Lake of Vouliagmeni.
- The coastal area has sandy beaches used for swimming.

Development physiognomy

The coastal region from the Faliro Bay to Vouliagmeni, over the last few decades has shown large populations and residential development. The good weather condintions of the coastal area, the short distance from the center of Athens, the existence of a waterfront offering recreational opportunities, the search of the people of Athens for a higher quality of life in suburban areas, favored the development of this coastal area.

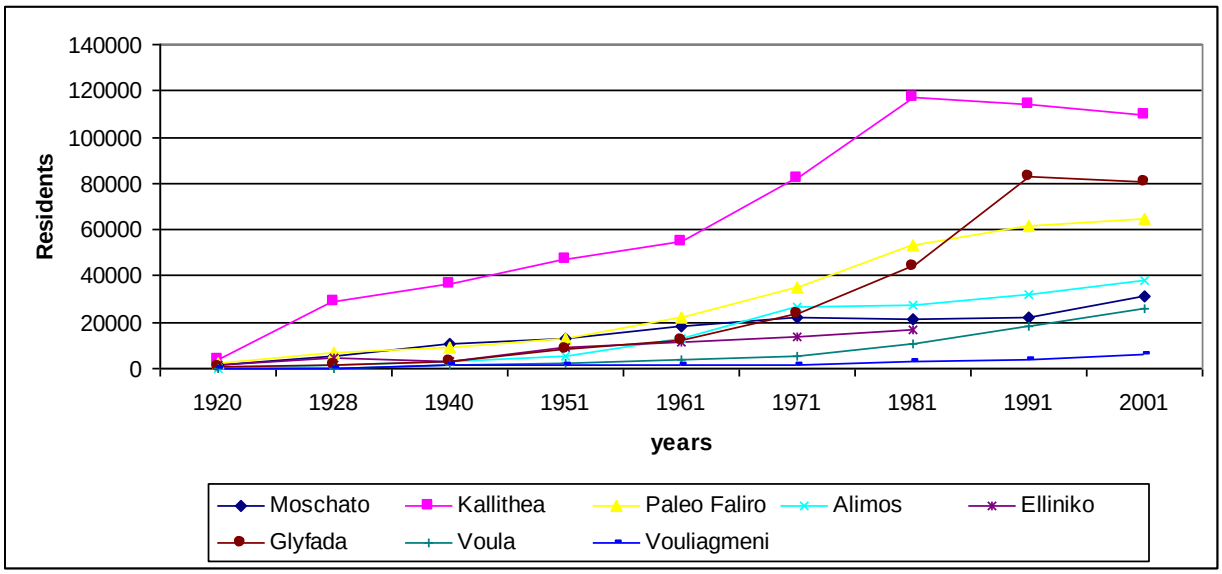

Fig. 2: Population in the coastal area of Attica at time interval 1920 - 2001 (Source: National Statitistical Service of Greece, 2002)

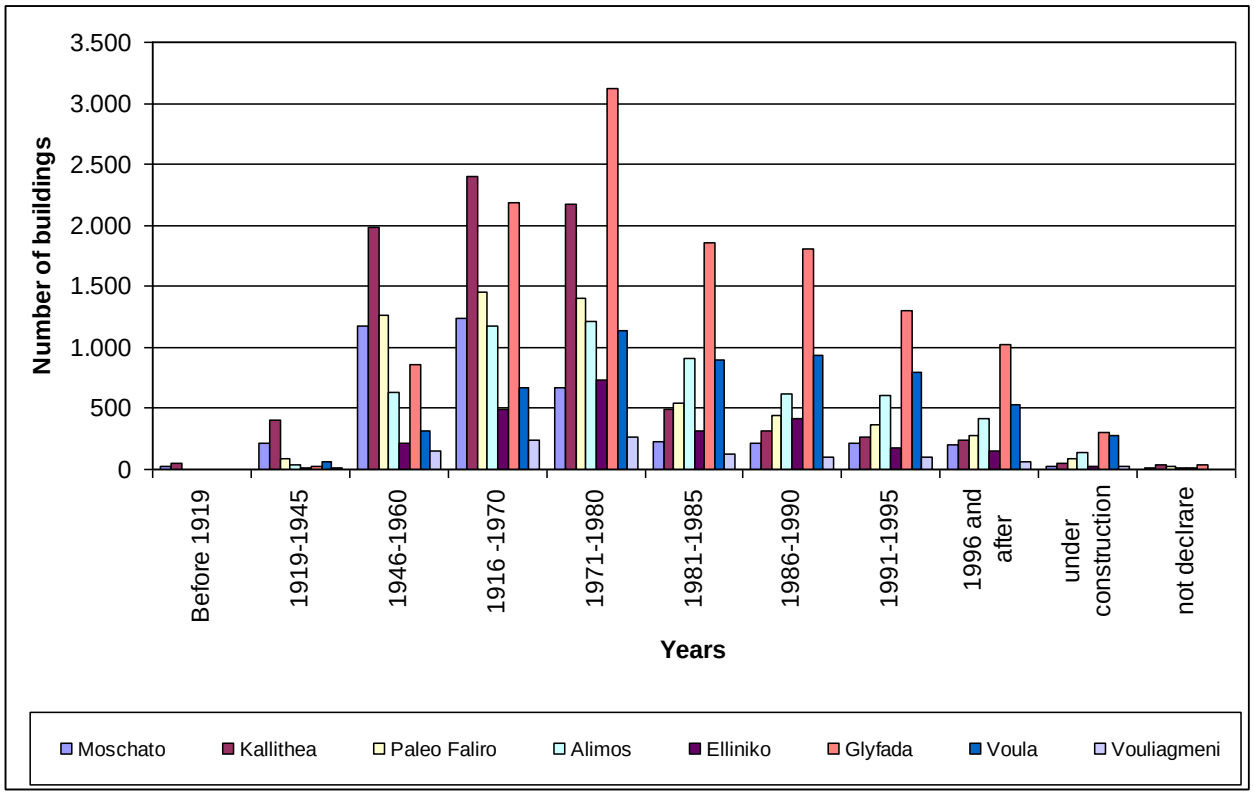

Fig. 3: Residential development in the coastal urban area of Attica at time interval 1919 - 1996 (Source: National Statitistical Service of Greece, 2002a)

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This large population and residential growth (Fig. 1 & Fig.2) has been accompanied by the need for more services resulting in the further development of the area. Also, the area was upgraded by the Olympic projects that were constructed in recent years in order to facilitate the Olympic Games.

Thus, on the one hand they enhance the sporting infrastructure and on the other hand they have lead to the construction of road works for their service. For example, the construction of the interchange in Kifissia and the elevated highway of Kifisos, are projects that have facilitated the traffic in that direction.

At the same time, there have been many redevelopment projects to improve the natural environment. However, today the area is facing many problems that have degraded the natural resources and the quality of life.

Coastal area land use regulations

During the development of coastal areas, legislative regulations have been issued to determine land use and to constrain construction in order to protect these areas. Thus, land use and building conditions are set by the Presidential Decree 28.9.1993 (Official journal of the Helenic Republic, 1993), which is part of the wider legislative framework that is set by the Master Plan of Athens (Law 1515/1985) (Official journal of the Helenic Republic, 1985) and subsequent amendments of the law 2052/1992 (Official journal of the Helenic Republic, 1992).

Within the framework set by the directions and objectives of the Master Plan, the General Urban Planning Designs for the symmetric development of urban municipalities , in their entire surface, were created.

Despite the land use planning, coastal areas have faced many problems, which resulted in new laws to regulate land use (Presidential Degree 254). As we will analyze below, despite the above mentioned land use regulations, there are many prombles.

Urban environment and quality of life

Taking into account the area of the municipalities, the population and land uses, it is clear that that the municipalities of the study area present varying degrees of quality of life.

To assess the quality of life of residents some factors such as the proportion of green, open spaces and sports facilities per capita were taken into account.

Coastal area	Vegetation (green area) %	Sp.m./inhabitant	Open spaces -parking places %	Sp.m./inhabitant
Moschato	3.16	1.57	9.18	6.51
Kallithea	4.24	0.75	12.39	1.85
Paleo Faliro	8.08	4.09	5.14	3.25
Alimos	10.51	2.79	5.10	0.0
Elliniko	13.89	18.06	62.28	22.22
Glyfada	8.30	2.69	3.40	2.65
Voula	12.55	10.837	2.62	0.0
Vouliagmeni	21.61+5.79	138.68	3.10	27.66

Table 1: The proportion of green, open spaces in the coastal area.

The search shows that the area of Vouliagmeni occupies the largest green areas 21.61%, followed by Voula with 12.55%, Elliniko (13.89%), Glyfada (8.30%), Faliro (8.08%), Kalithea (4.24%) and Moschato (3.16%). Taking into account the ratio of green space per inhabitant it is found that the areas of Vouliagmeni, Ellhniko and Voula have rates > 10 sq.m. / Inhabitan, in contrast to other areas with smaller ratios.

Regarding the ratio of open space / resident, it is noted that the areas of Vouliagmeni and Elliniko due to the former airport, are showing high rates of approximately27.66 sq.m. / inhabitant and 22.22 sq.m. / inhabitant respectively.

With regard to sports facilities, the areas showing significant sporting infrastructure are, the area of Paleo Faliro, Elliniko and Alimos due to Olympic construction projects in the area. Thus, the proportion of sports facilities is 0.52 sq.m. / Inhabitant (Faliro), 5.68 sq.m. / Inhabitant (Alimos), 4.30 sq.m. / Inhabitant (Helliniko) and 4.82 sq.m. / Inhabitant (Voula) and 1.16 sq.m. / inhabitant (Vouliagmeni).

Taking into account the waterfront, the areas with beaches for swimming are Faliro, Alimos, Elliniko, Glyfada, Voula and Vouliagmeni. Specifically:

Coastal area	Area of beaches	Sq.m / inhabitant
Moschato	-	
Kallithea	-	
Paleo Faliro	30199.65	0.47
Alimos	30245.78	0.79
Elliniko	27222.33	1.63
Glyfada	33199.6	0.41
Voula	39802.87	1.56
Vouliagmeni	42528.26	6.60

Table 2: Area of beaches in the coasta area

The areas which have a waterfront but do not have beaches for swimming are the areas of Moschato and Kallithea. In contrast, other areas have sandy beaches, which attract not only local residents for recreation and swimming, but bathers from the entire basin of Athens.

The marine area is protected from pollution due to its connection with the tertiary treatment sewerage system sewage treatment plants, at Psitalia. At the same time, the implementation of recycling programs (Paleo Faliro, Kallithea, Alimos) and the use of natural gas, reduce the environmental impact of pollutants and protect natural resources.

Generally, in the coastal urban area there are no abandoned sites. On the contrary, open spaces for commercial use and new green areas are sought.

5 ENVIRONMENTS PROBLEMS

The survey showed that coastal municipalities face many environmental problems that degrade the standard level of life. Mainly, the problems are related to land use, intensity, and to the policies followed by local authorities to develop and protect the area.

Many of them are common to two or more municipalities and can be addressed via commons actions and policies. Based on interviews with relevant staff of the municipalities, it was found that the most common problems faced by coastal municipalities are:

- Cutting the coastal zone of the urban fabric due to the coastal road and parallel construction along the beach.
- Noise pollution from heavy traffic on the coastal road . Measures that should have been taken to levels of noise have not been implemented at all or have been only partially implemented. This has as a result, an increase in the level of noise levels above the allowable limits, making life unbearable for people as well as an increase of health hazards.
- Noise from the operation of nightclubs in the coastal zone. (Alimos, Glyfada, Elliniko)
- Problems of accessibility to the beach for the residents
- Increased traffic on the coastal avenue, due to the link between urban areas in the urban area of Athens and the southern suburbs.
- Lack of parking.
- Air pollution by NO_2 due to heavy traffic.
- Degradation of the urban environment due to increased construction. To the ncreased construction, the law of compensation which took place in 1970 has contributed to a large extent.
- Not all the projects mentioned in development studies are realized due to time constraints and inadequate funding.
- Non-implementation of Presidential Decree 254 (Official journal of the Helenic Republic, 2004) on land uses outside the areas of Alimos and Paleo Faliro.

- Lack of green space in areas presenting low rates compared compared to the total area of the municipality.
- Rainwater management problems in Glyfada, Alimos, Faliro and Muschato.
- Problems with parking on commercial streets and the central squares of the municipalities of Paleo Faliro and Glyfada.
- The region of Elliniko faces many problems of land uses. There are incompatible land uses on the beach and the center of the municipality. Generally, in the area there is a fragmentation of space. Today there is a concern for the management of the area of the former airport of Ellhniko. Its management involves many agencies whith large parts of the airport belonging to Alimos and Glyfada.
- In the area of Voula there are strong pressures to develop commercial uses along the Athens - Poseidon Avenue.
- The coastal area is faced with problems of pollution in the estuaries of the Kifissos and Ilissos rivers, because of illegal household waste dumping.

6 MEASURES TO ADDRESS ENVIRONMENTAL PROBLEMS

The problems of coastal areas mentioned above are related to the intensity of land uses.

The plans of the municipalities are to conduct studies to link the seafront with the rest of the urban fabric. These studies refer mainly to subways for the areas of Paleo Faliro, Kallithea and Alimos.

Also in the plans of the municipalities are to conduct studies to address the problems faced by some areas

Many of the problems require common actions. For example, facing the pollution of the streams marine area, requires coordination on behalf of the Municipalities that these streams across.

Many strains of land use in coastal areas, may be addressed by imposing more stringent conditions to limit the urbanization of coastal areas and to remove activities from the already burdened areas.

In areas with future development plans such as the area of the old airport in Elliniko, the new land uses will play a key role in upgrading the area. Here, we need proper planning so that new activities do not cause land use intensification and degradation of neighboring areas.

Many problems such as the reduction of green areas, the non-application of the Presidential Degree to regulate land uses, should be addressed directly by the municipalities. The implementation of the Presidential Decree which regulates land uses in the coastal front, as well as a review of the general urban plans in areas with acute problems are necessary. The design should follow the principles of sustainable development and the respect the characteristics of this sensitive coastal area.

Regarding the protection of natural resources, it is found that recycling programs are not implement by all municipalities. Even those who apply recycling, only do so at a percentage of 20%, for the municipalities of Paleo Faliro Kallithea and Alimos.

7 CONCLUSION

The research showed that the coastal area faces many problems caused not only by the intensity of land uses but also by the policies which have been implemented for the organization and function of the area.

The projects which have taken place in the coastal area have upgraded the area to an extent and on the other hand, have caused environmental problems due to non implementation of existing studies for the protection of the environment . The area has a need for new interventions and new infrastructure projects that will face the environmental problems which are mentioned above.Natural resources should be preserved and protected, because further deterioration will have as a result the reduction of the residents' quality of life.

The efforts should focus on increasing the green areas, regulating traffic problems, adjusting land use, implementing legal provisions for the regulation of land use as well as on the expansion of protected areas.

Also it is clear that the coastal area of the bay from Phaleron to Vouliagmeni, has a potential for further development and utilization of open spaces. The good cooperation between municipalities and the active participation of local residents is necessary.

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🏆 *reviewed paper*

An Exploration of Efficiency and Influencing Factors of Low Carbon City

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1 ABSTRACT

Recent years due to global environmental change, environmental protection and carbon dioxide reduction have become urgent issues. At the same time, it is also required to ensure the maintenance of urban economic activities and human life. The priority of economic development and environmental protection has caused much controversy. The tradeoff between economy and environment implies the concept of urban efficiency. And this corresponds to the viewpoint of low carbon economy:"the least carbon emission in exchange for the largest urban benefits".

Therefore, this paper takes the concept of eco-efficiency to simulate the process that a city consumes natural resources in exchange for social and economic development, and adopts Data Envelopment Analysis as a tool to analyze the urban efficiency performance and the factors of urban efficiency. First, this paper assesses urban development efficiency of Taiwan cities and counties, and analyzes the room for improvement of inputs and outputs. Second, this paper explores the influential factors of urban efficiency and the effects of these factors. Final result is expected to provide a reference to low carbon strategies of Taiwan cities and counties, and it will be helpful to future urban management, so that cities will develop towards low carbon economy and achieve the goal of sustainable development.

2 INTRODUCTION

In the face of global environmental change, carbon dioxide reduction is an urgent issue. However, a city can't sustain the basic needs of urban development by only considering for the environment. It is also required to ensure the maintenance of urban economic activities and human life.

Therefore, how to consume the least environmental resources while improving the effectiveness of urban development, so that the use of environmental resources will be more efficient under the condition of limited resources is an important issue. And this issue corresponds to the viewpoint of low carbon economy: "the least carbon emission in exchange for the largest urban benefits".

In view of this, this paper explores the impacts on the environment during the period of urban development from the viewpoint of low carbon economy, and measures the status of urban development by the evaluation of urban efficiency. Furthermore, this paper tries to construct an evaluation method of sustainable urban development in order to providing the reference of the future urban management.

3 RELATED THEORIES

3.1 Low Carbon Economy

British Government announced "Energy White Paper" in which the "low carbon economy" was first proposed in 2003. It points out that low carbon economy is to obtain more economic outputs through less consumption of natural resources and environmental pollution to create the opportunities of better quality of life.

Low carbon economy contains "low carbon" and "economy". "Low carbon" means that we must minimize or stop the dependence on carbon-based fuels in economic development; "economy" means that we should maintain the stability and sustainability of economic growth while achieving the transformation of the energy.

Low carbon economy suits the main points of sustainable development, and it could essentially show that economic growth is towards the direction of sustainable development or not. Furthermore, low carbon economy is easier to monitor and to measure the progress of sustainable development than "clean production", "green economy" and "ecological economy".

3.2 Low Carbon City

Cities are the major sources of carbon dioxide emissions, and the critical locations where emissions can be effectively managed. Adopting low carbon urban development model is the pathway towards reducing the emissions(Stanley C.T.YIP, 2010).

The core of low carbon city is low carbon economy, which intends to get more economic outputs through less consumption of natural resources and environmental pollution, and achieves better quality of life. Low carbon city development is aimed at achieving an ecological economic mode of low consumption, low pollution, high performance and high efficiency, so that we would get more economic and social benefits relatively through consuming fewer natural resources.

In the face of the trade-off between environmental protection and socio-economic development, low carbon city is the response to climate change issues with its emphasis on protecting the environment while ensuring the social and economic development. The concept of low carbon economy and low carbon city is put forward under the background that all people over the world is taking action to deal with climate change. Low carbon economy is the trend and the construction of low carbon city is necessary for future development.

3.3 Urban Development Efficiency

In the beginning, urban development efficiency was mainly used to assess the administrative efficiency of organizational performance and planning policy. And then, urban development efficiency was used to evaluate the urban efficiency by labor, income or expenditure. Later it gradually transferred to the study of the environmental and economic aspects.

Schaltegger and Sturm proposed the concept of eco-efficiency in 1990 (Schaltegger, S. and Sturm, A., 1990), and defined it as the ratio of the environmental impact and the value. "Eco-" is the prefix of economical and ecological. The original intent of eco-efficiency includes both economic and ecological benefits. World Business Council for Sustainable Development (WBCSD) has developed the following equation, which merges value and ecological aspects into an efficiency ratio:

$$\text{Eco} - \text{efficiency} = \frac{\text{Product or service value}}{\text{Environmental influence}}$$

Whitford et al (Whitford, V., Ennos, A. R. and Handley, J. F., 2001) and De Koeijer et al (De Koeijer et al., 2003) applied the concept of eco-efficiency in the urban development efficiency. They thought that we should reduce the environmental damage in the urban development process, and improve the efficiency of urban development.

4 METHODOLOGY

This study takes cities and counties in Taiwan as the spatial units, and the research year is 2009. The input of urban efficiency is carbon emissions in a city, including carbon dioxide emissions of residential sector, industrial sector and commercial sector. And the outputs are disposable income and public facilities area, which represent economic and social benefits of a city.

4.1 Calculation of Carbon Emissions

The calculation method of carbon emissions is according to the "sectoral approach" in 2006 IPCC Guidelines for National Greenhouse Gas Inventories. And the energy emission information of Taiwan is from Energy Balance Sheet.

This study calculates the carbon dioxide emissions of industrial sector and commercial sector in every counties and cities by the proportion of number of establishments, and calculates the carbon dioxide emissions of residential sector by the proportion of number of households.

4.2 Data Envelopment Analysis

This study takes cities and counties in Taiwan as the decision making units (DMUs).The inputs of urban development efficiency are: 1.carbon dioxide emissions of the residential sector 2.carbon dioxide emissions of the industrial sector 3.carbon dioxide emissions of the commercial sector. The outputs of urban development efficiency are: 1.disposable income per capita of economic aspect 2.public facilities area per

capita of social aspect. And then this paper conducts data envelopment analysis through DEA-solver software.

Overall Efficiency

It represents the efficiency that carbon dioxide emissions convert to urban development benefits. The value is between 0 and 1. The higher the value, the more efficient the urban development is.

Technical Efficiency

It represents the relative efficiency that compares the urban development benefits of DMUs which have similar degree of environmental loss (inputs of environmental resources). The value is between 0 and 1. And it implies that the inputs are used effectively to get the maxima of outputs or not.

Scale Efficiency

It represents the relative efficiency that compares the status of environmental loss and urban development benefits of one DMU with another DMU which is in optimal scale.

5 ANALYSIS RESULT

5.1 Urban Development Efficiency Analysis

The evaluation results of urban development efficiency could be an initial view of urban status in different counties and cities. According to the performances of the overall efficiency, technical efficiency and scale efficiency of DMUs, we could figure out where the efficiency problem is in different cities.

Figure 1 shows the result of the overall efficiency, technical efficiency and scale efficiency value of Taiwan counties and cities. Because the efficiency of Penghu County and Taitung County is much greater than the other 21 counties and cities, we remove Penghu County and Taitung County from this analysis, so that we will be easier to tell the differences in the remaining DMUs.

Table 1 and Figure 2 shows the result of overall efficiency, technical efficiency and scale efficiency in 21 counties and cities. And Figure 3 shows the result of overall efficiency in Taiwan map. Hsinchu County, Chiayi County, Hualien County, Keelung City, Hsinchu City and Chiayi City whose overall efficiency are 1.0 are efficient cities and counties; Other cities and counties are inefficient.

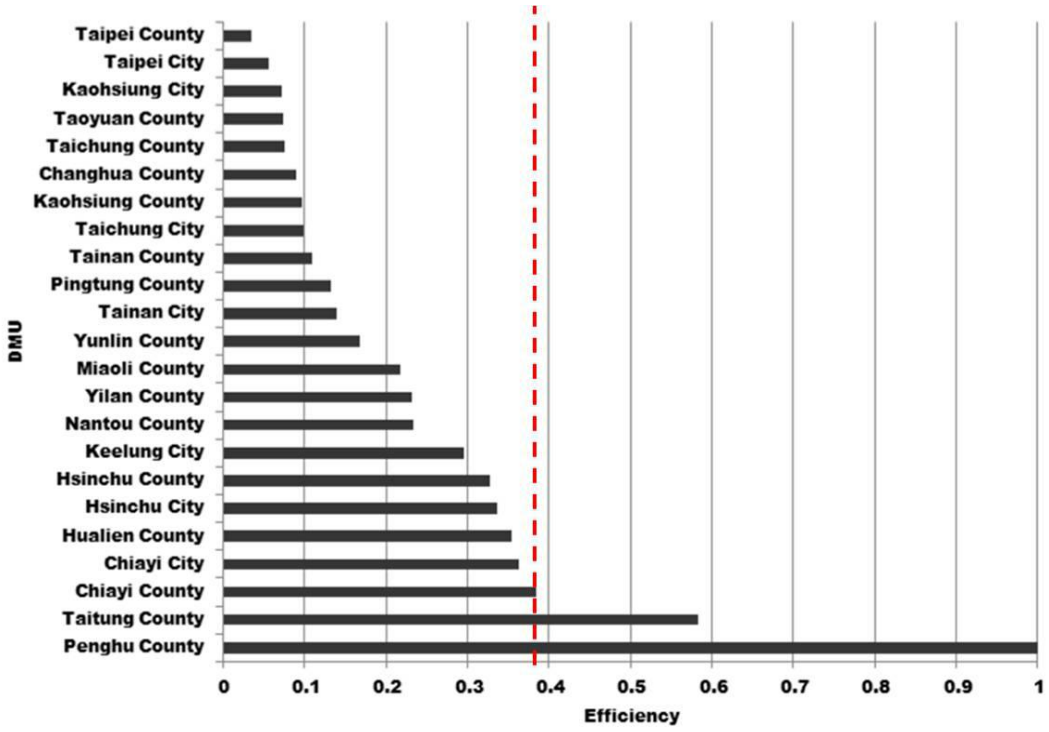

Fig. 1: The results of overall efficiency, technical efficiency and scale efficiency in Taiwan.

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In non-efficient cities and counties, the technical efficiency of Taipei City is 1.0, which shows that the inefficiency is due to "scale inefficiency". Taipei City should change its amount of resources use to improve the efficiency performance. And the reason of other non-efficient cities and counties is mainly from "technical inefficiency", which implies the inputs are not used effectively to reach the output maximization. These cities and counties should maintain the consumption of natural resources, and make further improvements for economic and social policies.

DMU	Overall Efficiency	Technical Efficiency	Scale Efficiency	Reference times
Taipei City	0.2098	1.0000	0.2098	0
Kaohsiung City	0.2337	0.3081	0.7586	0
Taipei County	0.1060	0.1113	0.9519	0
Yilan County	0.7327	0.7909	0.9264	0
Taoyuan County	0.2203	0.2293	0.9605	0
Hsinchu County	1.0000	1.0000	1.0000	8
Miaoli County	0.6801	0.7958	0.8546	0
Taichung County	0.2324	0.2669	0.8707	0
Changhua County	0.2785	0.3364	0.8281	0
Nantou County	0.7742	0.7905	0.9794	0
Yunlin County	0.5543	0.6386	0.8680	0
Chiayi County	1.0000	1.0000	1.0000	1
Tainan County	0.3534	0.3995	0.8845	0
Kaohsiung County	0.3110	0.3312	0.9388	0
Pingtung County	0.4701	0.4924	0.9547	0
Hualien County	1.0000	1.0000	1.0000	11
Keelung City	1.0000	1.0000	1.0000	5
Hsinchu City	1.0000	1.0000	1.0000	11
Taichung City	0.2742	0.2812	0.9754	0
Chiayi City	1.0000	1.0000	1.0000	6
Tainan City	0.4098	0.4258	0.9624	0

Table 1: The result of overall efficiency, technical efficiency scale efficiency and reference times.

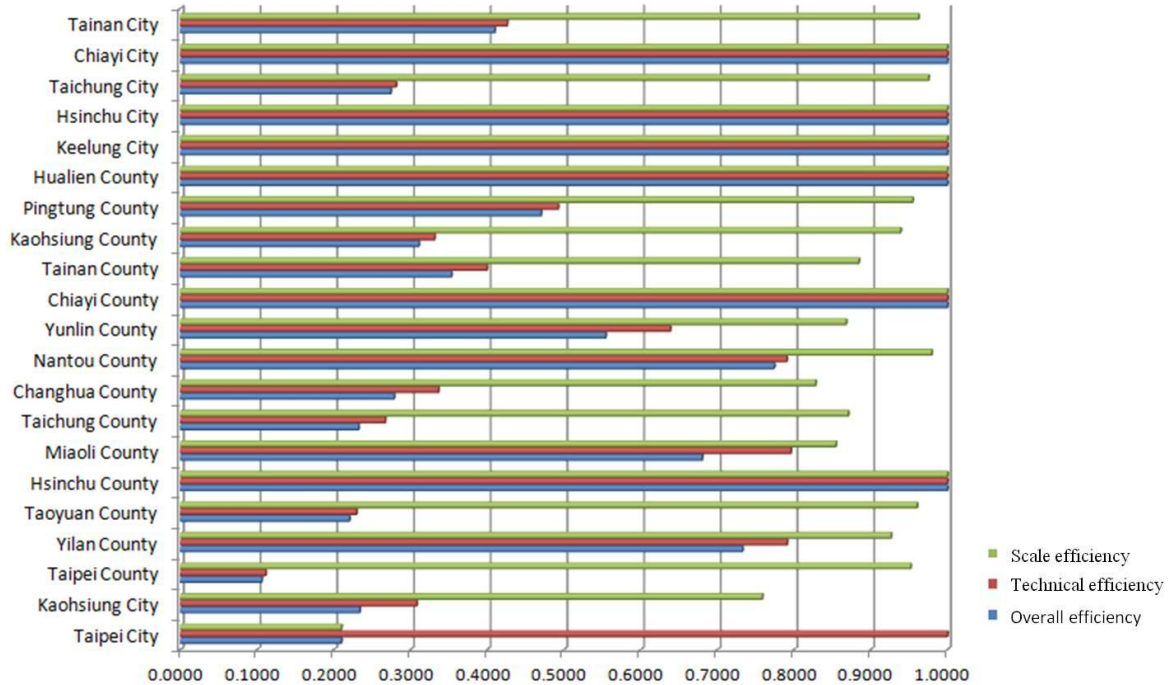

Fig. 2: The result of overall efficiency, technical efficiency and scale efficiency in 21 counties and cities.

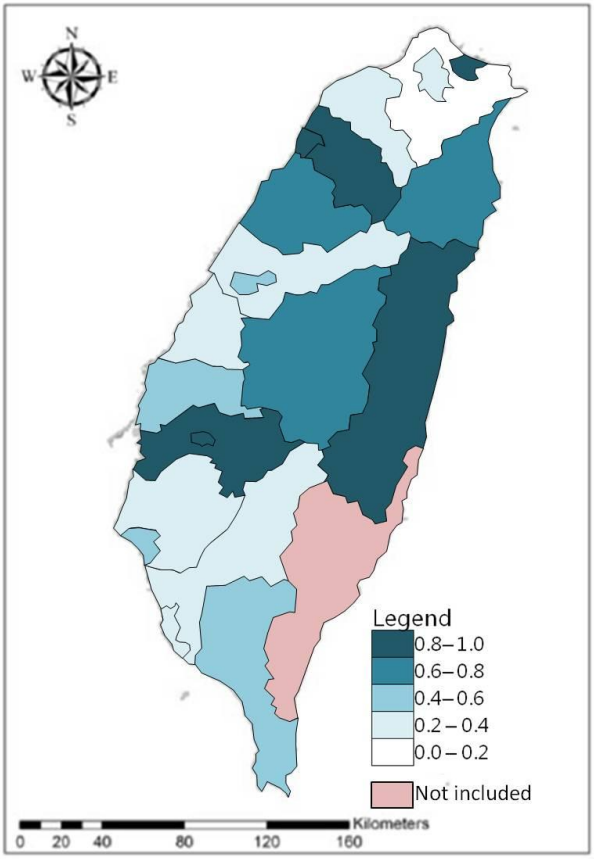

Fig. 3: The result of overall efficiency in Taiwan map.

Norman and Barry (Norman, M., Barry, S., 1991) distinguish four types of efficiency performance: "Robustly Efficient units", "Marginal Efficient Units", "Marginal Inefficient Units" and "Distinctly Inefficient Units". Taiwan counties and cities are classified by these four types as shown in Table 2.

Efficiency type	Description	DMUs
Robustly Efficient Units	The value of overall efficiency, technical efficiency and scale efficiency of the DMUs is 1.0. And the DMUs appear in many reference sets.	Hsinchu County, Hualien County, Keelung City, Hsinchu City, Chiayi City
Marginal Efficient Units	The value of overall efficiency of the DMUs is 1.0. And the reference times of the DMUs is only one or two.	Chiayi County
Marginal Inefficient Units	The value of overall efficiency of the DMUs is between 0.9-1.0. And the DMUs will be relative efficiency by adjusting the inputs and outputs.	-
Distinctly Inefficient Units	The value of overall efficiency of the DMUs is less than 0.9. And the DMUs with overall efficiency less than 0.75 will maintain the inefficient status if there are no big changes in those DMUs.	Nantou County, Yilan County, Miaoli County, Yunlin County, Pingtung County, Tainan City, Tainan County, Kaohsiung County, Changhua County, Taichung City, Kaohsiung City, Taichung County, Taoyuan County, Taipei City, Taipei County

Table 2: Efficiency types of Taiwan counties and cities.

5.2 Slack Variable Analysis

In slack variable analysis, the input variables represent the input volume should be reduced, and the output variables represent the volume should be increased. DMUs will obtain the best efficiency by reducing inputs and increasing outputs. In other words, we could analyze improvement direction and potential improvement

space of urban inputs and outputs in different cities. The result of slack variable analysis are given in Table 3.

Taipei County, Taoyuan County, Taichung County, Nantou County, Yunlin County, Tainan County, Kaohsiung County and Pingtung County could improve their urban development efficiency by reducing carbon dioxide emissions of residential sector. And there are more required improvements in Taipei County, Taoyuan County and Yunlin County. Taipei City and Pingtung County could improve their urban development efficiency by reducing carbon dioxide emissions of commercial sector. And there are ten couties and cities that could improve their urban development efficiency by reducing carbon dioxide emissions of industrial sector. It shows that the carbon dioxide emissions of industrial sector is the main factor to affect the efficiency of urban development in Taiwan.

In addition, there are no couties and cities could improve their urban development efficiency by increasing disposable income. And Taipei City, Kaohsiung City, Taipei County and Taichung City could improve their urban development efficiency by increasing public facilities area per capita.

DMU	Inputs			Outputs	
	CO_2 emissions of residential sector	CO_2 emissions of industrial sector	CO_2 emissions of commercial sector	Disposable income per capita	Public facilities area per capita
Taipei City	0	0	55503.4048	0	46.1747
Kaohsiung City	0	0	0	0	8.2798
Taipei County	21843.5571	482014.1919	0	0	2.0741
Yilan County	0	0	0	0	0
Taoyuan County	14322.1528	292910.5545	0	0	0
Hsinchu County	0	0	0	0	0
Miaoli County	0	35067.2683	0	0	0
Taichung County	4654.8890	1745083.1595	0	0	0
Changhua County	0	1145262.3776	0	0	0
Nantou County	3999.0850	163775.9297	0	0	0
Yunlin County	12607.7986	0	0	0	0
Chiayi County	0	0	0	0	0
Tainan County	6621.0496	541655.8918	0	0	0
Kaohsiung County	1162.1181	234140.7705	0	0	0
Pingtung County	4570.3247	0	1826.7951	0	0
Hualien County	0	0	0	0	0
Keelung City	0	0	0	0	0
Hsinchu City	0	0	0	0	0
Taichung City	0	251773.9167	0	0	9.2942
Chiayi City	0	0	0	0	0
Tainan City	0	260306.7231	0	0	0
Sum	69780.9749	5151990.7836	57330.1999	0	65.8228
Number of DMUs	8	10	2	0	4
Mean	8722.6219	515199.0784	28665.1000	0	16.4557

Table 3: The result of slack variable analysis.

6 CONCLUSION

The tradeoff between economy and environment implies the concept of urban efficiency. This paper tries to explore the environmental impacts of urban development from the viewpoint of low carbon economy, and evaluates the status of urban development by measuring the urban efficiency. And then this paper assesses urban development efficiency of Taiwan cities and counties through data envelopment analysis.

The evaluation results of urban development efficiency could be an initial view of urban status. And then we could analyze potential improvement of urban inputs and outputs by slack variable analysis, so that we could provide suggestions of improvement direction to those cities with poor urban efficiency and set up the different development goals to cities with different urban efficiency.

This paper constructs an evaluation method of sustainable urban development through the evaluation of urban development efficiency from the perspective of carbon efficiency. We could examine that the urban development is towards sustainable development or not by this method. And it will be helpful to future urban management, so that it will achieve the goal of low carbon economy and develop towards sustainable development.

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🏆 *reviewed paper*

Anknüpfungspunkte für Web-2.0- und AR-Instrumente in Verkehrsplanungs- und Beteiligungsprozessen und ihre Umsetzung

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1 ABSTRACT

The paper presents the first results of the project ways2gether which focuses on the reduction of barriers in terms of communication and accessibility in participative planning processes through a specifically adapted tool set. This tool set is based on visualisation techniques through augmented-reality applications (AR) and interactive Web 2.0 tools. This also enables the 3-dimensional presentation and easy modification of planning areas – both online and on site. The paper gives an overview on the state of the art of AR and Web 2.0-tools with regard to (traffic-) planning. The requirements of future user groups of the ways2gether tools are summarised. The use of the ways2gether tools in different phases of a planning process as well as the technical requirements and implementation possibilities are described.

2 EINLEITUNG

Das Paper stellt erste Ergebnisse aus dem im Frühjahr 2011 gestarteten Projekt „ways2gether – Zielgruppenspezifischer Einsatz von Augmented Reality (dt. Erweiterte Realität/Wahrnehmung) und Web 2.0 in partizipativen Verkehrsplanungsprozessen“[1] vor. Das Ziel des Projekts ways2gether ist die Verringerung von Kommunikations- und Zugangsbarrieren in partizipativen Planungsprozessen durch ein spezifisch angepasstes Tool-Set, basierend auf Visualisierungstechniken durch Augmented-Reality-Anwendungen und interaktive Web-2.0-Tools. Das Projekt fokussiert den Bereich der mobilen Augmented-Reality-Anwendungen.

Die Darstellung der AR-Information kann auf unterschiedlichen mobilen Geräten erfolgen (z. B. Head-Mounted-Displays, See-Through-Displays etc.) (vgl. u. a. Wietzel 2007:164ff). Da eine Unterstützung von Beteiligungsprozessen im Vordergrund des Projektes steht und die Nutzerinnen und Nutzer auch selbstständig die AR-Informationen nutzen können sollen, wird die Entwicklung auf Hand-Held Geräte wie Tablet-PCs und Smartphones fokussiert. Diese haben die für mobile AR Anwendungen notwendigen Kameras, GPS sowie Lagesensoren in den meisten Fällen bereits eingebaut. Eine weiter Anforderungen an das AR System ist, dass die AR Anwendungen auf mobilen Endgeräten laufen müssen.

In diesem Beitrag wird ein Überblick über die einzelnen Web-2.0- und AR-Instrumente gegeben, die durch eine inter- und transdisziplinäre Zusammenarbeit von Verkehrsplanerinnen und Verkehrsplanern, Landschaftsplanerinnen und Landschaftsplanern, Sozialwissenschaftlerinnen und Sozialwissenschaftlern sowie Technikerinnen und Technikern ausgearbeitet wurden.

3 WEB 2.0 UND AUGMENTED REALITY IN DER PLANUNG

Viele, bereits gut etablierte Web-Anwendungen wie Online-GIS-Systeme und Social Networks finden bereits zahlreich Verwendung und unterstützen (Verkehrs-)Planungs und Beteiligungsprozesse (vgl. u. a. Körnig-Pich et al. 2010). Diese Instrumente werden in Beteiligungsprozessen hauptsächlich im Bereich der Informationsgewinnung,[2] der Informationsverbreitung,[3] für den Austausch[4] oder die Konsultation[5] verwendet.

[1] Mehr Informationen unter www.ways2gether.at, gefördert im Rahmen der Programmlinie ways2go

[2] z. B. Projekt Urban Happiness in Finnland. Einsatz von SoftGIS-Anwendungen um Nutzerinformationen über die Wahrnehmung von städtebaulichen Dichten, Lieblingsorten oder Alltagswege zu generieren (http://pehmogis.tkk.fi/pehmogis/fi/helsinki.html).

[3] z. B. Hafencity Hamburg, Infopool zu Planungsprojekten (http://www.hafencity.com)

[4] z. B. Seestadt Aspern, zur Organisation von Baugruppen, also der Koordination der Mitglieder untereinander (http://www.brot-aspern.at/)

Augmented Reality ist eine neue Art des Sehens und erweitert die Möglichkeiten der Inhaltsvermittlung. In die reale Situation werden zusätzliche digitale Informationen eingespielt. Diese neue Technik, die zum Beispiel im Marketing, der Navigation, bei Spielen, in der Medizin, im Servicebereich, aber auch dem Tourismus erfolgreich zur Anwendung kommt (vgl. u. a. Höhl, 2007, Heldal 2007), kann auch in Verkehrsplanungsprozessen einen entscheidenden Beitrag zur Qualitätssicherung und -verbesserung leisten (vgl. Nash 2010).

Erste Versuche mit virtueller Realität wurden bereits in den 50er-Jahren des letzten Jahrhunderts durchgeführt, aber erst bis 1997 wurden die Begriffe definiert (vgl. Carmigniani et al. 2011). Obwohl Augmented Reality seit den 1990er-Jahren stark diskutiert wird (vgl. u. a. Azuma 1997), sind außerhalb von Forschungsprojekten wenig greifbare Projekte umgesetzt worden. Die Analyse der aktuellen Praxis-Beispiele im Bereich der Augmented Reality hat gezeigt, dass es ein breites Spektrum an Anwendungen von AR-Instrumenten gibt, aber sehr wenige Beispiele im Bereich von mobilen AR-Anwendungen. Insbesondere mit planerischem Bezug und im Bereich der dreidimensionalen Visualieirung sind sehr wenige Beispiele vorhanden.

4 AUGMENTED-REALITY-TECHNOLOGIEN FÜR MOBILE ENDGERÄTE

Erst durch die aktuelle Verbreitung von geeigneten mobilen Geräten, die über Kamera, Datenverbindung und ausreichende Rechenleistung verfügen, wurden (mobile) Augmented-Reality-Anwendungen auch für den Endnutzer interessant. In der Werbung wurde bereits früher mit AR experimentiert, hierzu wurden aber Webcams verwendet, die an PCs gebunden sind. Durch die Verbreitung von Smartphones und die Möglichkeit, Anwendungen von Drittanbietern für die mobilen Geräte zu nutzen, hat sich in den letzten Jahren ein Trend zur Augmentierung entwickelt, der allerdings erst noch Einzug in das tägliche Leben halten muss.

	Wikitude[6]	Layar[7]	Junaio[8]
3D-Modell	Ja	Ja (.obj => .l3d)	Ja (.obj/.md2 => Metaios .zip)
Points of Interest	Ja	Ja	Ja
3D-POI	Ja	Ja	Ja
Animation 3D-Objekt	Nein	mit Hoppala: nein (l3d statisch); eigenes Web-service: ja; mit buildAR: ja	Ja
Speicherung auf Server	Server: eigener (Webservi-ce) oder Anbieterserver (z. B.: Hoppala, Wikitude)	Server: eigener (Webservice) oder Anbieterserver (z. B.: Hoppala)	Server: eigener (Webservice) oder Anbieterserver (z. B.: Hoppala)
LLA-Marker	Nein	Nein (Übergabe von Koordinaten mit QR-Code möglich)	Ja
In eigene Applikation einbetten	Ja (iOS und Android)	Ja (iOS Q4/2011 Android)	Ja (iOS Q4/2011 Android)

Tabelle 1: Vergleich der verbreitetesten AR-Applikationen

Bisher ist die alltägliche Relevanz der angebotenen Anwendungen noch als gering einzustufen, jedoch werden laufend neue Entwicklungen auf den Markt gebracht und durch den einfachen Zugang und die Verbreitung der Endgeräte können große Teile der Bevölkerung erreicht werden. Nun geht es darum, interessante und sinnvolle Anwendungen die Augmented Reality nutzen, anzubieten. Das Projekt ways2gether will hier im Bereich der Stadt- bzw. Verkehrsplanung und vor allem der Partizipation einen Beitrag leisten.

[5] z. B. Stadt-Wien-App, um Mängel und Missstände zu melden (http://data.wien.gv.at/apps/machmit.html)
[6] http://www.wikitude.com/en/
[7] http://www.layar.com/
[8] http://www.junaio.com/

Im Projekt wurden dafür bereits bestehende AR-Frameworks untersucht und ausgewählt, um sowohl deren Verbreitung zu fördern, als auch bestehende Ressourcen zu nutzen. Tabelle 1 zeigt einen Ausschnitt der erfolgten Recherchearbeit mit den relevantesten Anbietern von AR-Applikationen auf mobilen Endgeräten. Es wurden abgesehen von den genannten noch Tripwolf,[9] Peak.AR,[10] RADAR,[11] Popcode[12] und Aurasma[13] auf ihre Eignung für das Projekt untersucht.

Die untersuchten Kriterien ergeben sich aus den Anforderungen, die das Projekt ways2gether für die Anwendung von AR in Planungsszenarien und der Partizipation definiert hat. Dabei sind vor allem die Unterstützung von dreidimensionalen Objekten sowie die Verbesserung der GPS-Positionierung durch sogenannte LLA-Marker (LLA = Latitude, Longitude, Altitude) von Bedeutung.

LLA-Marker können als QR-(Quick-Response-)Codes zum Einsatz kommen; dabei wird ein gut sichtbares Symbol (Fig. 1) am relevanten Ort angebracht und im Falle der Nutzung im Rahmen eines Partizipationsvorhabens mit weiterführenden Informationen versehen. An einer Baustelle können Interessierte und betroffene Bürgerinnen und Bürger beispielsweise direkt über ein Plakat die wesentlichen Fakten erhalten und zusätzlich durch das Scannen des angebrachten QR-Codes weitere Informationen abrufen oder sich das Modell des Bauvorhabens mit ihrem Smartphone vor Ort ansehen.

Fig. 1: LLA-Marker, aktiviert einen Junaio-Channel.

5 ANFORDERUNGEN AN DAS WAYS2GETHER TOOL-SET AUS SICHT DER PLANER UND AR-EXPERTEN

Befragungen im Rahmen der Projekte HOLODECK[14] und TechnoVeP[15] brachten das Ergebnis, dass der Einsatz von technologischen Planungsinstrumenten nur dann erfolgt, wenn damit die Effizienz und die Effektivität gesteigert werden können sowie die Vermittlung der Planungsergebnisse leichter erfolgt (Berger et al. 2011:1344).

Im Rahmen von Expertengesprächen[16] im Projekt ways2gether wurden die Anforderungen an die AR- und Web-2.0-Instrumente aus Sicht der Planerinnen und Planer sowie AR-Expertinnen und AR-Experten erhoben. Themen der Gespräche waren die Abläufe der Planungs- und Beteiligungsprozesse, die Zielgruppen, die sich an Planungsprozessen, beteiligen, Hindernisse in der Beteiligung sowie die bisherigen Erfahrungen mit AR- und Web-2.0-Instrumenten. Im Folgenden werden die wichtigsten Anforderungen an den Einsatz von AR- und Web-2.0-Instrumenten abgeleitet aus den Expertengesprächen zusammengefasst.

Vor- und Nachteile des Einsatzes von AR Instrumenten in Planungsprozessen

Eine Verbesserung der Kommunikation, vor allem in Hinblick auf die Auswirkungen der Planungen kann durch den Einsatz von AR-Instrumenten nach Einschätzung der Expertinnen und Experten erreicht werden. Der Vorteil von AR-Visualisierungen im Vergleich zu den derzeit eingesetzten 3D-Visualisierungen in Form

[9] http://www.tripwolf.com/de/
[10] http://peakar.salzburgresearch.at/
[11] http://kl.radar-project.de/AloeView/action/welcome
[12] http://www.popcode.info/
[13] http://www.aurasma.com/
[14] TechnoVeP – Praxisrelevanz technologiebasierter Methoden und Instrumente der Planung zur Forcierung innovativer Verkehrstechnologien http://www2.ffg.at/verkehr/projekte.php?id=740&lang=de&browse=programm
[15] HOLODECK – Maßnahmen und Schritte für den Einsatz holistischer Planungstechnologien in der Verkehrs- und Raumplanung, http://www2.ffg.at/verkehr/projekte.php?id=731&lang=de&browse=programm
[16] Die ein- bis eineinhalbstündigen Interviews wurden im Zeitraum von Mai bis Juli 2011 von Florian Reinwald und Christoph Stoik durchgeführt. Interviewpartner waren: Christoph Schwarz (FGM), Thomas Pilz (FGM), Ulrich Bergmann (verkehr+), Peter Zeile (TU Kaiserslautern), Martin Forstner (GB 20), Roman Koselsky (Aspern – Wien 3420), Annemarie Hietler (Aspern – Wien 3420); Martina Jauschneg führte ein Gespräch mit Christine Chaloupka-Risser, (Verkehrspsychologin).

von Renderings ist, dass sie weniger manipulativ durch eine freie Wahl des Augpunktes sind. AR-Visualisierungen bieten eine weit größere Flexibilität in der räumlichen Ansicht. Die Auseinandersetzung mit den AR-Modellen in Kombination mit der realen Umgebung schafft und verbessert eine Identifikation mit dem Projekt.

Als Nachteile des Einsatzes von AR-Instrumenten wurden hauptsächlich Einschränkungen aufgrund der technischen Möglichkeiten der derzeitigen Geräte und der Software genannt. Eine Anschaulichkeit und Genauigkeit muss gegeben sein, sonst „schreckt es eher ab". Auch ein zusätzlicher Aufwand, der sowohl durch den Einsatz der Instrumente als auch durch die damit verbundene Steigerung der Informationen und Beiträge der Bewohnerinnen und Bewohner entsteht, wird befürchtet.

5.1 Anforderungen aus den unterschiedlichen Planungs- und Beteiligungsprozessen

Die einzelnen Expertinnen und Experten wurden auch nach den unterschiedlichen Abläufen ihrer üblichen Planungs- und Beteiligungsprozesse befragt. Die unterschiedlichen Ziele und Anlässe der Planungs- und Beteiligungsprozesse führen zu unterschiedlichen Prozessgestaltungen und Arbeitsschritten und verlangen daher einen differenzierten und anpassbaren Einsatz von Web-2.0- und AR-Instrumenten. Innerhalb des ways2gether-Projekts werden daher anhand von unterschiedlichen Planungs- und Beteiligungsprozessen[17] die Einsatzmöglichkeiten geprüft.

Auf fast allen Ebenen und Phasen des Planungsprozesses wurden Anknüpfungspunkte und Einsatzmöglichkeiten für Web-2.0- und AR-Instrumente identifiziert, die in unterschiedlichen Phasen sowie in Abstimmung auf die Ziele der Betetiligung eingesetzt werden können. Als zentrale Instrumente in Beteiligungsprozessen in der Verkehrsplanung wurden (1) die (Online-)Information und Konsultation, (2) die Vor-Ort-Information, (3) die Analyse des Planungsraumes (4) Begehungen und Vor-Ort-Besprechungen (5) die Beteiligung am Entwurf (6) die Visualisierung der Entwürfe sowie (7) die Ergebnisvisualisierung identifiziert.

5.2 Anforderungen aus Sicht der Planer und Nutzer

Der Einsatz der einzelnen Instrumente des ways2gether-Tool-Sets muss auf die unterschiedlichen Planungsprozesse abgestimmt werden können, da nicht alle Instrumente in jedem Anwendungsfall eingesetzt werden. Die Planerinnen und Planer und die Prozessbegleiterinnen und –begleiter müssen die Möglichkeit haben, rasch die notwendigen Instrumente auswählen und die Plattform einzurichten zu können. Zur Einbindung des ways2gether-Tool-Sets in den üblichen Arbeitsablauf muss dieser bei der Entwicklung der einzelnen Instrumente von Anfang an berücksichtigt werden (Datenschnittstellen, Visualisierungsprogramme etc.).

Die AR-Visualisierungen sollten mit bestehenden, im üblichen Planungsalltag verwendeten Softwareprodukten erarbeitet werden und dann in die AR-Umgebung migriert werden können. Bei der Implementierung in die Planungs- und Beteiligungspraxis muss auch gewährleistet sein, dass die Prozessbegleiter in das Tool eingeschult werden und damit vertraut gemacht werden können. Eine Einschulungsphase ist zu konzipieren und von Anfang an zu kommunizieren. Weiterführende Inputs dazu sind aus den zukünftigen Testfällen im Projekt ways2gether zu erwarten.

Die Nutzerinnen und Nutzer müssen die einzelnen Instrumente des ways2gether-Tool-Sets relativ einfach bedienen können. Der Lernaufwand für soll gering sein. Vorausgesetzt werden kann der Umgang mit Smartphones und Applikationen, ebenso jener mit Onlineplänen wie Google Maps. Für die Benutzung der einzelnen Instrumente sollten Leitfäden und Anleitungen vorbereitet werden. Im Rahmen von begleiteten Veranstaltungen wie Begehungen und Treffen können die Nutzer eingeschult werden.

Eine Transparenz bei Kosten und Downloadvolumen muss geschaffen werden. Auch der Datenschutz und die Datensicherheit sind wichtige Anforderungen der Nutzerinnen und Nutzer, sowohl von den Planern als auch den Bewohnern.

[17] Anhand folgender Planungsprozesse wurden die Einsatzmöglichkeiten geprüft: (1) Verbesserung von bestehenden Straßenfreiräumen durch Umbauten und Adaptionen. In diesem Beispiel werden die Lösungsvorschläge und Empfehlungen durch Arbeitsgruppen von Bewohnerinnen und Bewohnern eingebracht (Gebietsbetreuung 20, Wien); (2) AR-Visualisierung von Straßenfreiräumen in Stadtentwicklungsgebieten (Seestadt Aspern, Wien); (3) Innerörtliches Verkehrsplanungsprojekt mit Bürgerbeteiligung (Verkehr+/Forschungsgesellschaft Mobilität, Steiermark).

6 DAS WAYS2GETHER-TOOL-SET ALS BAUKASTEN FÜR PLANUNGSPROZESSE

Die ways2gether-Toolbox soll in unterschiedlichen Verkehrsplanungs- und Beteiligungsprozessen zur Anwendung kommen. Die Instrumente müssen also vielfältig einsetzbar und auf die spezifischen Anforderungen in den unterschiedlichen Verkehrsplanungsprozessen anpassbar sein. In einem intensiven Diskussionsprozess wurden durch die im Projekt ways2gether beteiligten Fachdisziplinen (Planer, Sozialwissenschaftler und Techniker) zuerst Anforderungen für die unterschiedlichen Zielgruppen und für die vielfältigen Arbeitsschritte in den Planungsprozessen definiert und darauf aufbauend die (technischen) Möglichkeiten einer Umsetzung ausgearbeitet.

Das ways2gether-Tool-Set

Basis für das ways2gether-Tool-Set ist eine Online-Plattform. Auf diese setzen Tools (Web 2.0 und AR) auf, die abgestimmt auf die Ziele des Planungs- und Beteiligungsprozesses eingesetzt werden können. Als zentrale Onlinetools werden die „digitale Nadelmethode“ als Erhebungsinstrumente, „Foren“ als Austauschplattformen sowie ein „Online-Baukasten“ zur Mitgestaltung eingesetzt. Als mobile AR-Tools kommen „AR-Post-Its“ als Erhebungs- und Austauschinstrumente, „AR-Informations-Tools“ zur Bereitstellung von georeferenzierten Informationen sowie „AR-Visualisierungs-Tools“ für die Darstellung der Entwürfe zum Einsatz.

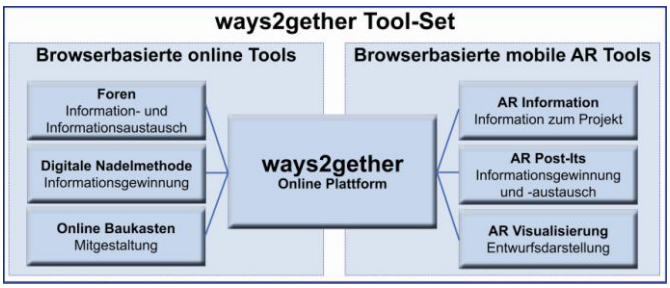

Fig. 2: Bestandteile des ways2gether-Tool-Sets (Draft).

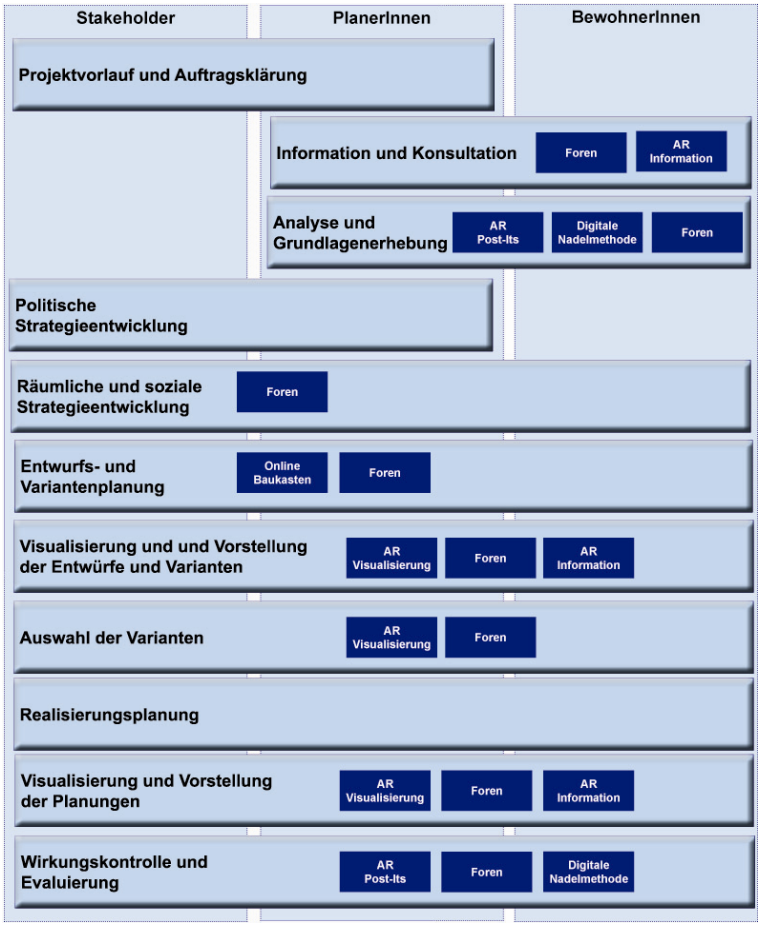

Fig. 3: Einsatzmöglichkeiten des ways2gether-Tool-Sets (Draft)

6.1 Einsatz der Instrumente im Prozess

Die einzelnen Instrumente können in unterschiedlichen Phasen des Planungsprozesses zur Informationsgewinnung und dem Informationsaustausch eingesetzt werden (Siehe Fig.3).

Informationsgewinnung und Informationsaustausch über Web-2.0-Instrumente

Zur Konsultation der Bewohnerinnen und Bewohner und zum Austausch untereinander, werden „Foren" in das ways2gether-Tool-Set mit einbezogen. Mit Hilfe der „digitalen Nadelmethode" soll die Analyse des Untersuchungsraumes unterstützt werden. Die Nutzer sollen die Möglichkeit haben, Orte, Wege und Räume zu markieren sowie Kommentare und Bewertungen dazu abgeben können. Ein (browserbasierter) „Online-Baukasten" soll eine Beteiligung am Entwurf ermöglichen. Dazu wird ein Baukasten mit einfachen Gestaltungselementen benötigt, die die Nutzer im Raum bewegen und positionieren können. Die Ergebnisse der Entwürfe sollen in das AR-System einspielbar sein um auch anderen Prozessbeteiligten zugänglich zu sein.

Informationsgewinnung und Informationsaustausch über AR-Instrumente

Durch „virtuelle Bautafeln" kann vor Ort über die Planungsabsichten und zum aktuellen Planungs- und Arbeitsablauf informiert werden. Dazu werden QR-Codes verwendet, die über die Handys und Tablets eingelesen werden können und zu aktuellen und verorteten Informationen auf der Projektseite führen. Damit können ortsbezogene Informationen mit einer hohen Aktualität den Nutzerinnen und Nutzern zur Verfügung gestellt werden. Als zweite Möglichkeit werden georeferenzierte Informationen über AR-Browser angeboten. Kommentarfunktionen sollen bei beiden Instrumenten ein Feed-Back der Nutzerinnen und Nutzer und Rückfragen der Planerinnen, Planer, Prozessbegleiterinnen oder Prozessbegleiter ermöglichen.

Durch „digitale Post-Its" (POI) können georeferenzierte Beiträge der Bewohnerinnen und Bewohner zu räumlichen Situationen gesammelt werden (z. B. da muss was getan werden, gefährliche Situation etc.). Sie unterstützen die Analyse des Raumes durch die Beiträge der Nutzer. Zusätzlich soll die Möglichkeit geboten werden, Bilder georeferenziert zu posten um die Analyse aus Nutzersicht zu unterstützen. Die „digitalen Post-Its" sollen auch für andere Nutzer sichtbar sein, um die bereits vorgenommenen Anmerkungen und Beiträge einzusehen, kommentieren oder erweitern zu können.

Zentraler Fokus im Projekt ways2gether wird auf die AR-Instrumente zur Visualisierung von Entwürfen und Planungen gelegt. Zentral dabei ist eine Unterscheidung zwischen der Visualisierung der Entwürfe und in der Ergebnisvisualisierung (Bestand und Neuplanung). Für die AR-Visualisierung der Entwürfe ist eine „skizzenhafte" Darstellung notwendig. Auch müssen die Visualisierungen aus dem „Online-Baukasten" in diese Umgebung migriert werden können. Für die Ergebnisvisualisierung ist eine möglichst hohe Darstellungsgenauigkeit notwendig.

7 TECHNISCHE ANFORDERUNGEN UND UMSETZUNG

Die Umsetzung der AR-Instrumente erfolgte nach gründlicher Recherche der zur Verfügung stehenden AR-Frameworks für mobile Endgeräte mit dem freien metaio Mobile SDK.[18] In der ersten Phase der Entwicklung wird ein Demonstrator für iOS-Geräte entwickelt. Dabei handelt es sich um eine eigene App, die auf dem Endgerät installiert wird. Das ermöglicht es, in Zukunft ein eigenes Branding einzusetzen, im Gegensatz zu AR-Entwicklungen, die sich darauf beschränken, einen sogenannten Channel zur Ansicht mit dem juniao-Client (beziehungsweise Layer für die layar-App) zur Verfügung zu stellen. Es bietet sich dadurch die Möglichkeit, die App mit der Onlinepräsenz des Projekts zu verknüpfen und weitere Informationen anzubieten.

Die Grundvoraussetzungen für die Entwicklung einer iOS-Applikation ist ein Computer mit dem Betriebssystem Mac OS mit einer installierten XCode-Entwicklungsumgebung und dem metaio Mobile SDK, das als Modul in XCode eingebunden wird und Zugriff auf diverse AR-Funktionen bietet.

Um den geschriebenen Code als Applikation zu verpacken und zu Testzwecken auf ein Endgerät bringen zu können, ist außerdem ein Zugang zum Developer-Programm von Apple vonnöten. Damit kann die entstandene Applikation dann auch in den App Store eingereicht werden.

Mögliche Endgeräte für diese Applikation sind:

[18] http://www.metaio.com/software/mobile-sdk/

- iPhone 3GS
- iPhone 4/4S
- iPad 2

jeweils mit dem Betriebssystem iOS ab Version 4.3.

In einer späteren Phase des Projekts folgt die Implementierung für Android-Geräte. Dazu wird ebenfalls das metaio Mobile SDK verwendet, allerdings im Zusammenspiel mit Eclipse und dem Android SDK. Die in Frage kommenden Endgeräte für Augmented Reality müssen zumindest folgende technische Anforderungen erfüllen: Kamera, Positionsbestimmung mit GPS, Internetverbindung. Eine gute Datenverbindung ist nötig, da die Modelle für die Visualisierung erst bei Abruf aus dem Internet von einem Server geladen werden.

Für die internen Tests der 3D-Modelle, die mit SketchUp Pro in ein geeignetes Format gebracht werden, wurden einige zusätzliche Funktionen in die Applikation eingebaut, die den späteren Endbenutzern nicht zugänglich sein werden. „Administratoren" der Software haben Zugang zu Funktionen um die 3D-Modelle in der Visualisierung nach den drei Achsen auszurichten sowie zu skalieren. Damit können die Modelle im Vorfeld den Gegebenheiten vor Ort optimal angepasst werden, bevor sie im Rahmen der Beteiligungsprozesse der Bevölkerung zur Verfügung gestellt werden.

8 DISKUSSION UND AUSBLICK

Erst seit wenigen Jahren zeigt sich bei den AR-Anwendungen eine verstärkte Präsenz und die Nutzung von AR-Browsern (z. B. Wikitude seit 2008, Layar und Junaio seit 2009) nimmt stetig zu. Die Anwendungen haben sich bereits weit verbreitet und zeigen eine dynamische Entwicklung. Auch die Etablierung in verschiedenen Anwendungs- und Forschungsfeldern gibt Hinweise auf die möglichen Verbesserungen, die durch den Einsatz von AR-Informationen erreicht werden können und die zukünftige Wichtigkeit von AR-Instrumenten.

Insbesondere die Verkehrsplanung kann neben der Architektur, der Stadt-, Raum- und Landschaftsplanung, von dem Einsatz von AR-Instrumenten profitieren. In all diesen Disziplinen muss (meist) mit einem Bestand umgegangen werden und es gibt keine Möglichkeiten für „Laborversuche" (vgl. u. a. Vollweiler, Jung 2011:86). Die Realität ist der Maßstab, innerhalb dessen sich Planungen und Gestaltungen bewähren müssen. Der Einsatz von augmentierten Realitäten kann hier einen entscheidenden Beitrag leisten, die Auswirkungen im Vorfeld zu prüfen.

Die derzeit vorhandenen Einschränkungen für den Einsatz von mobilen AR-Instrumenten wie die Prozessorgeschwindigkeit, die Bildschirmgrößen und Auflösung oder die geringe Akkulaufzeit fallen immer weiter weg. Zentrale Herausforderungen bleiben die Geschwindigkeit und Genauigkeit von GPS-Systemen, die Fähigkeiten der AR-Browser sowie insbesondere die Akzeptanz der Nutzer.

Hier setzt das ways2gether-Projekt an. Eine zentrale These des ways2gether-Projekts ist, dass durch den Einsatz von AR-Instrumenten neue Gruppen angesprochen werden können und durch eine Vermittlung mit AR-Instrumenten Inhalte besser transportiert und das Verständnis über die Folgen und Möglichkeiten von Planungsprojekten verbessert wird.

Das Standards der Öffentlichkeitsbeteiligung wie, dass „Inhalte und Rahmenbedingungen klar und verständlich kommuniziert und zugänglich gemacht" oder die „Chancengleichheit der beteiligten Gruppen und gleichwertige Einflussmöglichkeiten" (BKA 2008) verbessert werden, kann durch den Einsatz von AR-Instrumenten erreicht werden. Neue Präsentations-, Vermittlungs- und Visualisierungsmethoden, die von allen Akteurinnen und Akteuren in den Planungsprozessen verstanden, selbständig angewandt werden und damit nachhaltig die Standards der Öffentlichkeitsbeteiligung verbessern, sind dazu notwendig (vgl. Siegler, Wietzel 2009). Augmented-Reality- und Web-2.0-Lösungen haben das Potenzial, Verkehrsplanungen und Verkehrsplanungsprozesse in dieser Richtung weiter zu verbessern und effizienter zu gestalten (vgl. Nash 2010).

Die Analyse der Nutzeranforderungen – Planungsexperten sowie Laien – haben aber gezeigt, dass der Einsatz auch mit Vorsicht gewählt werden muss, um nicht bestimmte Gruppen durch den Technikeinsatz auszuschließen. Im Projekt ways2gether steht daher der Test des Tool-Sets in unterschiedlichen Einsatzumgebungen und mit unterschiedlichen Zielgruppen im Vordergrund.

Ähnlich wie bei der Einführung von hochauflösenden Renderings als Visualisierungsinstrumente in der Planung stellt sich hier die Frage: Wie ist die Resonanz der Nutzerinnen und Nutzer auf den Einsatz von AR-Visualisierungen und welchen Vorteil haben sie gegenüber herkömmlichen Visualisierungen?

Die Interpretation dessen, was in Plänen und Visualisierungen der Planungen enthalten ist, variiert sehr stark zwischen einzelnen Personen. Zur Einführung von Computervisualisierungen in der Planung wurden unter anderem Vergleiche vorgenommen, wie sich die Wahrnehmungen von Personen unterscheiden, in Abhängigkeit davon, ob sie die reale Umgebung, Pläne oder Visualisierungen betrachten. Die Ergebnisse waren unter anderem, dass die Qualität der Bilder bewertet wird, nicht die Qualität der Planung, dass Visualisierungen durch den Bildausschnitt und die Augpunktwahl manipulieren können oder dass Unterschiede in der Wahrnehmung der Virtualität und der Realität vor allem durch Außeneinflüsse wie die Umgebung, Lärm, Bewegungen etc. beeinflusst wurden (vgl. u. a. Wergles, Muhar 2009:177ff). Die Erwartung war aber auch, dass Animationen oder virtuelle Umgebungen zu Visualisierungen helfen können, die Wahrnehmung wesentlich zu verbessern (ebd. S. 181).

Genau hier setzen die AR-Instrumente und die Tests in realen Einsatzumgebungen innerhalb des Projekts ways2gether an. Als nächster Schritt werden die AR-Instrumente im Einsatz getestet und sowohl die Auswirkungen von AR-Instrumenten auf die Wahrnehmung und die Interpretation von Planungen als auch auf die Beteiligung und die Eignung für unterschiedliche Zielgruppen, aufgezeigt. Praxisnah sollen daher die ways2gether-Instrumente in den zukünftigen Einsatzumgebungen und -feldern getestet und die Auswirkungen differenzierter betrachtet werden.

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🏆 *reviewed paper*

Application of Knowledge Management Framework as a Decision-Support System for Disaster Management in Metropolitan Areas – Tehran as the Case Study

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1 ABSTRACT

Disaster management and metropolitan planning both involve making decisions and taking actions which has wide-ranging and diverse spatial information requirements. One major challenge in existing disaster management and metropolitan planning – on both fields of knowledge and practice – is the lack of relevant, accurate and available information or in other words an appropriate decision support system (DSS) along with a knowledge management framework (KMF) which not only establishes a DSS but also converts information to knowledge and considers the knowledge of past experiences.

In the context of disaster management worldwide, the crucial problem is that there are apparent gaps in terms of information coordination and knowledge management at different stages of disaster management. The post-disaster stages too require appropriate information as there are little common terminology and definition amongst relief agencies and assistant groups worldwide. Considering the fact that varied and multiple agencies are involved in different stages of disaster management and metropolitan planning, this makes sharing and integration of information between such agencies very intricate. A key problem is that such information is fragmented and is not efficiently organised.

Knowledge management that aims at facilitating the processes of collecting, maintaining, sharing and utilising information and knowledge in disaster management can provide a framework that integrates multiple information in order to subsequently analyse and manage information. Knowledge management initiative has been envisaged as a tool to integrate, store, retrieve, disseminate and manage information and knowledge related to disaster management. The main functions of knowledge management in any disaster management process are to enhance and develop the knowledge of disaster management and to support decision making in an emergency situation. Using comprehensive, Integrated, accurate and reliable information and knowledge may enhance the process of disaster management, and reduce the negative impacts of disaster in the communities at risk.

Tehran, as the case study of this paper, lies on a seismic zone with a high risk of earthquake which can have severe impact upon the life of its residents. This has been one of the most important challenges of the country in general and also in decision-making and planning for this city. One important aspect of planning and managing change in this city is to have due regards to disaster management. This requires not only an integrated method of planning and management but also an appropriate information and knowledge base. Information required for operating disaster management in Tehran currently is fragmented (i.e., owned by different organizations) and not capable to be converted to an appropriate DSS and KMF.

The dual aim of this paper is first to delineate the situation of Tehran in terms of its disaster management related information and knowledge base and second to propose an appropriate and integrated knowledge management framework. The proposed framework is intended to facilitate integrating, sharing and reusing knowledge in order to support decision making in both disaster management and metropolitan planning. The proposed knowledge management framework can help achieving an efficient and effective disaster management process which can be integrated in a metropolitan planning process, reducing the future risks and improving the resilience of vulnerable communities in case of a crisis in Tehran. The proposed framework – as a comprehensive, consistent and dependable knowledge base which will facilitate knowledge sharing – will help identify the information needs, will present an awareness of a disaster situation for the society at large and for decision-makers and can provide practical recommendations based on past experiences. This framework can also be applied to other parallel decision-making environments, such as crisis management.

2 INTRODUCTION: PROBLEM UNDER STUDY, PURPOSE AND AIM

Urban planning that makes and implements spatial decisions and policies about different aspects of urban structure and urban life, including decisions and policies relevant to disaster management, has wide-ranging, diverse and all-embracing spatial information requirements. Not only the availability, continuity and quality of data are essential components of an information system, as part of a knowledge base, it must also be considered that the dependency of such systems upon many sources of production is a key impediment to the establishment of such systems.

It is common that in different societies a specific planning approach is practiced (either traditional, rational comprehensive or some form of a mixed approach). Each approach requires its specific information or knowledge base. Important point about the adoption of any planning approach in any society is not only the planning process with its different stages and the information requirements of each stage, but what is vital is the adaptation of the process to local circumstances and also the type and the availability of information at the local level of planning and decision-making. While there are many information sources in any metropolitan area, there are many information gaps. Thus it must be considered that the official procedures do not usually enable and facilitate the sharing and integrating process of the available information to support decisions when planning and managing an urban environment.

It is important to note that an effective disaster management process is an important component of a successful spatial urban planning. Within the disaster management framework and the different stages of its process, the crucial and worldwide problem is that there are apparent gaps in terms of information, information coordination and knowledge management. Such information is fragmented and is not efficiently organised. The post-disaster stages as well as pre-disaster stages of such a process too require an appropriate information system (especially that there are little common terminology and definition amongst relief agencies and assistant groups worldwide). Considering the fact that there is varied and multiple agencies involved in different stages of either metropolitan planning or disaster management, the sharing and integration of information between such agencies turns out to be very intricate. Information required for operating either disaster management or any sort of metropolitan planning in Tehran is currently fragmented (i. e., owned by different organisations) and not capable to be converted to an appropriate decision support system (DSS) or a knowledge management framework (KMF). These information systems can help improving the efficiency of urban planning management activities including disaster management in general and in the case studied in this paper.

This paper has a dual aim of first to delineate the situation of Tehran in terms of its disaster management related information and knowledge base and second to propose an appropriate and integrated knowledge management framework that is intended eventually to improve urban resilience in Tehran. To achieve this aim, this paper – both in general and in Tehran – examines the the role of urban planning in disaster management and also the current links and gaps between urban planning and disaster management and also between the information and knowledge base of the two distinct, though highly connected, realms. In addition, this paper explores possible and appropriate courses and approaches to manage and plan urban systems in order to reduce risk in urban communities: advocating that a new way of thinking and a more collaborative and interdisciplinary approach is required. The development of knowledge management framework as a decision-support system for disaster management has possible consequences for all levels and forms of decision-making, including urban planning and disaster management in general and in the case studied in this paper.

3 CONCEPTUAL FRAMEWORK

Information plays a central role in urban spatial planning as well as in disaster management. Information requirements of urban spatial planning include the collection, manipulation and analysis of spatial structure.

Disaster management and urban planning both involve making decisions and taking actions which has wide-ranging and diverse spatial information requirements. One major challenge in existing disaster management and urban planning – on both fields of knowledge and practice – is the lack of relevant, accurate and available information or in other words an appropriate decision support system (DSS) along with a knowledge management framework (KMF) which not only establishes a DSS but also converts information to knowledge and considers the knowledge of past experiences.

3.1 Disaster management

Occurance of natural disasters is inevident in many cases worldwide. Disasters increasingly threaten human beings and bring tremendous social, economic, and environmental impacts.

Within the field of Disaster Management, disaster has been defined as a progressive or sudden, widespread or localised, natural or human-caused occurrences which can cause death, injury or disease, damage to properties, infrastructure or the overall environment that exceeds the ability of those affected by the disaster to cope with its effects using only their own resources (Disaster Management Policy 2002).

Disaster management refers to a continuous and integrated multi-sectoral and multi-disciplinary process of planning and implementation of specific measures aimed at reducing or avoiding the potential losses from disaster, promoting appropriate assistance to victims of disaster and seeking to achieve rapid and effective recovery(Seneviratne, Baldry, and Pathirage 2010).

Disaster management process includes the two main phases of (a) pre-disaster risk reduction and (b) post-disaster recovery.

The pre-disaster risk reduction phase involves three stages as follows(Seneviratne, Baldry, and Pathirage 2010):

- Stage one: Risk and vulnerability assessment, this stage involves identifying the nature and magnitude of risks (current and future) from diasters to people, infrastructure and buildings.
- Stage two: Mitigation or risk reduction activities, this stage include structural and non-structural measures undertaken to limit the adverse impact or consequences of diasters.
- Stage Three: Preparedness, this stage deals with the activities and measures taken to ensure effective response to the impact of diasters.
- Post-disaster recovery phase involves three stages as follows (Seneviratne, Baldry, and Pathirage 2010):
- Stage one: Relief, this stage refers to the provision of assistance – or intervention by the relevant authorities – during or after a disaster to meet the life preservation and basic subsistence needs of the people affected by disaster.
- Stage two: Transition, this stage involves the relevant transitional related activities, including community surveys, needs assessment, land survey and acquisition and provision of transitional shelter.
- Stage Three: Reconstruction, this stage refers to the rebuilding of damaged living conditions with considering the aim of long term sustainability.

3.2 Knowledge management

For holistic understanding of knowledge management, it is necessary to identify knowledge. There are wide-ranging definitions of knowledge. A comprehensive definition has defined knowledge as “a fluid mix of framed experience, contextual information, values and expert insight that provides a framework for evaluating and incorporating new experiences and information” (Otim 2006). In addition, knowledge is defind from a dual perspective of practical and general, as follows(Dongsong et al. 2002):

- Specific and practical definition of knowledge defines knowledge as applied information that actively guides task execution, problem-solving, and decision making.
- General definition of knowledge, defines knowledge as any fact, event, rule, hypothesis, or model that increases understanding or performance in a domain or discipline.

In the applied perspective “knowledge is to know when, why and which information is needed, how information could be obtained and processed, and where information can be found to achieve a desired objective” (Dongsong et al. 2002).

There is no general agreement on the definition of knowledge management, though some of its relevant definitions are listed below:

- knowledge management is "a discipline that promotes an integrated approach to identifying, managing, sharing, and reusing all of information assets by using advanced technology" (Dongsong et al. 2002).
- Knowledge management is the creation and subsequent management of an environment which encourages knowledge to be created, shared, learnt, enhanced, organised and utilised (Sujit et al. 2011).
- Knowledge management is "the practice of selectively applying knowledge from previous experiences of decision making to current and future decision making activities with the express purpose of improving the organisation's effectiveness"(Otim 2006).
- Knowledge management is "the creation, organisation, sharing and use of knowledge for development results"(UNDP 2007).
- Knowledge management is "about facilitating the process by which knowledge is created, shared and utilised"(Seneviratne, Baldry, and Pathirage 2010).
- The process of knowledge management or what is known as the Knowledge Management Cycle (KMC) has three main essentials as follows (Sujit et al. 2011):
- Management: This focuses on capturing, organising and facilitating knowledge.
- Application: This focuses on effective retrieval of relevant content through advanced searches and mining headed for (a) conducting knowledge-related work and tasks and (b) using the results for discovery.
- Organizations: This focus on learning, sharing and collaborating: the education component of the cycle.
- Main processes of knowledge management are (Otim 2006):
- The process of knowledge creation: This can be done by (a) acquiring external knowledge, or (b) by means of creating knowledge in the process of learning.
- The process of retention of knowledge: To keep knowledge available, some kind of memory is needed. Retention of knowledge refers to the process of storing knowledge and making its retrieval possible.
- The process of knowledge sharing: Its aim is to make sure that (existing) knowledge is obtained and shared – or in other words knowledge disseminates or transferred – at the right place.
- The process of application or use of knowledge: The other three knowledge processes (mentioned above) are supplementary to this process, i.e., the application of knowledge.

4 URBAN PLANNING, INFORMATION AND KNOWLEDGE

During the post Second World War period, in many European countries, urban planning was essentially an exercise dealing with "the physical planning and design of land-use and built form". The "general and fundamental criticisms" of the prevailed approach to urban planning led to radical changes and the introduction of adapted concepts of planning. Primarily it was the rational process view of planning. Considering the debate about the necessity and implication of this view of planning, an alternative approach which claimed to be more relevant to the real world of planning and policy-making, i.e. the incremental or piecemeal approach, was later introduced. The mixed-scanning approach as was also introduced, involved distinguishing more fundamental or strategic decisions from more detailed decisions. In fact it is the mixed-scanning approach – as a hybrid model of both the rationalist and incrementalist approaches – which involves imposing patterns on information received, formulating a program within this framework and going back to changing that framework (Daneshpour 2007). The major point about the adoption of any of these approaches, in any country or urban/metropolitan area, is that of their process, the different stages of the adopted process and the alteration of the process to the local circumstances as well as the information requirements of each of the stages. Almost all of these stages not only require spatial information but also require considerable information processing and analysis. Part of the information requirements of the planning process, especially problem formulation and evaluation of the existing conditions, require the

collection, manipulation and analysis of spatial features with the aim of being able in the subsequent stages of the planning process to produce plans, whether with strategic or operational nature. Not only problem definition but also problem formulation and the evaluation of circumstances require the collection; manipulation and analysis of spatial information (Daneshpour 2007).

The act of management too requires agencies to use more detailed information for routine operations. These different requirements concerning information can "explain the existence of various specialised ad hoc systems in urban planning, such as management information system (MIS), land information system (LIS), and urban GIS". One important point about using the methods devised in the more developed countries of the world is that general principles and analytical tools that have been developed there is not feasible in the less developed countries of the world without considerable modifications and adaptations. So there is a need to develop new approaches to launch an appropriate decision support system (DSS) along with a knowledge management framework (KMF), appropriate to the varying conditions (Daneshpour 2007).

While there are many formal and informal sources of information in any urban/metropolitan area, the official procedures are usually incapable of sharing and integrating necessary information to support decisions when planning and managing an urban/metropolitan area. Besides information deficiency in cities, there are many concealed and unused information potentialities that not included in or part of an established and effective Dss and KMF system. Decision-making activity involves merging a variety of information in order to analyse the different elements of the applicable spatial structure and their interaction. Integration of incoherent, incomplete and dispersed information that have diverse information sources can reduce information gaps and strengthen the decisions to solve problems in an urban area.

5 DISASTER MANAGEMENT AND INFORMATION AND KNOWLEDGE

Information plays a central role in disaster management, while the input of all stages of disaster management process is considered to be information and knowledge. Uusing integrated, accurate, reliable and timely information has an important role in achieving the aims and objectives of any attempt related to not only disaster management but also towards improving pertinent attempts of decisions-making. Two major challenges in existing disaster management procedure worldwide – on both fields of knowledge and practice – are (a) the lack of relevant, accurate and available information and (b) ineffective management of information despite the importance of management of information in reducing the impacts of disasters.

5.1 Information and knowledge requirements of disaster management

Information in disaster management is an essential resource that is translated into decisions and actions in the two main phases of disaster management process.

The information needs of disaster management can be categorised in two distinct, but closely related, categories as follows (Dongsong et al. 2002):

- Pre-disaster risk reduction: including information about risk assessment, mitigation and preparedness to improve the existing knowledge about disaster.
- Post-disaster recovery: including information about the impact of the disaster and the resources available to combat it to support decision-making.

5.2 Challenges related to information and knowledge in disaster management process

One main barrier of effective disaster management in urban/metropolitan areas worldwide is related to their information system and knowledge base. These barriers can be listed as the following:

- Information and knowledge on disaster management are fragmented (Seneviratne, Baldry, and Pathirage 2010), widely distributed and owned by a great number of organizations/agents (Dongsong et al. 2002).
- Information, experiences, approaches, adopted modalities and generated/created knowledge of disaster management remain in individual or institutional domains and are not usually translated to and transformed into applied knowledge for future experiences for the communities at risk (Seneviratne, Baldry, and Pathirage 2010) & (Sujit et al. 2011).

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- Information and knowledge coordination, sharing and creation on any process of disaster management is usually inadequate and ineffective(Seneviratne, Baldry, and Pathirage 2010).
- The linkages among all agencies working on disaster management is usually weak and inefficient and this fact inhibits an efficient management approach and an integrated and an appropriate coping mechanism (Sujit et al. 2011).

5.3 The role and importance of information and knowledge to support decision-making in disaster management as an emergency situation decision-making

Decision-making is a process of analysing information and using knowledge to resolve problems. During the decision-making process, the problems should be detected, relevant information should be gathered and the right judgment should be made so as to make appropriate decisions (Dongsong et al. 2002). Accordingly, information is the main input of this process, while the main element of a relevant decision-making is accurate, reliable and integrated information. Decision-making during a disaster management process – especially its post-disaster phase – is different from decision-making processes in general. Decision-making in disaster management is by and large faced with a variety of challenge such as (Dongsong et al. 2002):

- Gathering relevant information in a timely and accurate manner;
- Synchronized acquisition and analysis of distributed information;
- Reusing knowledge (or consider past experiences) to facilitate current decision making;
- Organising, sharing and managing the information efficiently; and
- Dynamically changing the situation under study.

6 INFORMATION AND KNOWLEDGE MANAGEMENT IN URBAN PLANNING AND DISASTER MANAGEMENT

Knowledge management that aims at facilitating the processes of collecting, maintaining, sharing and utilising information and knowledge in disaster management can provide a framework that integrates multiple information in order to subsequently analyse and manage information. Knowledge management is envisaged as a tool to integrate, store, retrieve, disseminate and manage information and knowledge related to disaster management in an urban/metropolitan area. As one main function of knowledge management in any disaster management process is to enhance and develop the knowledge of disaster management and to support decision making in an emergency situation, thus using comprehensive, integrated, accurate and reliable information and knowledge may enhance the process of disaster management, and reduce the negative impacts of disaster in the communities at risk in an urban/metropolitan area.

6.1 The functions of knowledge management frameworks in urban planning and disaster management

Though there is no way of neutralising all negative impacts of disasters, efforts can be made to reduce their resource costs and consequences (Seneviratne, Baldry, and Pathirage 2010). Knowledge management can undoubtedly maintain a decision-support system for disaster management in urban/metropolitan areas. This will have possible consequences for all levels, forms and aspects of decision-making, including urban planning and disaster management. In this respect, some functions of knowledge management frameworks can be listed as below:

- Knowledge management frameworks can act as a tool to store, retrieve, disseminate and manage information related to urban planning and disaster management (Sujit et al. 2011).
- Knowledge management frameworks can facilitate the entire process of acquisition, sharing, management, and utilisation of information and knowledge for the support of urban planning and disaster management processes (Dongsong et al. 2002) &(Otim 2006).
- Knowledge management frameworks can avoid repeating past errors of practice, highlight good practice to be replicated and make lesson-learning (UNDP 2007).
- Knowledge management frameworks make it possible to learn from and leverage past experience in the management of current problems (Otim 2006) and to build a culture of learning from previous lessons and the adoption of best practices (Seneviratne, Baldry, and Pathirage 2010).

7 CHALLENGES OF PLANNING AND DISASTER MANAGEMENT RELATED INFORMATION AND KNOWLEDGE IN TEHRAN

Tehran, as the case study of this paper, lies on a seismic zone with a high risk of earthquake which can have severe impact upon the life of its residents. This has been one of the most important challenges of the country generally as well as in planning, decision-making and managing this city, one main aspect of which is to have due regards to disaster management. This requires not only an integrated method of planning and management but also an appropriate information system and knowledge base for the two areas of knowledge and practice. Information required for operating disaster management in Tehran is fragmented and is in the possession of diverse agencies/organisations. This is while this information system and knowledge base is not capable to be converted to an appropriate DSS and KMF.

The lack of reliability, consistency and coordination of urban planning and disaster management related information and knowledge in Tehran has stemmed from factors such as (a) administrative inefficiencies, (b) resource limitations, (c) the shortage of skilled personnel and technical expertise and (d) the lack of funding or political will to support the construction of the an appropriate and integrated DSS and KMF system. These factors, in addition, reflect a disapproval of the policy makers; urban planners and managers for the different aspects of application and importance of information systems and knowledge basis in any urban planning and disaster managing activity especially when continuance and sustainability reveal themselves as important agendas, locally and internationally (Daneshpour 2007).

The main challenges of urban planning and disaster managent related information and knowledge in the case of Tehran can be listed as below:

There is a large gap between the two areas of activity, i.e., urban planning and disaster management. In other words, disaster managemnt – as a category of planning activity – has been done without due consideration to urban planning and urban plans as the product of it. Thus the result of risk assessment – as one important stage of a disaster management process – has not been considerd in the process of generating urban plans.

- There is varied and multiple agencies/organisations involved in different stages of disaster management which perform the tasks such as research and action. This is relevant to the both fields of urban plannig and disaster managent. Accordingly it can be deduced that the information and knowledge required for operating disaster management within the broad context of urban planning in Tehran is fragmented.
- There is the lack of information and knowledge coordination at the different stages of urban planning and disaster management in Tehran.
- Agencies involved in urban planning and disaster management in Tehran have their own information sources, while others are not aware of the available information of the other agencies that might aid them and provide a support system for their task of decision-making.
- There is not relevant, accurate and available information system and knowledge base concerning urban planning in general and disaster management in particular in Tehran.

8 EXPLANATIONOF THE PROPOSED KNOWLEDGE MANAGEMENT FRAMEWORK FOR TEHRAN

Knowledge management framework in this paper has been envisaged as a tool to share, integrate, store, retrieve, disseminate and manage information and knowledge related to disaster management in Tehran. The main functions of knowledge management framework in disaster management process of Tehran are to enhance and develop the knowledge of disaster management and to support decision making in an emergency situation, while keeping this within the urban/metropolitan planning context of Tehran. Using comprehensive, integrated, accurate and reliable information and knowledge in this city may enhance the process of disaster management, and reduce the negative impacts of disaster in Tehran.

Two essential principles for establishing an appropriate information and knowledge management framework for managing disaster in Tehran are first defining the purpose of the framework, and second investigating the existing information system in Tehran i order to integrate the two (UNDP 2007). In Tehran the main proposes of the proposed knowledge management frameworks are:

- Integrating multiple information and knowledge related to disaster management in order to subsequently analyse, manage information and creat knowledge.
- Integrating disaster management with urban planning activity altogether.

Relating to the second base of establishing knowledge management framework for managing disaster in Tehran, there is no complete and integrated pool of information for urban planning and disaster management.

9 APPLICATION OF KNOWLEDGE MANAGEMENT FRAMEWORK AS A DECISION-SUPPORT SYSTEM FOR DISASTER MANAGEMENT IN TEHRAN

A comprehensive knowledge management framework is presented here in support of disaster management in metropolitan area of Tehran. The core of the proposed framework is the knowledge base with a set of involved knowledge management processes for knowledge acquisition, organisation, creation, and sharing. This knowledge base must evolve incrementally over the time (figure 1).

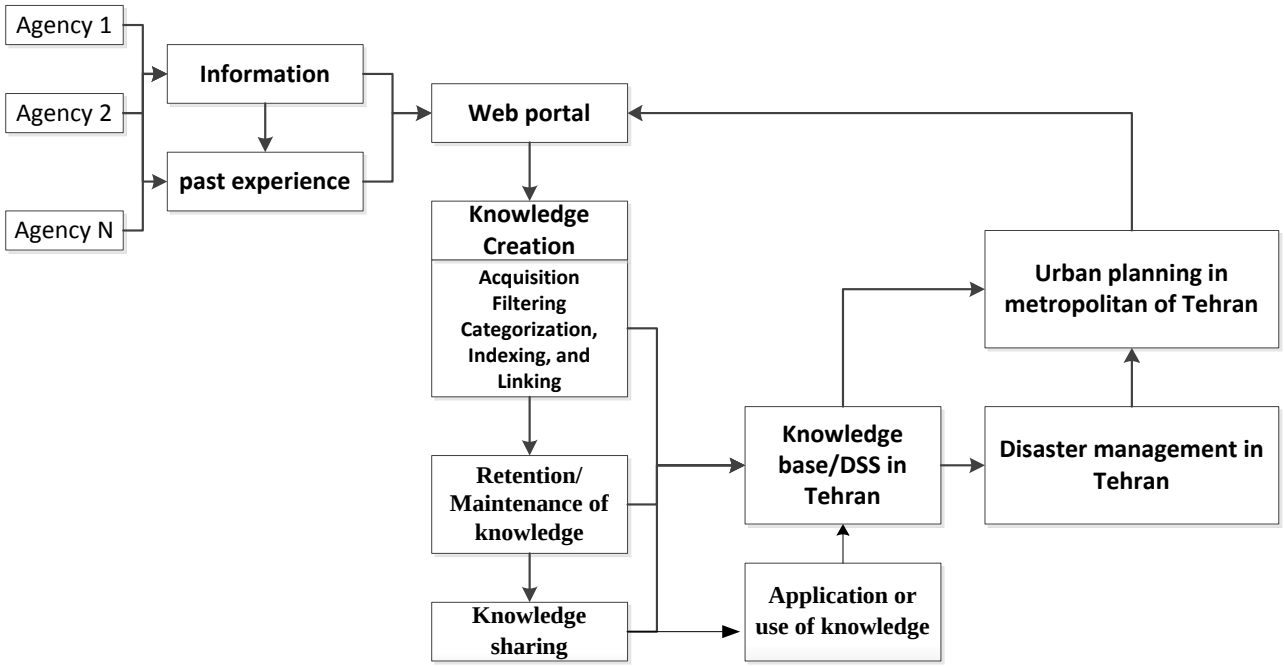

Fig. 1: The proposed knowledge management framework of disaster management within an appropriate metropolitan DSS for Tehran

The proposed framework is intended to facilitate integrating, sharing and reusing knowledge in order to support decision making in both disaster management and metropolitan planning in Tehran. The proposed framework can help achieving an efficient and effective disaster management process which can be integrated in a metropolitan planning process in order to reducing the future risks and improving the resilience of vulnerable communities in case of a disaster in Tehran. The proposed framework – as a comprehensive, consistent and dependable knowledge base which will facilitate knowledge sharing – will also help identify the information needs, an awareness of a disaster situation for the society in general and for decision-makers can provide practical recommendations based on past experiences.

10 CONCLUSION

Disaster management requires comprehensive information and knowledge as well as extensive assistance from many relief agencies. The demand for efficient knowledge management to help the agencies make decisions widely recognised. This paper made an attempt to present a comprehensive knowledge management framework in support of decision-making in disaster management process within a broader context of metropolitan planning. It advocates multiple knowledge management processes that create, maintain and share the knowledge, provide consistent support to decision-makers in disaster management operations, and recommend possible solutions based on the knowledge base which includes the past experiences. The proposed knowledge management framework is intended to evolve incrementally while the framework must allow the disaster management agencies/organisations to transcend the existing limitations

and redundancies created by fragmented information and knowledge. This framework can also be applied to other similar decision-making environments, such as crisis management.

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🏆 *reviewed paper*

Aufbau einer partizipativen Planungscommunity am Beispiel von Nexthamburg

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1 ABSTRACT

Angesichts sich verändernder klimatischer und gesellschaftlicher Rahmenbedingungen ist es wichtig die Menschen für die Fragen der Stadtplanung zu interessieren und darüberhinaus zu ermutigen sich in Planungsprozessen aktiv einzubringen. Es zeigt sich, dass immer mehr Menschen die Dienste des Web 2.0 nutzen und sich webbasierten Gemeinschaften, den so genannten Communities anschließen (vgl. ARD/ZDF Onlienstudie 2011). Blogs, Foren und Soziale Netzwerke dienen als Plattformen, um sich zu informieren und zu diskutieren. Mit Blick auf ein gesteigertes Bedürfnis nach Partizipation kann die Berücksichtigung des bürgerschaftlichen Engagements der Web-2.0-Bewegung einen möglichen Lösungsansatz für die Bürgerbeteiligung in der Stadtplanung darstellen. Mit einer partizipativen Planungscomunnity soll den an Planungsfragen interessierten Menschen eine Plattform geboten werden, auf der sie miteinander kommunizieren und interagieren können. Das Hamburger Projekt Nexthamburg kann als ein Beispiel für eine partizipative Planungscommunity gesehen werden. In dem unabhängigen Ideenlabor können Bürger ihre Vorstellungen über die zukünftige Entwicklung der Stadt äußern und gemeinsam mit anderen Nutzern darüber diskutieren. Gegenstand des vorliegenden Beitrags ist der Aufbau und die Zusammensetzung einer partizipativen Planungscommunity am Beispiel von Nexthamburg. Als Forschungspartner des Projktes hat die HafenCity Universität im Sommer 2011 eine Befragung in der Nexthamburg Community durchgeführt. Die daraus resultierenden Ergebnisse biden die Datanbasis für die Betrachtung.

2 EINLEITUNG

Nach über 50 Jahren Erfahrung mit der Beteiligung des Bürgers in Deutschland zeigen die Ereignisse rund um das Bahnhofsumbau- und Stadtentwicklungsprojekt Stuttgart 21, dass eine umfassende und zufriedenstellende Form der Partizipation nach wie vor eine große Herausforderung darstellt. Trotz Schlichtungsverfahren und Volksentscheid wurde gegen das Projekt bis zuletzt protestiert (weltonline 2012).

Die künftigen Handlungsfelder der Stadtplanung werden unter anderem durch die Themen Klimaschutz, Klimaanpassung und demographischem Wandel geprägt sein. Mit Blick auf die beschriebenen Tendenzen steht zu erwarten, dass die neue Protestbewegung auch künftig die Umsetzung von Maßnahmen erheblich erschweren wird. Somit stellt sich die Frage, welche Formen der Beteiligung langfristig geeignet sind.

Auch in Hamburg regt sich seit einigen Jahren vermehrt Widerstand in der Planungslandschaft. Gängeviertel, Stadtbahn, Fernwärmetrasse Moorburg oder die Planungen rund um die Neue Mitte in Hamburg Altona haben viele Menschen aufgeschreckt, zum Protest ermutigt oder einfach nur für Planungsthemen sensibilisiert. Dementsprechend bildet Hamburg einen geeigneten Nährboden, um neue Beteiligungsansätze zu erproben. Ein Beispiel dafür, wie eine solche zukunftsweisende Beteiligungsform aussehen kann, zeigt das Projekt Nexthamburg. Dort konnten die Hamburger/-innen in den zurückliegenden zwei Jahren aktiv ihre Überlegungen und Wünsche über die zukünftige Gestalt Hamburgs vorstellen und mit anderen Interessierten darüber diskutieren. In Online- und Offlineverfahren sind von den Nexthamburg Nutzern Zukunftsideen eingebracht und durch ein Fachgremium zu umsatzfähigen Konzepten weiterentwickelt worden. Über das Zusammenwirken und den Austausch der Nexthamburg Nutzer ist aus dem Kreis interessierter Personen eine Nexthamburg Community entstanden.

Sollen Fragen zur Stadtentwicklung von einer breiten Öffentlichkeit diskutiert werden, stellen Planungscommunities einen interessanten Löungsansatz dar. Ein Grundgedanke der Partizipation ist es, dass Vertreter aus allen gesellschaftlichen Millieus angesprochen werden. Für den Aufbau solcher Communities besteht dabei Forschungsinteresse an der Zusammensetzung des Nutzerkreises. Darüberhinaus ist es wichtig zu erfahren, welche von den angebotenen Kommunikationskanälen die Nutzer am besten erreichen, sowie welche Beteiligungswerkzeuge von der Community wie häufig und zu welchem Zweck genutzt werden.

Am Beispiel von Nexthamburg soll eine Nutzergruppenanalyse zeigen, wie sich der Nutzerkreis einer solchen partizipativen Community zusammensetzt. Grundlage dieser Betrachtung bilden Ergebnisse einer

Nutzerbefragung zu den auf Nexthamburg eingesetzten Informations- und Kommunikationsangeboten. Die hier präsentierten Ergebnisse sind als weiterer Baustein in der Analyse der Nutzer von Partizipationsangeboten zu sehen. Nachdem von Weninger, Poplin, Petrin (2010) eine Typologie für Public Participation 2.0 User am Beispiel von Nexthamburg vorgestellt wurde, liegt der Fokus in diesem Forschungsbeitrag auf der Zusammensetzung und der Entwicklung von partizipativen Gemeinschaften.

Dieser Artikel ist wie folgt gegliedert. Im zweiten Teil der Arbeit wird ein allgemeiner Überblick zum Thema Beteiligung in Planungsverfahren gegeben. Daraufhin folgt im dritten Kapitel die Auseinandersetzung mit der Partizipation im Web 2.0. Unter anderem werden Eigenschaften und wichtige Onlinedienste des Web 2.0 benannt sowie ein Einstieg in das Thema partizipative Planungscommunity gegeben. Im vierten Abschnitt wird die Informations-, Ideen- und Diskussionsplattform Nexthamburg näher vorgestellt. Dabei wird auf den Beteiligungsprozess, die Beteiligungsangebote und den Aufbau der Befragung näher eingegangen. Im fünften Kapitel der Arbeit werden die Ergebnisse der Befragung präsentiert. Im sechsten und letzten Teil werden die für den Aufbau der Planungscommunity Nexthamburg wichtigen Erkenntnisse dargelegt.

3 PARTIZIPATION IN DER PLANUNG HEUTE

Dass die Beteiligung der Bürger bei Planungsfragen auch künftig eine Herausforderung darstellen wird, hat mehrere Ursachen. Pfenning (2011) sieht drei klassische Probleme in der Bürgerbeteiligung. Demnach ist der Personenkreis der am Planungsverfahren aktiv Teilnehmenden oft homogen. In der Regel sind am Beteiligungsprozess weder alle Bevölkerungs- noch Altersschichten verteten. Die sich im Beteiligungsverfahren einbringenden Teilnehmer, die eher gut gebildet sind, nehmen nur ihre partikularen Interessen war. Dies kann dazu führen, dass sich soziale Ungleichheiten verstärken.

Ferner ergibt sich ein Legitimationsproblem. Die Entscheidungsträger sehen in den partizipativ erarbeiteten Ergebnissen Empfehlungen, denen sie nicht Folge leisten müssen. Die Teilnehmer ihrerseits hegen demgegenüber die Erwartung, dass die von ihnen erarbeiteten Empfehlungen auch umgesetzt werden. Geschieht dies nicht, können Vertrauensverlust und Resignation der Bürger die Folge sein.

Letzlich wird von Seiten der Planungsverantwortlichen argumentiert, dass es den Bürgern an Fach- und Sachwissen fehlt, um sich qualifiziert in die Plannungsdiskussion einzubringen. Jedoch suchen auch Politik und Verwaltung nach neuen Beteiligungsformen. Zum einen sind die Themen der Stadtentwicklung oft eher abstrakt, so dass sie sich dem Bürger schwer vermitteln lassen (Maly 2010). Zum anderen sind mit der Stadtentwicklung lange Planungshorizonte verbunden. Von der ersten Idee über die rechtliche Festsetzung bis hin zur tatsächlichen Umsetzung können mitunter Jahrzehnte vergehen. Durch fehlende Kommunikation, die idealerweise den Prozess begleiten sollte, fühlen sich die Bürger am Ende übergangen. Langfristig kann dies zu Akzteptanzverlusten bei den Menschen führen. Im schlimmsten Fall droht der „Wutbürger“ (Kurbjuweit 2010), der durch seine Blockadehaltung die Stadtentwicklung folgenreich behindert. Gegen diese Form der Ablehnungsbeteiligung wünschen sich die kommunalen Planungsverantwortlichen die Etablierung neuer Dialogformen im Sinne einer Gestaltungsbeteiligung (vhw 2010).

Aus heutiger Sicht bieten sich den Planungsverantwortlichen zahlreiche Verfahren, um den Bürger zu beteiligen. Neben den klassischen gesetzlichen Verfahren sind Dialogformen wie Beratungsgremien, runde Tische oder Fokusgruppen bereits weit verbreitet. Weitere Lösungen stellen Dialogverfahren auf Basis von modernen Governancestrukturen oder open-source Verfahren dar Verfahren dar, in denen sich die Menschen zu bestimmten Fragen oder Problemen der Stadtentwicklung äußern können (Thalgott 2011). Daneben kann auch das Bürgerbegehren als Verfahrensmittel angesehen werden. Gezielt eingesetzt kann es als Notausstieg dabei helfen, Planungen, die nicht dem Gemeinwohl dienen, abzuwenden (Thalgott 2011).

Es zeigt sich, dass eine zukunftsweisende Stadtplanung auf die Einbeziehung und Mitwirkung der Menschen setzt (Pahl Weber 2011). Dabei geht es nicht mehr nur um die Informationsbereitstellung oder darum den Bürger „mitzunehmen“, sondern den Stadtbewohner als aktiven und gestaltenden Akteur in die lokale Planungsdiskussionen mit einzubeziehen (Thalgott 2011). Um über die Fragen der Stadtplanung mit einer breiten Öffentlichkeit diskutieren zu können, ist die Einbindung von webbasierten Diensten und Anwendungen hilfreich. Welche dies sind und wie sie eingesetzt werden können, wird im nächsten Abschnitt behandelt.

4 PARTIZIPATION IM WEB 2.0

Mit dem Web 2.0, dem sogenannten Mitmachnetz, haben die Kommunikationsgewohnheiten der Menschen umfangreiche Wandlungen erfahren. Im Internet der zweiten Generation steht das Produzieren, Sammeln, Teilen und Verbreiten von Inhalten im Vordergrund. Die Menschen geben Informationen über sich preis, arbeiten auf Plattformen kollaborativ an Projekten zusammen und benutzen soziale Netzwerke zur Kommunikation miteinander. Die Funktionen der Onlinedienste sind intuitiv erfassbar und erfordern keine großen Fachkenntisse. Daher haben die Dienste des Web 2.0 inzwischen in weiten Teilen der Gesellschaft Eingang gefunden. An Beispielen, wie Frankfurt gestalten (www.frankfurt-gestalten.de), das Unortekataster der Stadt Köln (www.unortekataster.de) oder der Seite www.moorburgtrasse-stoppen.de, wird zudem ersichtlich das Onlinedienste des Web 2.0 auch für Partizipationszwecke bei Stadtplanungs- und Stadtentwicklungsthemen eingesetzt werden..

Als Beweggründe, warum sich Menschen im Web 2.0 engagieren, nennt Goodchild (2007) drei Ursachen. Zum einen ist es die öffentliche Selbstdarstellung und der Glaube daran, dass andere Nutzer an den bereitgestellten Inhalten interessiert sein könnten. Ferner spielen altruistische Gründe eine Rolle. Der Wunsch Daten mit Freunden über das Internet teilen zu können vernachlässigt die Tatsache, dass auch andere Nutzer auf diese zugreifen und verwenden können. Den Entstehungsprozess zu begleiten und zu sehen, wie aus dem geleisteten Beitrag in Gemeinschaftsarbeit ein fertiges Produkt entsteht, kann ebenfalls als Motivation angesehen werden sich aktiv im Web 2.0 zu beteiligen (Goodchild 2007).Im Folgenden werden ausgewählte Anwendungen des Web 2.0 erläutert sowie der Begriff der partitipativen Planungscommunity vorgestellt.

4.1 Anwendungen und Dienste des Web 2.0

Für die zwischenmenschliche Interaktion hält das Web 2.0 unterschiedliche Dienste und Technologien bereit. Nachfolgend soll auf Einige näher eingegangen werden.

Weblogs

Ein wichtiges Element des Web 2.0 sind Weblogs. Als eine Art Onlinetagebuch werden vom „Betreiber in regelmäßigen Abständen und in chronologischer Ordnung neue Inhalte“ (Behrend, Zeppenfeld 2008:26) erstellt, welche von Besuchern der Seite kommentiert werden können. Durch Verlinkung einzelner Blogs lässt sich ein Netzwerk, die sogenannte Bloggosphäre aufbauen. Auf diese Weise vergrößert sich der Teil der erreichten Menschen.

Soziale Netzwerke/Online Communities

Online Communities sind offene, webbasierte Gemeinschaften (Rölver, Alpar 2008), die sich zumeist aus einer unbestimmten Anzahl von Menschen zusammensetzen, die auf einer Plattform miteinander interagieren (Behrend, Zeppenfeld 2008). Für den Austausch und das kollaborative Arbeiten werden den Nutzern verschiedene Onlinedienste wie Mailing, Instant Messaging, Blogs, Chat, Foren oder Videoportale bereitgestellt. Durch die Vielfalt der zusammengeführten Angebote werden Communities für ihre Mitglieder zu netzbasierten Kommunikationszentralen (Busemann, Gscheidle 2011:360). Eines der erfolgreichsten sozialen Netzwerke ist Facebook. Um auf Facebook aktiv sein zu können müssen sich Nutzer registrieren und für die eigene Präsentation innerhalb der Community eine Profilseite anlegen. Neben den bereits genannten, in Facebook eingebeteten Onlinediensten, ist dass Posten von Informationen eine wichtige Funktion. Es dient im wesentlichen dem schnellen, öffentlich nachvollziehbaren Hinterlassen von Nachrichten. Nach Zahlen der ARD/ZDF Onlinestuide 2011 nutzen besonders junge Menschen im Alter zwischen 14 bis 29 Jahren, die Onlinenetzwerke regelmäßig, mindestens einmal die Woche. Die Studie belegt jedoch auch, dass ab einem Alter von 30 Jahren, die Aktivität in Communities (bisher) deutlich abnimmt (Busemann, Gescheidle 2011).

RSS-Feeds

Really Simple Syndication ist ein Dienst, der für die schnelle und gezielte Informationsbereitstellung genutzt wird. Der Benutzer aboniert die ihn interessierenden Inhalte einer Webseite als RSS-Feed. Durch einen Klick auf das Icon werden sämtliche Neuigkeiten der abonierten Webseiten angezeigt.

Mobile Dienste

Durch sogenannte Location based Services lassen sich Informationen in der Stadt direkt vor Ort erfassen und abrufen. In einem mobilen Endgerät, bspw. einem Mobiltelefon, lassen sich die Informationen dann selektiv anzeigen. Um die Standortdaten zu bestimmen können Techniken wie GPS, GSM, Bluetooth oder RFID eingesetzt werden (Althoff et. al. 2010; Wagner 2011). Mit Hilfe spezifischer Dienste können räumliche Informationen bspw. durch Fotografieren dokumentiert und durch Verlinkung mit einer Online Community direkt einem größeren Publikum mitgeteilt werden.

4.2 Partizipative Planungscommunity

Eine partizipative Planungscommunity ist eine Gemeinschaft, die unterschiedliche Formate der Informations- und Kommunikationsbereitstellung aktiv oder passiv nutzt, um sich über planungsrelevante Themen zu informieren und auszutauschen. Der dazugehörende Kerngedanke ist es, dass die eingebrachten Ideen unter Verwendung unterschiedlicher Partizipationsangebote Online und Offline und unter Mitwirkung anderer Nutzer weiterentwickelt werden. Über den kontinuierlichen Prozess des Diskurses formiert sich eine Community. Die Themen der Stadtplanung und Stadtentwicklung sind integratives Element der Community.

Durch das Zusammenwirken einzelner Mitglieder können die aus Sicht der Bürger planungsrelevanten Sachverhalte gezielt angesprochen, Lösungvorschläge erarbeitet und einem größeren Publikum zugänglich gemacht werden. Die Interessen werden gebündelt, wodurch einzelne Meinungen in einem Planungsverfahren mehr Gewicht erhalten. Auf diese Weise kann eine solche webbasierte Gemeinschaft als wichtiger Interessenvertreter in der lokalen Planungslandschaft auftreten und im Sinne der Gestaltungsbeteiligung den Verantwortungsträgern Feedback und Denkanstöße geben.

In einer partizipativen Planungscommunity befassen sich die Mitglieder durch kontinuierliche Diskussionen langfristig mit Planungsthemen. Dadurch angeeignetes spezifisches Fachwissen ermöglicht es dem Nutzer sich auch an anderen Beteiligungsverfahren qualifiziert einzubringen. Desweiteren übernehmen die Mitglieder die Funktion von Mulitplikatoren, da sie das innerhalb der Gemeinschaft generierte Wissen durch Kontakte im persönlichen Umfeld weitergeben. So besteht die Chance, dass der Kreis der Planungsinteressierten und letztlich auch die Community selbst kontinuierlich wächst. Durch den partizipativen Ansatz leistet die Community darüberhinaus einen wichtigen Beitrag zur Verbesserung der Beteiligungkultur.

Für die Entwicklung neuer Beteiligungsansätze ist es wichtig zu Wissen, wer durch die Partizipationsangebote erreicht wird und wie intensiv diese genutzt werden. Damit sich die Menschen einbringen können, ist es zudem von Interesse, welche Partizipationsangebote Online und Offline bevorzugt werden. In der wissenschaftlichen Diskussion liegen darüber bisher nicht genügend Ergebnisse vor. Anhand des Beispiels von Nexthamburg soll im Folgenden der Aufbau und die Zusammensetzung einer partizipativen Planungscommunity nachgezeichnet werden. Als Pilotprojekt der nationalen Stadtentwicklungspolitik wurde Nexthamburg von April 2009 bis Dezember 2011 vom Bundesministerium für Verkehr-, Bau- und Stadtentwiklung gefördert. Im Sommer 2011 ist in dieser partizipativen Planungscommunity eine Befragung zur Zufriedenheit der Nutzung der bei Nexthamburg eingesetzten Beteiligungsangebote durchgeführt worden. Als Kooperationspartner war die HafenCity Universität Hamburg mit der wissenschaftlichen Begleitforschung beauftragt. Ihre Aufgabe bestand in der Konzeption, Durchführung und Auswertung der Befragungsergebnisse,

5 ÜBER NEXTHAMBURG

Nexthamburg ist eine unabhängige Plattform, auf der Bürger/innen ihre Vorstellungen über die künftige Gestalt Hamburgs äußern und gemeinsam mit anderen Interessierten diskutieren können. „Nexthamburg gibt Bürgern eine Plattform, die eine Vorstellung davon haben, welche Themen drängend sind, und ermutigt bisher planungsferne Menschen, mit spielerischen und untypischen Werkzeugen ihre eigenen Vorstellungen von der Zukunft der Stadt zu formulieren“ (Petrin 2011:25). Ein Redaktionsteam begleitet und koordiniert den Beteiligungsprozess und arbeitet daran die Ideen, Meinungen und Wünsche der Menschen zu einem Zukunftsbild zusammenzufügen. „Das Ergebnis ist eine dauerhaft fortgeschriebene Bürgervision, die Ziele und Prioritäten deutlich macht, die in die Politik und Verwaltung zurückgespeist werden und dabei gezielte Impulse auf die Stadtentwicklung geben sollen (Petrin 2011:25). Die Nexthamburg Community zählt inzwischen über 5.000 Personen (Stand Februar 2012). Zum Zeitpunkt der Befragung (Juni 2011) waren es

ca. 3.000 Personen. Die Nexthamburg Community setzt sich aus aktiven und passiven Nutzern zusammen. Damit sind sowohl die Menschen gemeint die Nexthamburg für den Informationszweck nutzen als auch jenen, die sich aktiv in Diskussionen einbringen oder Beiträge erstellen und Kommentieren. Auch die Freunde von Nexthamburg auf Facebook zählen zur Community.

5.1 Gestaltung des Beteilgungsprozesses

Der Beteiligungsprozess bei Nexthamburg gestaltet sich durch vier aufeinander aufbauende Arbeitsschritte. Auf der Webseite nexthamburg.de können zunächst von jedem Interessierten Ideen gepostet werden. Die eingebrachten Beiträge können lokal begrenzt sein und sich auf die Untertunnelung einer Straße beschränken. Sie können aber auch ein größeres Stadtgebiet umfassen wie im Fall der Umweltkarte (nexthamburg.de 2012). Andere Nutzer erhalten die Gelegenheit ihre Kommentare und Meinungen dazu abzugeben. Die so angestoßene öffentliche Diskussion trägt sowohl zur Verfeinerung als auch umfassenden Reflexion der Idee bei. Im zweiten Schritt wird von der Community via Voting über die beste Idee abgestimmt. Im nächsten Bearbeitungsstadium werden die gewählten Ideen unter Mitwirkung von Fachleuten weiterentwickelt und münden schließlich in einer Zukunftsstudie. Langfristig ist auch die Umsetzung der ausgearbeiteten Ideen angedacht.

5.2 Beteiligungsangebote

Für die Kommunikation werden unterschiedliche Kommunikationskanäle angeboten. Die Webseite nexthamburg.de dient als zentrale Plattform für den dauerhaften Online Dialog. Hier können Informationen zum Hamburger Planungsgeschehen aufgerufen, Ideen für die Stadt von Morgen eingestellt oder Beiträge anderer Nutzer nachvollzogen und kommentiert werden. Über die Webseite lässt sich auch der Onlinekartendienst Hamburg Navigator erreichen. Die Flash-Karte vermittelt dem Betrachter einen schnellen Eindruck über Ideen, Planungvorhaben und was die Hamburger gut („das find ich toll“) bzw. weniger gut („das stinkt mir“) finden. Die Onlinekarte wird zudem für das Gebäudevoting genutzt. Dort können von der Community Gebäude als Lieblingsgebäude und Abrisskandidat verortet werden. Nexthamburg verfügt auch über eine mobile Applikation. Mit der iPhone-App, Nexthamburg mobil, lassen sich Informationen unterwegs aufnehmen, kommentieren und über die Onlinekarte mit anderen Communitymitgliedern teilen.

Der Nachrichtendienst Twitter und der E-Mail Newsletter dienen wiederum der Informationsverbreitung. Mit der Nexthamburg Facebook Seite ist die Initiative auch in einem sozialen Netzwerk präsent. Facebook dient dabei dem Aggregieren von aktuellen Themen und Meldungen aus Stadtentwicklungsdebatten (Petrin 2011).

Neben den angeführten Onlinediensten finden auch Offline-Veranstaltungen statt. Sie dienen der Rückkopplung des Online Dialoges an einen konkreten Ort. Bisher wurden drei Formate erprobt:

- Sessions, in denen Ideen und Themen gesammelt und anschließend weiter bearbeitet werden.
- Zukunftscafés, die eher ein mobiles Veranstaltungsformat darstellen und die Menschen in Alltagssituationen an den Nexthamburg Prozess heranführen (Petrin 2011).
- Nexthamburg-Salon, in dem mit einem Fachpublikum Hintergrunddebatten geführt werden (Petrin 2011).

Bis zum Februar 2012 wurden insgesamt vier Sessions- Bürgerworkshops, vier Zukunftscafes und ein Salon Veranstaltung abgehalten.

5.3 Aufbau der Befragung

Um zu ermitteln, wie zufrieden die Nutzer mit den bereitgestellten Angeboten waren, ob gegebenenfalls Verbesserungen erforderlich oder Alternativen erwünscht waren, wurde eine Befragung in der Nexthamburg Community durchgeführt. In dieser sind die von Nexthamburg angebotenen Instrumente zur Beteiligung Webseite nexthamburg.de, Nexthamburg Facebookseite, Nachrichtendienst Twitter, E-Mail Newsletter, Nexthamburg mobil und Nexthamburg Sessions näher betrachtet worden. Da diese Formate wesentlicher Bestandteil der Konzeptidee von Nexthamburg sind, sollten insbesondere die Anwender an der Verbesserung und Weiterentwicklung des bestehenden Angebotes mitwirken. Im Mittelpunkt stand dabei die Frage, welche der von Nexthamburg angebotenen Onlinedienste bisher am häufigsten verwendet wurden. Basierend auf den Erkenntnissen der Befragung sollte dann das bestehende Angebot angepasst werden. Um Restriktionen

und Probleme, die von Seiten der Nutzer im Zusammenhang mit dem Internetauftritt bestanden, leichter identifizieren und eventuelle Verbesserungsmaßnahmen einleiten zu können, war auch die Benutzerfreundlichkeit der Webseite Gegenstand der Untersuchung. Fragen zum Nexthamburg-Verfahren und zur Person rundeten die Befragung ab.

Die Befragung wurde sowohl Online als auch Offline durchgeführt. Die Onlinebefragung startete am 12.05.2011 und endete am 23.06.2011. Der Link zum Fragebogen wurde zunächst via E-Mail verschickt. Ab dem 23.05.2011 stand dieser auch auf der Internetseite www.nexthamburg.de zur Verfügung. Zudem wurde über den Facebookauftritt von Nexthamburg via Postings mehrfach auf die Befragung aufmerksam gemacht. Die Offlinebefragung fand im Rahmen des Nexthamburg-Salons zum Thema „Ist die Zukunft der Bürgerbeteiligung digital?“ am 24.05.2011 statt. Der Befragungsbogen konnte von jedem Interessierten ausgefüllt werden, richtete sich aber grundsätzlich an die Nexthamburg Community. Während des sechs wöchigen Befragungszeitraums wurde der Fragebogen insgesamt 114-mal ausgefüllt. Je nach Fragestellung und Antwortmöglichkeit waren Ein-, Zwei- oder Mehrfachnennungen möglich. Die technische Umsetzung des Fragebogens erfolgte mithilfe des Onlinetools Survey Gizmo (Version 3.0). Der generierte Link, unter welchem der Fragebogen erreichbar war, wurde entsprechend in die Website nexthamburg.de, die Postings über die Befragung auf der Nexthamburg Facebook Seite und in E-Mails eingebettet.

6 ERGEBNISSE DER BEFRAGUNG

Um die Zusammensetzung und das Nutzerverhalten innerhalb der partizipativen Planungscommunity analysieren zu können, sollen an dieser Stelle sechs von insgesamt 20 Fragen näher vorgestellt werden. Der Blick richtet sich dabei neben soziodemographischen Angaben auch auf die von den Nutzern verwendeten Onlinedienste.

Die Frage nach der Geschlechtszugehörigkeit (Abb. 1) brachte hervor, dass in der Nexthamburg Community mehr Männer als Frauen vertreten waren. Von insgesamt 78 teilnehmenden Personen waren 49 Nutzer männlich und 29 weiblich.

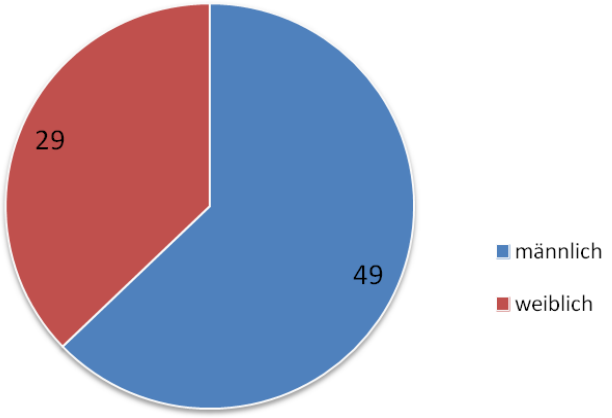

Abb. 1: Geschlechterzugehörigkeit. Frage: Ich bin männlich/weiblich.

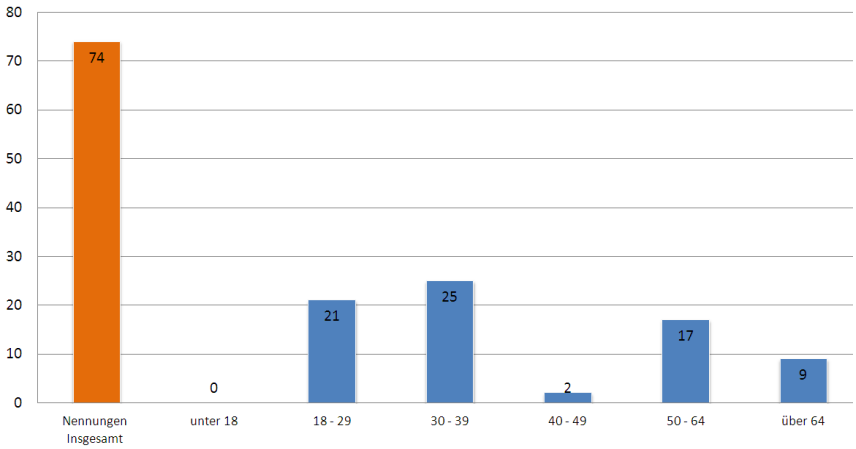

Abb. 2: Altersklassenzugehörigkeit. Frage: Welcher Altersklasse gehörst du an?

Folgende Ergebnisse lieferte die Frage zur Altersklassenzugehörigkeit (Abb.2), an der sich insgesamt 74 Personen beteiligten. Die größte Klasse der Communitymitglieder war mit 25 Angaben die Altersgruppe der zwischen 30- und 39-Jährigen. An zweiter Stelle befanden sich die 18- bis 29-Jährigen mit 21 Stimmen. Die Altersklasse der 40- bis 49-Jährigen war mit lediglich zwei Mitgliedern vertreten. Auch die Klasse der 50- bis 64-Jährigen mit einer Größe von 17 Nutzern sowie die Altersklasse der Über-64-Jährigen, welche insgesamt sieben Nutzer angegegeben haben, waren in der Nexthamburg Community zu finden. Auffällig war, dass es bei der Altersklasse der Unter-18-Jährigen keine Nennungen gab.

Ein wichtige Rolle für das Gelingen einer partizipativen Planungscommunity spielt die Motivation der einzelnen Nutzer sich am Planungsprozess zu beteiligen. Innerhalb einer Community gibt es unterschiedliche Beweggründe das bereitgestellte Angebot zu nutzen. Entscheidend dabei sind sowohl die Haltung, das Thema als auch die Frage, wie aktiv oder passiv das Angebot genutzt wird. Unter aktiver Nutzung wird das Diskutieren, Ideeneinbringung sowie Mobilisieren von Unterstützern verstanden. Währenddessen versteht die passive Nutzung die reine Informationsaufnahme.

Das Interesse sich am Thema Planung einzubringen kann in der Regel auf die persönliche Motivation zurückgeführt werden. Diese kann dabei sowohl privater Natur sein als auch aus beruflicher Verbundenheit resultieren. Um dies klären zu können, wurde in der Nexthamburg Community erfragt, wie die Haltung zum Themengebiet Stadtentwicklung gewesen ist. Insgesamt wurden 87 Nennungen erfasst. Es bestand die Möglichkeit der Mehrfachnennungen, wovon allerdings nur vier Personen Gebrauch machten. Das Ergebnis, dargestellt in Abb. 3, zeigt, dass die Nexthamburg Nutzer dem Thema Stadtentwicklung sowohl aus privatem als auch beruflichem Interesse verbunden waren. Auf beide Antwortmöglichkeiten entfielen jeweils 34 Nennungen. Mit 19 Nennungen gab eine geringere Anzahl der Befragten an, sich persönlich in der Stadtentwicklung zu engagieren.

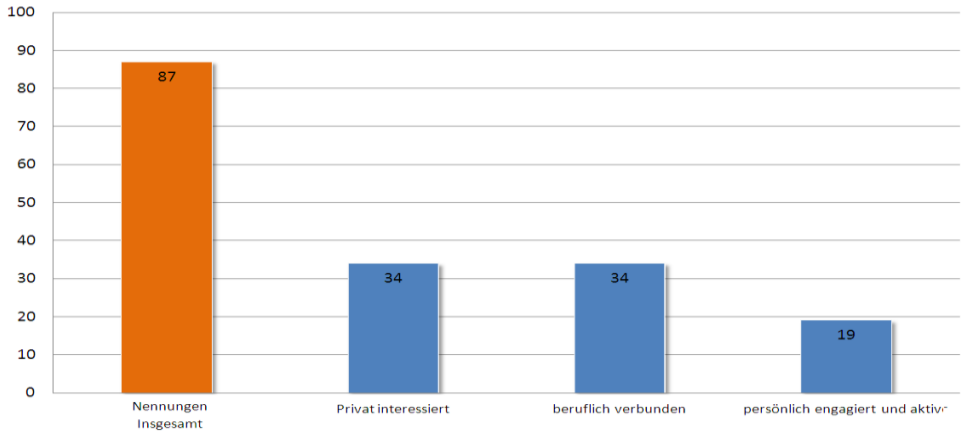

Abb. 3: Motivation. Frage: Wie ist deine Haltung zum Themengebiet Stadtentwicklung?

Auf die Frage zum Nutzungszweck der Nexthamburg Community entfielen insgesamt 162 Nennungen. Auch hier waren Mehrfachnennungen möglich. Mit Blick auf Abb. 4 wird deutlich, dass die Mehrheit der Befragten mit insgesamt 91 Nennungen Nexthamburg für die Informationsaufnahme nutzte. 28 Personen sahen in Nexthamburg darüber hinaus einen Ort, um Ideen und Verbesserungsvorschläge einbringen und diskutieren zu können. 22 Befragte nutzten Nexthamburg eher, um sich mit anderen auszutauschen. Nur acht Personen gaben an, mithilfe der durch Nexthamburg bestehenden Angebote Unterstützer für ihre eigenen Ideen mobilisieren zu wollen. Von diesen acht Personen gaben fünf Teilnehmer an, dass sie Nexthamburg auch nutzen, um eigene Ideen und Verbesserungsvorschläge einbringen und diskutieren zu können.

13 Befragte nutzten die Antwortmöglichkeit sonstige. Die Teilnehmer gaben dabei völlig unterschiedliche Beweggründe an. Für einige diente das Angebot als Inspirationsquelle und Ideengeber für den Beruf. Andere gaben an, dass sie auf diesem Wege ihre Ideen austauschen konnten. Ein Befragter nutzte Nexthamburg, um sich über die Funktionsweise und den Ablauf von Onlinebeteiligungen zu informieren.

Auf die vorhergehende Frage nach der Motivation zurückblickend waren die Antworten zur regelmäßigen Nutzung der angebotenen Onlinedienste interessant. Es wurden insgesamt 184 Nennungen abgegeben, wobei Mehrfachnennungen möglich waren (Abb. 5). So nutzten, mit 73 Nennungen, ein Großteil der Befragten die Website nexthamburg.de regelmäßig. Die herausgehobene Bedeutung sozialer Netzwerke und die daraus

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resultierende Erfordernisse, diese auch in einer partizipativen Planungscommunity zu berücksichtigen, verdeutlichten die 40 Nennungen zur regelmäßigen Nutzung der Facebookseite. Auch Angebote wie E-Mail Newsletter und Sessions wurden von den Community Mitgliedern genutzt, wenn auch mit 27 und 22 Nennungen etwas seltener. Ebenfalls wurde ersichtlich, dass Onlinedienste wie Twitter (11 Nennungen), mobile Applikationen (Nexthamburg mobil - 8 Nennungen) oder RSS Feed (3 Nennungen) noch eher selten genutzt wurden.

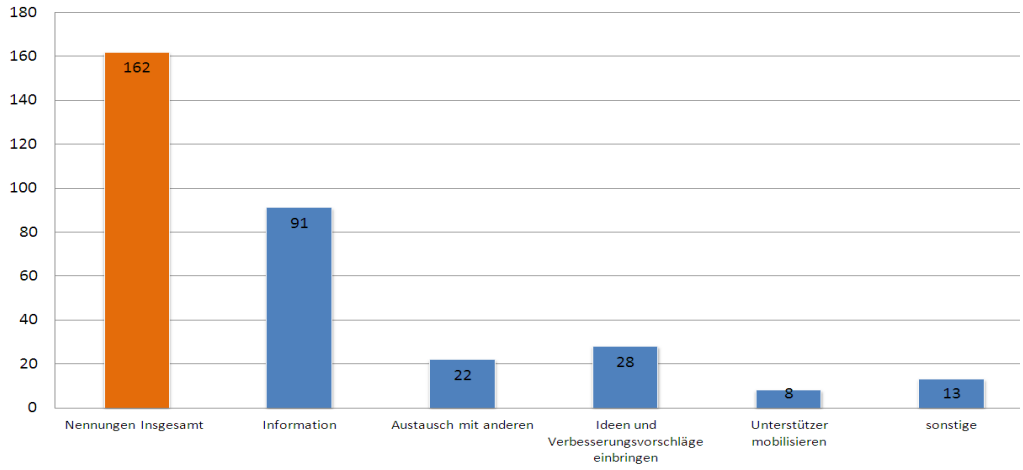

Abb. 4: Nutzungszweck. Frage: Zu welchem Zweck nutzt du Nexthamburg?

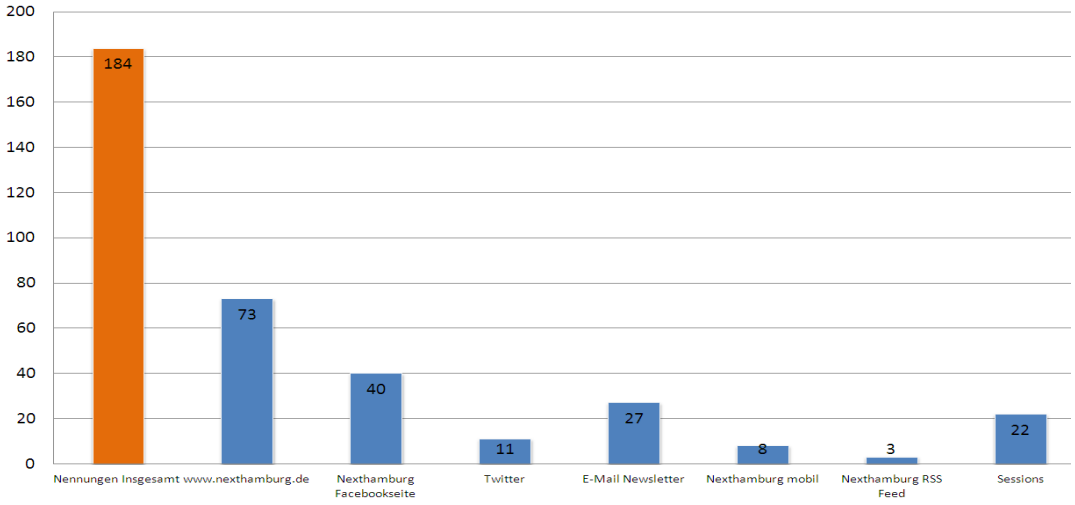

Abb. 5: genutzte Angebote. Frage:Welche Angebote von Nexthamburg nutzt du bereits regelmäßig?

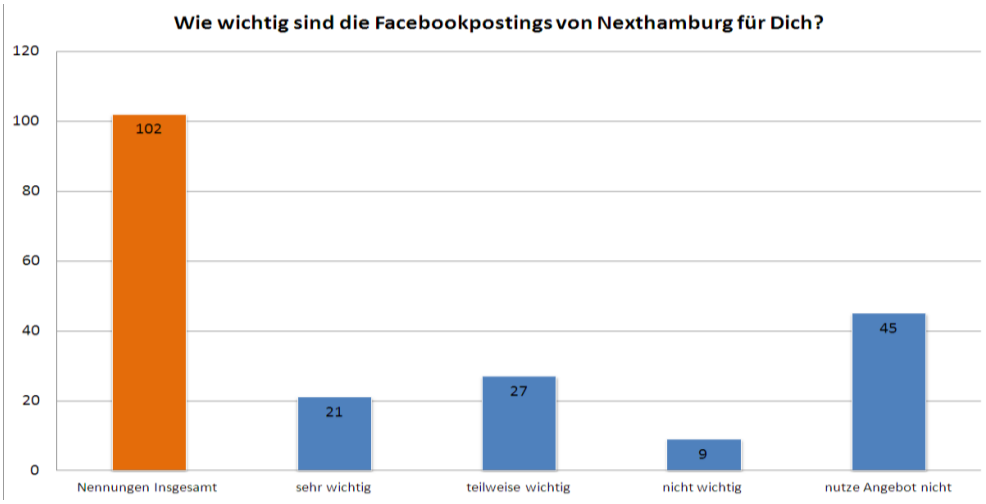

Abb. 6: Facebookpostings. Frage: Wie wichtig sind die Facebookpostings von Nexthamburg für Dich?

Zum Zeitpunkt der Befragung konnten auf der Facebookseite insgesamt 1.100 Freunde (Stand Juni 2011) gezählt werden. Aufgrund der Vielzahl an Nutzern war es daher spannend zu erfahren, wie wichtig den Community Mitgliedern die Facebook Postings sind. Diese Frage wurde von insgesamt 102 Personen beantwortet. Es konnte nur eine Antwort abgegeben werden. Von 45 Teilnehmern wurde angegeben, dass sie das Angebot nicht nutzen. Für 27 Personen waren die Postings teilweise wichtig. Für 21 Befragte waren die Facebookpostings sogar sehr wichtig und für neun Personen war das Angebot nicht wichtig. Abb. 6 verschaulicht das Ergebnis.

Fasst man die Nennungen der Befragten zusammen, denen die Postings sehr oder zumindest teilweise wichtig waren, wird deutlich, dass dieses Format für mindestens 48 Personen von Bedeutung war. Stellt man dem nun die 45 Nennungen der Befragten gegenüber die das Angebot nicht nutzten, wird sichtbar, dass die Facebookpostings gemessen an den von Nexthamburg angebotenen Kommunikationskanälen von gut der Hälfte der Befragten mindestens als wichtig angesehen wurden.

Als Gründe, warum die Facebookpostings nicht wichtig waren, wurde in vier Fällen angegeben, dass Facebook entweder nicht genutzt wurde oder grundsätzlich Vorbehalte bei der Nutzung dieses Kommunikationskanals bestanden („oberflächlich, niveaulos, Unübersichtlichkeit von Facebook, nervt!“).

7 ZUSAMMENFASSUNG UND DISKUSSION DER ERGEBNISSE

In diesem Beitrag ist die Zusammensetzung und der Aufbau von partizipativen Planungscommunities gezeigt worden. Es wurde dargelegt welche Probleme im Zusammenhang mit der Bürgerbeteiligung bestehen und welche Partizipationsmöglichkeiten durch die Nutzung von Web 2.0 Diensten existieren, Anhand des Beispiels von Nexthamburg und der diesbezüglich zur Verfügung stehenden Daten, wurde dargestellt, wie eine partizipative Planungscommunity zusammengesetzt sein kann.

Zunächst ist festzuhalten, dass trotz der breitangelegten Befragung, der Nutzung unterschiedlicher Medien und einer Communitygröße von ca. 3.000 Personen (Stand Juni 2011) die Teilnehmerzahl mit 114 verwertbaren ausgefüllten Fragebögen sehr gering ausfällt. Aus diesem Grund sind die hier dargestellten Ergebnisse eingeschränkt repräsentativ.

Bei der Betrachtung der Befragungsergebnisse wird erkennbar, dass sich die Menschen in einer Planungscommunity einbringen wollen und dies, wie im Fall der Nexthamburg Community, auch altersunabhängig tun. Den Hintergrund das Partizipationsangebot zu nutzen bildet in den meisten Fällen das private oder berufliche Interesse am Themengebiet der Stadtentwicklung. Allerdings zeigt sich mit Blick auf den Nutzungszweck der Community, dass der Anteil derer, die Inhalte erzeugen, also Ideen einbringen, vergleichsweise gering ist. Dieses Phänomen deckt sich mit den Erkenntnissen der ARD/ZDF-Onlinestudie 2011, in der ebenfalls herausgestellt wurde, dass der Großteil der Onliner nicht an der aktiven Generierung von Inhalten interessiert ist (Busemann, Gscheidle 2011). Auch spielt der Austausch mit anderen Nexthamburg Nutzern eine eher untergeordnete Rolle. Die überwiegende Mehrheit der Nutzer sieht in der Community im Wesentlichen einen Ort, um sich Informationen zu beschaffen.

Wird die Zusammensetzung der Community hinsichtlich des Alters der Mitglieder betrachtet, fällt auf, dass besonders die Altersklassen 18 bis 29 und 30 bis 39 am stärksten vertreten sind. Erfreulich ist, dass sich ältere Menschen (50+) in der Nexthamburg Community beteiligen. Die unter 18-Jähiren sowie die Gruppe der 40- bis 49-Jährigen beteiligen sich dagegen nur sehr wenig an der Nexthamburg Community. Es gilt zu überprüfen, inwiefern eine Erweiterung der Zielgruppenansprachen notwendig ist. Sollen partizipative Planungscommunities künftig als eine wichtige Beteiligungsform wahrgenommen werden, ist darauf zu achten, dass alle Altersklassen angemessen vertreten sind. Dies betrifft in erster Linie die in Nexthamburg unterdurchschnittlich bzw. gar nicht vertretenen Altersklassen der 40 bis 49- Jährigen und der unter 18-Jährigen. Sollen sich diese künftig stärker einbringen, müssen hier entsprechende Maßnahmen ergriffen werden. Gegebenenfalls ist es erforderlich für diese Zielgruppen spezielle, neue Konzepte und Angebote zu schaffen.

Die Internetpräsenz www.nexthamburg.de bildet die zentrale Plattform des Onlinedialogs und hat als solche den Anspruch einen möglichst großen Personenkreis anzusprechen. Die Resultate bezüglich der regelmäßigen Nutzung der Formate haben gezeigt, dass die Webseite bereits von vielen Befragten regelmäßig genutzt wird. Die Webseite kann daher als zentraler Ort für die Informationsvermittlung, Ideenentwicklung und den Austausch über Selbige angesehen werden. Die Präsenz in Sozialen Netzwerken

wie Facebook stellt für einen Teil der Community einen wichtigen Kommunikationskanal dar. So sind Postings für die Überwiegende Mehrzahl der Facebooknutzer teilweise oder sogar sehr wichtig. Die 1.100 Nexthamburg Facebook Freunde zum Zeitpunkt der Befragung machen deutlich, dass auf diesem Wege viele Menschen erreicht werden können. Ebenso muss jedoch herausgestellt werden, dass durch dieses Onlineangebot nicht jeder Nexthamburg Nutzer angesprochen wird. Neben einigen wenigen Befragten, die angeben, dass für sie die Facebookpostings nicht wichtig seien, gibt nahezu die Hälfte der befragten Personen an, dass sie das Angebot von Nexthamburg auf Facebook nicht nutzen. Um die Bedeutung Sozialer Netzwerke wie Facebook in einer partizipativen Planungscommunity besser einordnen zu können, besteht hier weiterer Forschungsbedarf. So ist es von Interesse zu erfahren, welche Nutzergruppen dieses Angebot am häufigsten nutzen und wofür. Von Interesse ist dabei auch, welche Rolle die Facebooknutzer innerhalb der Community einnehmen.

Mit Ausnahme des E-Mail Newsletters werden Dienste wie Twitter, RSS Feeds von den Nexthamburg Communitymitgliedern zwar genutzt, spielen im Vergleich zur Webseite und der Facebookseite eine untergeordnete Rolle. Auch mobile Applikationen werden bisher wenig genutzt. Die Gründe hierfür können nur durch weitere Forschungsarbeit geklärt werden.

Gemäß der Befragungsergebnisse haben Sessions für die Nutzer nicht den selben Stellenwert wie die Webseite oder der Facebook Auftritt. Doch unter der Berücksichtigung der Besucherzahlen aus den bisher abgehaltenen Offline-Veranstaltungen, müssen diese Angaben relativiert werden. An den Bürgerworkshops, den Nexthamburg Sessions, haben nach Angaben der Veranstalter jeweils bis zu 100 Personen teilgenommen. Selbiges kann für die Zukunftscafes gesagt werden. Diese relativ hohen Teilnehmerzahlen können als Beleg für die Wichtigkeit von Offlineveranstaltungen im Beteiligungsprozess angesehen werden.

Aus der Betrachtung geht hervor, dass Communities ein geeignetes Mittel sind, um mit einer großen Öffentlichkeit über die Themen der Stadtentwicklung ins Gespräch zu kommen. Es zeigt sich, dass der Aufbau einer aktiven Community Zeit benötigt und dass dafür sowohl Online- als auch Offlineangebote wichtig sind. Um die Entwicklung zu fördern, ist der Beteiligungsprozess fortwährend fachlich zu begleiten. Die Web-Anwendungen, ebenso wie die Offline Beteiligungsangebote können dabei helfen, aus einzelnen Ideen und Meinungen partizipativ Konzepte für die Stadt von morgen zu erarbeiten. Allerdings sind daran auch gewisse Erwartungshaltungen geknüpft. So erhoffen sich die Menschen, dass die erarbeiteten Egebnisse auch umgesetzt werden. Ist dies nicht der Fall, stellt sich über kurz oder lang Frust ein, der die Bereitschaft mitzuwirken schmälert. Somit ist in der Umsetzung von partizipativ erstellten Ideen ein wichtiger Bestandteil im Erhalt und dem Auf- bzw. Ausbau der Community zu sehen.

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BIBBIDI-BOBBIDI-BOO: The Reinvented Magic of Urban Shopping?

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1 ABSTRACT1

Built on the principles of the Athens charter and Modern movement, New Belgrade was a spatial representative of a new state and the post-war Yugoslav society. However, at the turn of the 21st century the processes of transition, globalization and EU-integration started, shaping New Belgrade into a polygon of another experiment, initiated by a number of local and foreign greenfield investments. The intensification of commercial, business and administrative activities has created a new identity of this urban entity, imposing new rules and elements into the rigid modernist concept. The shifts of consumption patterns and contemporary life style have imposed new shopping demands which reflected in a new typology of shopping nodes/centers dispersed throughout the territory.

The paper will focus on the period of the 1990s and 2000s analyzing the application of 'global rules' to shopping nodes and their network. The new layer of consumerism will be related to large/small scale spatial and social changes of New Belgrade, which have generated new urban energy while boosting further development and increasing the value of existing structures. The emphasis of the analysis will be on large shopping malls which announced another phase of New Belgrade's development offering elements of traditional 'inner city' atmosphere implanted into the modernist grid.

2 INTRODUCTION: THE JOY OF CONSUMERISM

The contemporary way of life has generated a number of problems which are directly or indirectly caused by our patterns of consumption and their effects on environment. Saturated by increasing consumerism, modern cities face difficulties related to production technologies, distribution, transportation and – consequently - pollution, while the gap between low-income and high-income social groups becomes more visible then ever. However, it is difficult to step out of the vicious circle of shopping addiction and to return to a simple fulfillment of basic needs.

The 'art of shopping' has become a well-elaborated subject for architects, urban planers, psychologist and sociologists, while its importance for urban development has been frequently underlined. Sometimes, shopping represents a necessity, everyday routine or even a nuisance. On another level, it could be glorified as an activator of total urban regeneration or it could be labeled as an instrument of personal catharsis for over-stressed consumers. Therefore, it is not surprising that the relation between shopping and urban morphing becomes very strong, which reflects in a number of types that evolved during the last few decades. Hugh Pearman (2002) identifies seven main categories/types of shopping centers – open mall, 'black box' enclosed mall, daylit covered mall, mega-mall, 'speciality center', village-like 'factory shopping center' and 'intersection city'. Most of these types could be considered as the latest development/transformation phase of a traditional shopping street, while the seventh type represents a mega-manifestation of commerce and its globalized character and performance. Pearman also emphasizes the revival of big department stores, which actually represent a social and architectural innovation of the 19th century (although the first one appeared even earlier in the UK, during the 18th century).

The position of new shopping nodes indicates recent changes and trends in urban development, demonstrating all the turbulence which occurred in the city of the 20th and early 21st century. The decline of the inner city, the expansion of town edges, urban growth and regional re-grouping, each one of these phases has affected different modes of shopping - their scale, architectural appearance, theme and attractions, favored atmosphere and relations to the city. However, the selected type of shopping could also define a preferred urban image, channeling its future nature and form (Sudjic, 1993).

[1] The paper was realized as a part of the research project "Spatial, Environmental, Energy and Social Aspects of Developing Settlements and Climate Change – Mutual Impacts" (project number TP36035), PP1: "Climate change as a factor of spatial development of settlements, natural areas and landscapes", financed within the program Technological Development by the Ministry of Education and Science of the Republic of Serbia (from 2011to 2014).

Consumerism usually overlaps with ideology, enabling a bifocal view to a society and its spatial manifestations. Therefore, this paper will give an insight into the urban transformations of New Belgrade analyzing the changes which occurred in shopping patterns during the last two decades. Representing a unique testimony of an epoch, New Belgrade has become the best example of recent social changes, revealing a striking image of transition - from socialism to capitalism (Fig. 1).

Figure 1: The image(s) of New Belgrade – snapshots of history and urban transformations (1950s and 2000s).

3 SETTING THE STAGE: MORPHOLOGY VS. IDEOLOGY

Conceived as a new administrative economic and cultural node of the post-war Yugoslavia and its society, New Belgrade played an important representative and symbolical role, which essentially distinguished its character, appearance and quality from other modern(ist) settlements and satellite towns with similar design pattern. As such, a new node of the Yugoslav capital had a necessary economic and ideological backup to implement a number of modernist ideals. Conceived as a functional city, it was composed according to an orthogonal grid of mega-blocks and mono-functional zoning. Consequently, it should have provided a variety of activities adjusted to the accepted concept and recognizable image of residential blocks with free standing buildings, greenery and large open spaces for social interactions. However, the changes of socio-political and economic conditions reduced the original idea transforming New Belgrade into a predominantly residential city. Nowadays, global trends and continuous debates about city development have underlined the importance of this area, bringing the question of its functional (re)structuring and activation into the limelight.

Figure 2: The local center in residential block no. 1 intended to serve the community cultural and daily needs.

3.1 The image of progress

New Belgrade, planned and designed as a modern, functional city, materialized some of the ideas launched by CIAM and Le Corbusier's Athens Charter. Beside its foreseen important position of a new administrative, economic and cultural hub of the capital, it also had the crucial impact on the integration of historical centers of Zemun and Belgrade into a greater metropolitan region. Thus, it does not represent a peripheral satellite settlement, but a unique central territory planned for further growth and concentration. Although conceived as a complex spatial structure with a number of functions, it was only partially realized. For many years, it has been dominated by residential modernist blocks. The mix of activities existed only on a community level, as a local center in each orthogonal mega-block, and it represented a state property (Fig. 2). The main role of every local center was to act as a meeting point, local supplier and a focus of cultural activities for the residents.

3.2 The critic of Modern

The critic of the applied modern concept marked the 1980's architectural scene, together with the impacts arising from the changed socio-political context. The concept was re-questioned, a number of problems was detected and some ideas about a renewal of this area appeared. This situation caused a shift of the original paradigm, transforming the open plan of New Belgrade and adjusting it to new users and needs. These changes could be decoded through two interesting events related to two different spatial levels. The first was The international competition for the future of New Belgrade, where majority of authors proposed fragmentation of over-scaled urban elements/blocks and suggested a return to traditional urban values. The second one was visible through the reinvention of residential scenery i.e. the construction of semi-open shopping centers which represented extensions of existing local centers.

The concept of these shopping centers was more traditional than modern, since their form and function resembled features and the atmosphere of old urban cores. Mostly composed of one or two longitudinal buildings, these nodes of shopping usually occupied only ground floor level. The space was divided into separate functional units – small shops which could only be accessed from outside. The variety of mixed contents included fashion stores, bakeries, cafes, bookstores, home appliances, etc. The land was state-owned, but each store was in private ownership. However, having in mind their small spatial capacity and structure and the fact that they were constructed only in a few mega-blocks, their role was mainly identified on a local level (Fig. 3).

Figure 3: First shopping centers built in New Belgrade - a/ the position in the block; b/ and c/ the built structure.

3.3 The period of transition

After 1989 and the beginning of European integration, Yugoslavia disintegrated. During the 1990s, the political, economic and social situation in Serbia was additionally complicated by the influence of international embargo, civil wars in ex-Yugoslavia and a continuous flow of refuges from ex-Yugoslav republics. Belgrade, as a capital, again became a stage for social turbulence, while New Belgrade, once conceived as an administrative and residential paradise of a socialist society, lost its prominent label. Reflecting a gloomy reality and limitations imposed by the economic isolation of the country, its urban tissue became a setting for new social transformation and architectural experiments.

The new postmodern streams that already emerged in the profession set off an imperative of 'thickening' the urban structure of New Belgrade. The guidelines were clear – to recreate a human scale of streets, to provide better accessibility for pedestrians, to reconsider scale of mega-blocks, superpose traditional urban patterns and, finally, to stimulate mixed-use by introducing new activities - culture, commerce, business, etc. (Milakovic and Vukmirovic, 2011). Consequently, the changed socio-economic circumstances and preferred spatial concepts reflected in the typology of shopping centers/nodes and this period generated three new types.

The first one – the flea/open market, represented a direct consequence of social stratification. In order to support socially vulnerable groups and meet their needs limited by low-income, this type was generated from informal sales near official markets and along streets. In time, this mode of shopping was relocated to a new, legal(ized) site, utilizing a large wired plot in which metal counters were set in rows. The market is totally open-air, with some characteristics of oriental bazaars (Fig. 4). The plot is still city-owned but each counter is private. Although its main role is to sell a wide range of products, there are some complementary activities, such as cafes and restaurants. The gravitation area of the largest New Belgrade open-market has also changed along with the change of its informal character. Nowadays, its importance on a city level is additionally supported by the proximity of a metro/tram station and a large parking lot.

Figure 4: The flea/open market - a/ the position in the block; b/ the entrance to the market, and c/ the daily atmosphere.

The second type appeared in a form of semi-closed malls along the main boulevards in just one area of New Belgrade and there are two examples of this concept. The spatial organization is based on a longitudinal building parallel to the main street, with two levels – ground floor and first floor. There are two types of galleries – closed, oriented toward the inner space, and opened, oriented toward the street. Both galleries actually represent a special kind of pedestrian 'street', providing access to all stores (Fig. 5). The longitudinal form is divided into three sections and two central atria are designed to be meeting points. Activities range from simple fashion stores to kindergartens and private medical offices. The buildings are still owned by the city, while individual stores are private. Parking lots exist, but their capacity in both cases is limited and inadequate – for ex. for more than 500 stores in one of the malls there are only 96 available parking places.

Although with similar spatial and functional structure, two representatives of this type have generated different importance and impact. The one which was built first remained locally oriented, attracting mostly residents of the nearby blocks. The structure of users has been changed in the second mall, becoming the biggest Chinese shopping center in the city and evolving into a shopping node of regional importance. This trend also influenced some changes in social diversity, replacing the inherited consistent structure of residents (originally mostly middle-income state officials) with a more multicultural (and globalized) milieu, composed of newcomers attracted by specific economic circumstances.

Figure 5: The semi-closed mall in Block 70: a/ the position in the block; b/ the system of open and closed galleries; c/ the daily atmosphere.

Figure 6: The transition type: from the semi-closed mall to the enclosed mall.

The third type actually represents a transition mode of the enclosed mall. Its semi-closed scheme consists of satellite standalone buildings located on the same lot/block. Visually, the central facility (the shopping center) and the surrounding satellite buildings are perceived as a single 'unit', although the outlying buildings are not physically connected (Fig. 6). At first, its importance was recognized on a city level, but nowadays its activities are mostly limited to the local area. Since it is not a typical representative of its kind, this paper will not consider further details.

4 MIRRORING THE GLOBAL FASHION

4.1 Shopping (in) the City

At the turn of centuries, the political and economical conditions in the country became more or less stable and a transition towards democracy influenced significant changes in planning practice. Stimulated by international trends, the area of New Belgrade has commenced its new life cycle and its disadvantages turned out to be potentials: the low index of built areas has indicated a number of possibilities for large development projects, while infrastructure and connectivity have provided a good backup. Open public spaces in this area have embraced some elements of traditional design and the process of reorganization and upgrading has started – responding both to an internal pressure (to transform the spatial structure) and respecting the global trends. The privatization of some public spaces has become a reality, imposing a business interest over the public one. The commercial facilities have been considered as positive markers of neighborhoods, while the penetration of private sector and the increased commercialization of public spaces have been accepted and promoted as an appropriate answer to the problems of mono-functional zoning and an opportunity to intensify activities, their quality and diversity (Fig. 7).

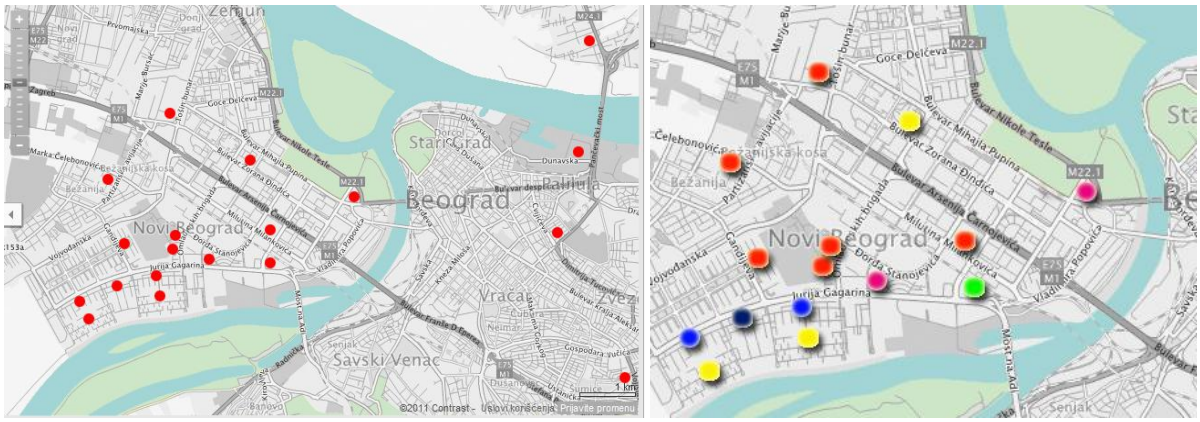


Figure 7: a/ Concentration of shopping malls in Belgrade; b/ Distribution of shopping mall types in New Belgrade (yellow – semi-open; blue – semi-closed; red – ‚big-box‘ mall; pink – enclosed mall; green – open shopping center).

The first enclosed malls in New Belgrade were positioned at strategic locations, attached to important traffic arteries. Occupying large plots they represented large retails, i.e. parts of different chains that operate a store. Their physical structure cold be classified as the ‘big-box’, a free-standing two story building, with a totally closed compact space (Fig. 8).

Figure 8. The first types of enclosed (big-box) malls in New Belgrade.

However, the typical representatives of the enclosed type appeared in New Belgrade few years ago. Since then, their number has increased, as well as a level and number of their activities and facilities. The design is introverted/inward-facing and its internal organization is based on theories which ‘control’ customers’ behavior (for example, the Gruen transfer - the moment when consumers respond to "scripted disorientation" cues in the environment; the effect of the transfer is marked by a slower walking pace). Like in many other cases, the mall is designed as a regional shopping hub and its building represents only a part of a larger superstructure, which also includes offices and/or residential space. The mall is up to three stories high, designed around two central atria, with a wide selection of stores, as well as with a number of entertainment facilities, fast-food outlets, restaurants and public areas (Fig. 9). The mall has its own social and functional dynamic, oriented towards the consumer. The shopping area is combined with a system of enclosed

walkways for pedestrians, which represents a modern version of the traditional marketplace. A convenient parking area is situated in an underground garage. One of the advantages of this type is certainly a permanent control of micro-climate.

Figure 9. An example/the biggest enclosed shopping mall (Usce): a/ the position in the block; b/ the connection to the historical core (via one of the major streets); c/ the internal atmosphere.

Obviously, the identified types (Table 1) are well positioned in the contemporary consumption pattern(s), but depending on their spatial and functional concept (which is the result of all inherited/imposed ideological stimuli) their attractiveness varies, as well as the level of their adjustment to current needs. Therefore, some of these shopping structures seem to be outdated or even abandoned, but the general image represents New Belgrade as a new shopping paradise. From approx. 0,5m2 of retail space per inhabitant (during the 1970s), the municipality of New Belgrade has nowadays around 1,6m2 of retail space/inhabitant, which is the highest ratio in Belgrade.

The established urban magnetism has certainly brought a significant financial benefits, but some other levels – mostly social and ecological, have to be reconsidered and thoroughly evaluated in the next phase of urban development and growth.

4.2 Shopping and environment

The current situation in New Belgrade has caused a number of environmental problems and dilemmas. Some of them are related to old/inherited types of shopping centers, their structure and performances, while others represent results of the recent urban intensification triggered by the construction of new shopping malls. The concerns about energy efficiency and environmental protection have opened a new perspective of the future urban transformation, focusing a professional and public attention to accumulated problems of pollution, waste recycling and thermal control.

The main challenges, identified after the introduction of new, 'globalized' patterns of consumption, could be divided in three groups which are mutually dependent:

- traffic – increased intensity, points of congestion, critical routs, car-friendly vs. pedestrian-friendly concept, parking capacity;
- environment – air pollution, waste recycling, climate, carbon intensive vs. carbon-free consumption;
- energy – heating/cooling, renewable sources, thermal insulation, natural systems vs high technology.

In New Belgrade, the crucial impacts could be decoded in the increased intensity of traffic and the appearance of new points of congestion. This problem is mostly related to the shopping malls of regional importance, which are positioned along strategic routes of the city, in a close proximity to the access points to New Belgrade. Since these shopping malls represent car-friendly structures, they cause major traffic congestion and obstruct expected mobility. The consequences could be also detected in air pollution and changes of micro-climate. The other types of shopping centers in New Belgrade have more pedestrian-friendly concept. However, in comparison to them, parking capacities in enclosed malls are well calculated and designed.

characteristics/ representatives	physical			Functional			social		environmental		
	surface and height	openness or closure	internal organization/concept	activities/structure	quality of activities	services	structure of users	special significance	included by project or not	microclimate	indirect impacts on the environment

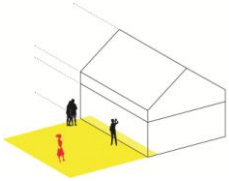
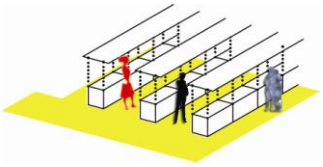
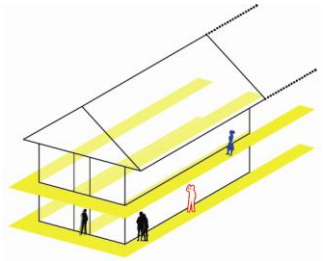
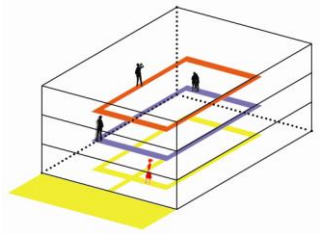
block 45 and 70/extensions 	1500 – 2000m2/P	semi-open shopping centre	traditional open streets	mix-use/not satisfactory	not satisfactory	/	local level	only on local level/residents of a block	no	good/considering open/air concept	/
block 43/flea market 	23000 m2/P	open shopping centre	characteristics of traditional bazaars	mix-use/not satisfactory	average	parking	city level	meeting point	no	good/considering open/air concept	increased traffic
block 45 and 70/multicultural transformation 	10000 – 15000 m2/P+1	semi-closed shopping mall	traditional streets and squares	retail and wholesale	not satisfactory	parking/inadequately dimensioned	regional level	meeting point/symbol – element of new identity	no	bad	increased traffic
block 16 and 67/new city markers 	50000 – 85000 m2/P+2	enclosed	traditional streets and squares	mix-use/satisfactory	good	parking, business, residential	city and regional level	meeting point, element of new identity	yes	good	increased traffic/air pollution

Table 1: Main types of commercial spaces in New Belgrade and their characteristics.

Regarding energy consumption, new enclosed malls are better designed than other types. The attention was mostly payed on thermal insulation. However, the latest standards of energy efficiency are not applied and there are still no attempts to orient/shift existing shopping centers to renewable sources of energy or (re)use of natural materials. The territory of New Belgrade is covered with remote heating system. However, all shopping centers use unsustainable systems of cooling.

The differences between identified types of shopping centers certainly direct future actions but the introduction of new environmental standards and their adjustment to local conditions should become an imperative for every process of renewal and/or transformation. The magnetism of consumption could also be used as an instrument of public promotion and education – suggesting and testing an environmentally conscious approach through various campaigns and activities.

5 CONCLUSION: FACING THE EFFECTS

The latest type of shopping malls, which is inserted into the urban tissue of New Belgrade, has become a landmark on several levels – local, city and regional. The changes in consumption patterns have also resulted in different urban morphology and functional structure, but in general, transformations could be decoded in several spheres:

- economy (higher rates of land and apartments in the surrounding area);
- society (new elements of multiculturalism/cosmopolitanism);
- space/activities (space attractiveness, intensification of pedestrian flows, articulation of meeting points, structure and quality of activities);
- environment (new standards and challenges).

Simultaneously, the contemporary urban needs, new inhabitants and recently improved attractiveness of New Belgrade have instigated some modifications of old types of shopping centers, as well as a new life of ex-community centers (initially with cultural activities). These new forms of shopping actually upgrade the previous content, providing a number of additional activities and public/communal facilities - such as libraries, theaters, banks, recreational units, pubs, groceries and even some civic initiatives (for ex. New Belgrade's Cultural Network), etc. As the trend grows, other facilities are usually developed around the existing centers increasing the significance of the center among local residents and other users on the city level (Fig. 10).

Figure 10. a/the local community center in block 45 - the public event 'New Belgrade – the city of the open heart'; b/reconstructed movie theater - multipurpose hall.

The shopping landscape of New Belgrade, currently composed of old and new types of commercial spaces, still needs to be thoroughly evaluated and subordinated to an integral vision of development. The physical, functional, social and environmental elements of each type provide a comprehensive image of a current situation and/or undertaken actions, while the synergy of global trends and local economy direct further guidelines. However, the magic of consumerism remains. Nowadays, it is in a glitzy package wrapped with mixed-use and new aesthetic, but the ultimate sensation and excitement are guaranteed.

You just have to pay for the spell.

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Can Universities Facilitate Cities to Function Better?

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1 ABSTRACT

According to Florida (2003), a better functioning city, offering high quality life style and amenities, can attract a huge number of creative people who in turn can influence businesses to locate there. In the tourism literature it has been mentioned that among the limited things the tourists want a city to have are good public transport, less congestion, safety, and night life. Therefore, it seems that the prospective permanent settlers and visitors look for a few common qualities in a city. Both of these groups of people have the potential to boost the economy and quality of life of a city.

Campuses of many universities across the world are located in a major city. Auckland is one of them. It locates two universities in the heart of the city. Among these two, The University of Auckland is the prime one with over 30,000 students studying on the City Campus. With so many students commuting to the university and spending a significant portion of their time in the city, they are likely to make an impact on the way the city functions.

Auckland is New Zealand's premier city and has been recently rated as the third-best city of the world to live in as per Mercer's rating. However, a record number of people have left New Zealand shores in recent times. Auckland is beset with some problems, such as traffic congestion and it hardly functions as a 24/7 city. Through literature review and a recent survey of the students at The University of Auckland, which mainly examines their commuting behaviour, this study tries to find out whether the university can facilitate Auckland to function better and thereby attract more tourists and reverse the brain-drain.

2 INTRODUCTION

In his legendary study, Florida (2003) observed that Pittsburgh had been losing talented young people from the core of the city and the surrounding areas since 2000. This was contrary to the fact the city became the top ranked liveable city in the USA in 1986 and continued to be ranked high since then. Their departure has been accompanied by a relocation of new companies to other regions and plateauing of the economy. Florida found that young people might even be moving to much smaller cities like Austin for lifestyle reasons including great night life. He termed these people, who were highly educated and drawing a handsome salary, as creative class. They are engaged in different types of work across different industries. The corporate profits from their input and economic prosperity increasingly depend on them. From Florida's study, it seems that for a city to prosper economically it must retain and attract quality workforce by providing amenities desired by them.

Along with the permanent residents, the temporary visitors or tourists are also important for the economy of a city. Coincidentally, the amenities that attract urban tourism are somewhat common to the ones desired by the creative class (Florida, 2003). Among the limited amenities cherished by the tourists in a city are nightlife, good public transport, shops and restaurants (Enright & Newton, 2005).

Auckland has been recently ranked as the third best liveable city as per Mercer Rankings. Unfortunately, it does not guarantee that the city would experience a huge economic growth. In fact, like Pittsburgh the signs are not encouraging for Auckland. Recently there has been a trend of a huge number of people leaving Auckland for other countries, especially Australian cities (Inkson et al., 2004). It is time that attention is given to a few key aspects of the city that could enhance its attractiveness to the creative people as well as the tourists, as tourism is one of the largest foreign currency earners for New Zealand.

Auckland is one of the few major cities in the world that has two universities located in the Central Business District (CBD) – The University of Auckland (UoA) and Auckland University of Technology (AUT). UoA is one of the leading universities of the world and New Zealand's largest with over 33,000 students. Cities function as complex sytems (Batty, 2008), but it is difficult to study the urban phenomenon as a whole (Lefebvre, 2003). In this study, we mainly focus on two aspects of a city, public transport and nightlife, and try to determine the ways UoA could facilitate Auckland to function better. Besides literature review, a recent survey of students regarding their commuting behaviour is used for this purpose.

3 NIGHLIFE AND 24-HOUR CITY

The city centre has been experiencing the loss of its status as the hub of the retail, business, entertainment and cultural activities for the surrounding areas since the early 1950s in the US and later in the advanced western countries (Thomas & Bromley, 2000). In recent years there have been initiatives in some of these countries to revitalise the Central Business District (CBD). Revamping the nightlife economy and extending the operation of the downtown for even up to 24 hours have commonly featured in the solutions to the problem (Bianchini, 1995; Hollands & Chatterton, 2002; Roberts & Turner, 2005).

There have been a number of research carried out in different cities in Britain in recent times, with a view to adopt the '24-hour city concept' and address issues related to it, using the lessons learnt from the European cities since the late 1970s (Heath, 1997; Hollands & Chatterton, 2002; Roberts & Turner, 2005; Thomas & Bromley, 2000). From his literature review, Heath (1997) listed the reasons for adopting the 24-hour city strategy in Britain, which included safer city, economic regeneration and city image. The last aspect is important for giving a competitive edge to a city (Lovatt & O'Connor, 1995). The initiatives based on the strategy included prolonging the activity period and introducing a variety of evening and nighttime activities to cater to different categories of people (Thomas & Bromley, 2000). One of the issues that needed to be addressed first was to fill the void in time between closure of offices and shops and early evening services, such as restaurants, theatres, cinemas and concerts. This could be done by extending the shopping hours and promoting a café culture (Bianchini, 1995; Heath, 1997; Thomas & Bromley, 2000).

The integration of office hours with the evening activities would also address the important issue of safety in between 5pm, when the offices and shops usually close, and 7pm, when the diners, cinema- and theatre-goers set into the city, who are later followed by pub and club clients (Thomas & Bromley, 2000). The city centre is sparsely occupied during 5-7pm, leading to a concern about the safety by the potential visitors, especially in winter. The perception of lack of safety has discouraged people, living in the suburbs, to visit the central city and reduced the amount of pedestrianised activities. For example, Thomas and Bromley (2000) report from a survey of potential shoppers in New York that 63 percent of the sample did not visit the city centre regularly owing to fear for safety. In another survey conducted in Birmingham, it was found that 69 percent of the respondents refrained from visiting the CBD at night. Similar findings were found from a survey in Swansea. In Britain, the reduction in natural surveillance due to the loss of people living in the core of the city is often associated with worsening of the safety factor. The decrease in natural surveillance in evening often leads to avoidance of the central city by the public.

In line with Florida (2003), Hollands and Chatterson (2002: 292) mention that 'young urban service workers, graduates and students, knowledge professionals and cultural intermediaries' are the main consumers of a city's nighttime and cultural economy. Thomas and Bromley (2000) conducted a survey in Swansea to learn about the pattern of evening and night use of the city centres. The respondents who visited central Swansea in the evening mainly went to the theatres, restaurants, shopping malls, cinemas and pubs. Each of these venues had different appeal to different categories of people. For example, both middle and youthful age groups resorted to latenight shopping, while cinemas, pubs and clubs attracted the youthful age group (16-29 years) more. Hollands (2002) also mentions that young adults are more likely to visit pubs and nightclubs compared to the general population. He indicates that young people have been found to be attracted to café type bars in recent times. In order to increase the social mix, the activity patterns in the central city could be diversified through street entertainment and festivals, and creatively organised functions in venues like museums, galleries and leisure centres (Thomas & Bromley, 2000).

Nearly half of the survey participants in Swansea avoided bus for their trip to the CBD, due to concern for safety. The steps for expansion of the nighttime economy needed to be complemented by improving the access to the area through adequate public transport provision (Hollands & Chatterton, 2002; Thomas & Bromley, 2000). Thomas and Bromley (2000) particularly put emphasis on increased surveillance on board and at major transport terminals.

The 24-hour initiative and vibrant nightlife have negative aspects as well, such as violence, disorder and crime (Chatterton, 2002). Especially, late hour trading has given rise to alcohol consumption in many cities across the world (Peters, 2010). Some of the incidents at nighttime are linked to alcohol drinking. Mostly male and youth were found to be associated with heavy drinking in Britain (Bianchini, 1995).

4 URBAN TOURISM

Urban tourism means tourism in the city (Law, 2002). Law (2002) mentions that large cities attract a number of visitors. They visit central cities due to their diverse functions and varieties of activities (Lawton & Page, 1997). The tourists definitely need transport to move around and travel to different destinations. Albalate and Bel (2010) report that urban tourists prefer to avoid private transport due to high cost, effort and hassles associated with driving. They are more likely to use public transport. In one study it was found that three-fourth of the tourists in Manchester used public transport (Thompson & Schofield, 2007). In fact, Public transport plays a big part in urban tourism development as it can even influence destination choice and raise the image of a city (Albalate & Bel, 2010; Thompson & Schofield, 2007). Tourists are becoming more environment-concerned these days and attach importance to sustainable modes (Baysan, 2001).

In order to attract more visitors through maiden visits, repeat visits and referrals, a city needs to demonstrate its competitive edge (Enright & Newton, 2005). Transportation facilities, along with shopping and nightlife feature in the factors influencing competitiveness of destinations in a study by Enright and Newton (2005). Nightlife is ranked highly for two cities – Hong Kong and Singapore - in the statistical analysis conducted by them.

Auckland contributes a big chunk to New Zealand's tourism revenue with a share of 27 percent (ARC, 2009). Lawton and Page (1997) conducted a survey with the tourists in downtown Auckland and found that most of the respondents had strong educational background and there were 32 percent professional or managerial workers. Coincidentally, their profile is consistent with the creative class people defined by Florida (2003). Among the activities or attractions the tourists wanted to visit, shopping was the most favourite choice followed by bar/nightclub, museum and art gallery. It seems the visitors are more interested in the activities of the city centre and attracted by its nightlife. The extension of the operation time of the city centre favours the tourists (Deffner, 2005). However, there is a little concern about safety in Auckland. While discussing the results of two surveys, Barker and Page (2002) mention that Auckland was rated the lowest among nine major national destinations with regard to safety in a survey of tourists, and in another survey 71 percent of the respondents were of the opinion that the level of safety needed to be improved in the CBD. In their own survey of tourists, they found that 10 percent feared for safety at some point in their trip.

5 AUCKLAND CBD AND THE UNIVERSITY OF AUCKLAND

The CBD is the hub of business, culture, recreation and leisure in Auckland (Auckland City Council, 2003). It is a triangular area covering 433 hectares of land (Fig. 1).

Fig. 1: Map showing The University of Auckland and Auckland University of Technology within Auckland CBD. (source: generated by the authors using Auckland Council GIS Viewer)

The number of tourists staying in the city centre has been increasing gradually over the years and doubled between 1991 and 2001. So has their duration of stay. Auckland CBD is New Zealand's largest centre in terms of employment with about 78,000 workers at the moment, increasing by 30 percent in the last ten

years. It has maintained a stable share of around 25 percent employment of Auckland City over the years. Tertiary education contributes to 5.7 percent of the centre's employment that makes it the fourth largest industry there. Area-wise the education sector uses around 15 percent of CBD's office space. This sector has experienced growth in the CBD and took 29 percent share of total education industry's employment in the Auckland City in 2002. The number of educational institutions in the central city stood around 100 that year. These include private secondary schools, private training establishments, and public tertiary institutions. Among these, UoA and AUT are the largest ones with current enrolments of about 19,000 and 30,000 students respectively. They are located in the central-east part of the CBD (Fig. 1). The University of Auckland is one of the leading universities of the world and the largest in New Zealand. It has 5 campuses with the main one in the downtown occupying 20.3 hectares of land (The University of Auckland, 2010). Unlike other universities, UoA operates from 8am to 6pm, with classes mostly taking place between 9-5. Most of the university offices also operate from 9am to 5pm. This pattern of operation deprives the university to bridge the time gap between the closure of business and nighttime activities in the city centre. Moreover, the students and staff are compelled to commute during the morning and evening peak hours, contributing to the congestion in the CBD.

6 THE SURVEY OF THE UOA STUDENTS

A random questionnaire survey was administered on the students of UoA in 2010 at a common space on the City Campus, which attracts visits by most of the students on a regular basis. The main purpose of the survey was to investigate the commuting behaviour of the students. There were 249 respondents. The survey provides some data which gives insights into some of the issues investigated in this paper.

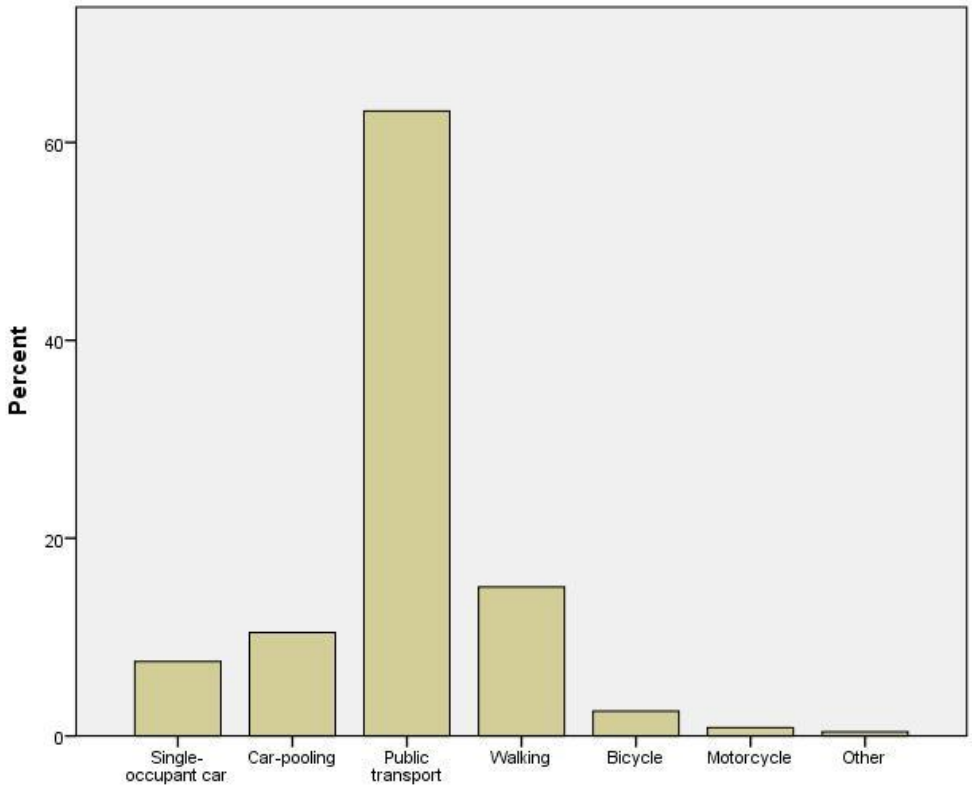

Fig. 2: Major mode usually used by the students to commute to The University of Auckland (source: survey conducted by the authors, 2010)

Fig. 2 shows the modal shares for the main mode used for commuting to the university. Contrary to the trend found in Auckland, the students used public transport extensively with more than 63 percent of the students using either bus, train or ferry to commute to the university. The modal share for bus was the highest with 51 percent. While this is positive for public transport patronage in general, there is a concern when we look at their commuting times in Fig. 3. It can be observed that 75 percent of them travelled to the university between 7-9am, which is considered the morning peak for Auckland (Ceder, Net, & Coriat, 2009).

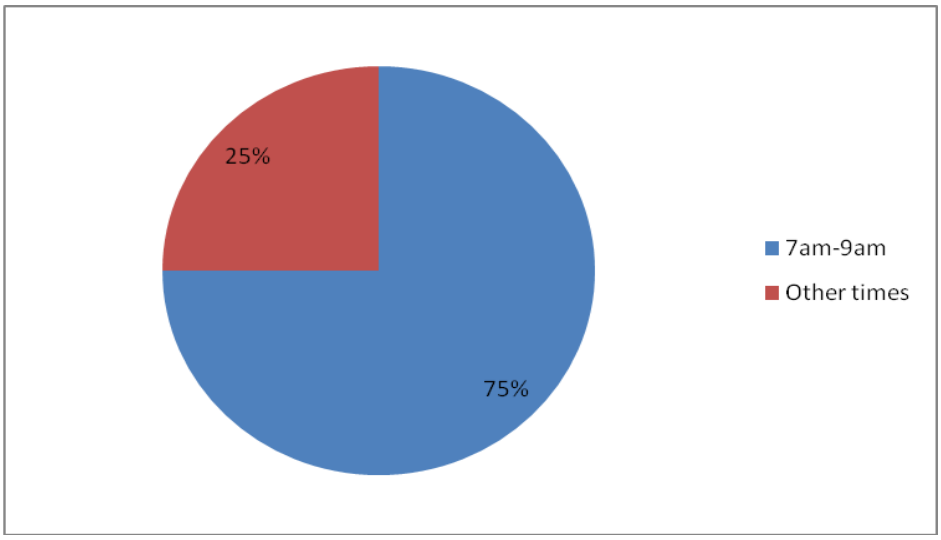

Fig. 3: Period of the day when students commute to The University of Auckland (source: survey conducted by the authors, 2010)

Though overall public transport usage is low in Auckland with a modal share of 4% (Auckland Regional Council, 2010), buses are usually crowded in the morning peak hours. This might deter some of the potential commuters from using the buses and some of the existing bus riders might consider switching to private vehicles. In the survey, we asked the students to indicate what they perceived as the main problems of morning peak-hour travel. More than 50 percent of the respondents mentioned congestion and about one-fifth mentioned inadequate public transport (Fig. 4). It is not surprising given their experience of travelling in crowded buses in the morning.

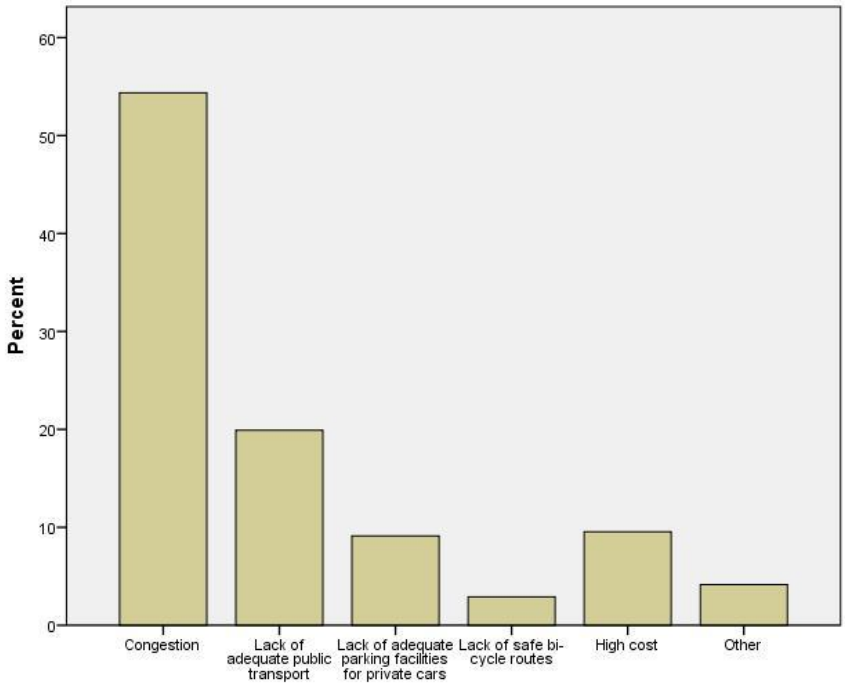

Fig. 4: Students' perception of main problems of morning peak-hour travel in Auckland (source: survey conducted by the authors, 2010)

If it was possible for the students to travel to the university after the morning peak period, it would mitigate some of the problems associated with morning peak-hour commuting to the CBD and public transport patronage in the off-peak period.

7 DISCUSSION AND CONCLUSION

With so many students studying at The University of Auckland, they can contribute to better functioning of the city centre if the operation period of the university is extended like many other similar universities of the world (e.g., The University of Sydney, Australia). One of the main hurdles for the nighttime economy to

flourish is the period after the offices and shopping centres in the CBD close. As the streets become empty the people are hardly encouraged to visit the CBD in the late evening to participate in different nighttime activities. Due to lack of patronage, some of the activities which could have run in late evening do not operate. Like some other cities, Auckland also faces the problem as most of the offices and shopping centres close between 5-6pm. As per previous studies, one way of mitigating this problem is to bridge the gap between closure of offices and evening dining time by extending the shopping time and café culture. The students could play a role here through their presence on the campus and movement through the CBD. As a large proportion of students use public transport, it is likely that most of them access the service at Britomart, the transport hub of the city, and at other locations of the CBD. Their presence and movement would increase the natural surveillance, which has been identified as a key factor for people to feel safer and encourage them to visit the city centre, especially since the university students have a good image in the eyes of the public. The students themselves could be the customers of the shopping centres and café and participate in the nighttime activities. By encouraging more people to stay on and enticing more people to visit downtown in the evening, the nightime economy could flourish and the nightlife could be made exciting and entertaining through varied activities.

Longer operation of the university would also allow flexibility in class hours and the students would be able to commute to the university after morning peak period. That would make the buses less crowded in the peak period and encourage office goers to ride buses more. It would also solve some of the problems relatad to shortage of public transport patronage in the off-peak period, especially in the evening, leading to balancing the demand throughout the day. As a result, it would help the public transport operators to offer better and frequent services, and reduce the dependency on subsidy. The central city would be greatly benefitted from the better service.

A vibrant nightlife served by a high quality public transport is likely to attract more tourists to Auckland and also fulfil the expectations of the creative class people. By having more overseas visitors and retaining and attracting highly talented people, the economy of Auckland could experience better growth.

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Changing Sub-Urban Land Uses to Urban

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1 ABSTRACT

The constant population increase of big cities has led to their sprawl towards areas that are close to the big centers. Places that used to be sub-urban or they were used as recreation places are through time changing and are mutating to urban areas as they accommodate increasing population.

The initial planning for these areas was based on their small population that was estimated to be increasing with slow pace. The rapid increase that was not predicted by planning found these areas not prepared for these changes. The arbitrary constructions combined with the lack of recent plans have led to the creation of unplanned areas were land uses are allocated randomly.

The aim of the current paper is to investigate the land uses kinds and posts in the sub-urban areas of the Athenians basin, that have during the past ten years mutating in urban areas. The paper will focus on the kind and the way new land uses have been allocated in these areas where planning does not exist. Finally it will evaluate if these land uses unplanned changes through time have covered the needs of the "new urban" population.

2 THE CREATION OF THE SUBURBS

The word suburb derives from the Latin word suburbium that means under the city. It is not recent, as in Rome, the capital of the Roman Empire; rich people moved to the hills of the city, away from the poor and there they constructed their luxury villas. Today, the word suburb is used to describe an area that is separate and in a commuting distance from the existing urban area but co-functions with it. This happens because suburbs are mainly residential areas that have not been developed autonomously, but are functionally connected with the urban core that concentrates the majority of functions.

Suburbs are the answer to the constant land demand versus the urban sprawl. They first emerged in the 19th and the 20th century because of the rapid population increase in the big cities taking advantage of the improved road and rail transport. They are organized, low-density areas that are designed in order to contain the urban sprawl and the exurbia development that is taking place particularly in the United States.

The creation and the development of the suburbs is taking place in three distinct stages. It begins as a residential phenomenon, encouraged by government expenditures on highways, favourable mortgage policies, and mass-produced suburban housing allowed for greater affordability. The fact that lower than in the city land values and easy automobile access exist, leads in the second stage when large-scale enterprises move in the suburbs. This second phase of suburbanization is also characterized by the relocation of manufacturing establishments to the suburbs, driven both by availability of cheap land and proximity to an increasingly suburbanized workforce. In the third stage, administrative functions begin to relocate to suburban office space and begin to spread beyond the urban cores. The three stages have been accomplished in the suburbs of the United States in the last years. In addition, many similar cases of three stages suburban development have been recorded in Europe.

In Greece, suburbs were initially planned cores that were distant from the central area and were intended for high-income class as vacation areas. Through the years the intermediate areas were constructed so the suburban areas became parts of the urban continuous, that is constantly sprawling in the big urban centers of Greece. The case of Kifisia is characteristic as it was the vacation area of rich Athenians and today is a part of the urban continuous of the Athens capital. Today the trend of the capital's population is to move to areas of the Mesogia plain that are connected with new infrastructures network and have the advantages of low-density development.

The research will focus on this new kind of suburbs that used to be villages or recreation areas distant from the urban centers but in the last twenty years are mutating to urban areas with the allocation of new functions and the arrival of new residents that are encouraged by the newly created infrastructures.

3 SUBURBAN DEVELOPMENT IN GREECE

Greece is a 130.100 km2 country that presents a wide variety as its geomorphology is concerned. The rapid movement of population towards the big urban centers that took place in the last century with intensity that varied according to the economic, political and other circumstances led to the dissertation of the mountainous areas and the gigantism of the urban areas. The framework for the urban policies in Greece began in 1920 with legislation that influenced in a big decree the cities of today. According to this decree, the areas around the existing cities could be constructed with some restrictions that were most of the times ignored, with the tolerance of the state and the inefficiency of the controlling mechanisms. This fact, for almost a century, has led to urban sprawl, which today is the main way for cities extension. Today, the existing legislative urban framework that is based on incrementalism has worsened the cities expansion. It is characteristic that the two largest urban centers of Greece are expanded in the way that is shown in Figure 1 (Athens expansion) and Figure 2 (Thessaloniki's expansion).

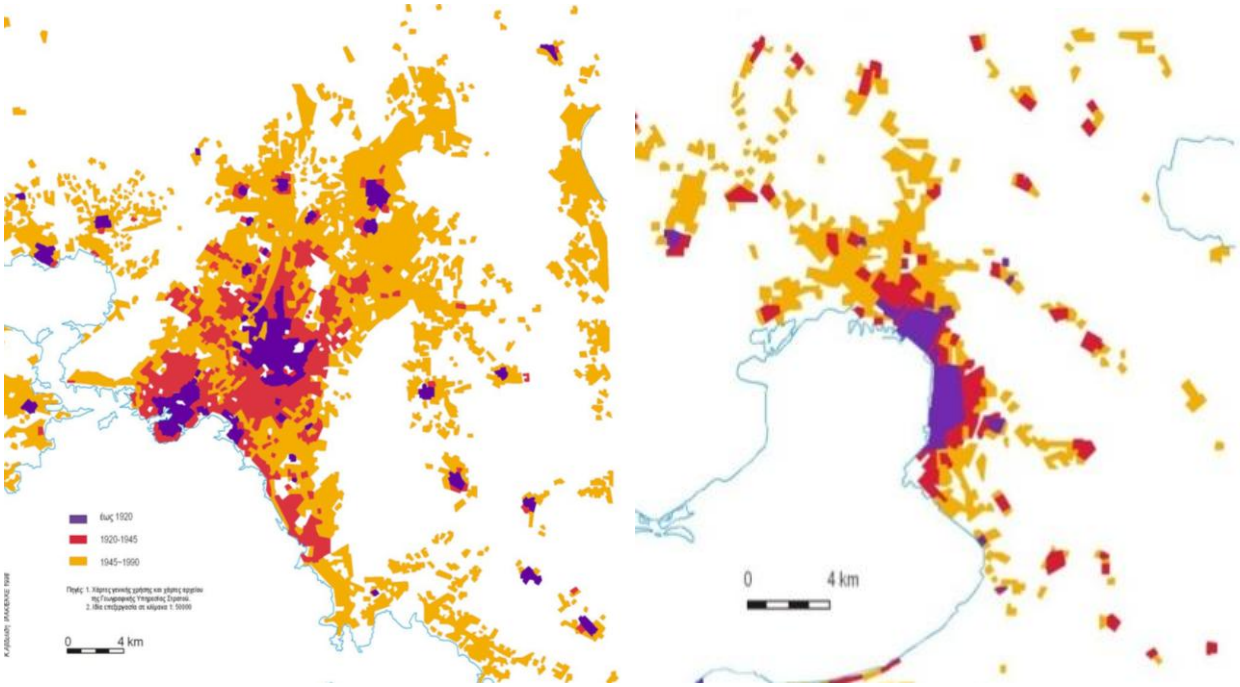

Figure 1 (left): Athens expansion. Figure 2 (right): Thessaloniki's expansion.

As it is shown in the above figures, except from the areal continuous that is presented, new suburban poles were since 1920 created. The research will focus on two types of suburban areas.

The first type is the villages that were distant from the urban core that were autonomous settlements isolated from the then shaped urban areas. The need for new urban land gradually mutated these areas that today function as suburbs of the central core.

The second type that will be examined is the coastal suburban areas, which were developed as recreation areas. These coastal areas today have mutated in urban areas that are constantly attracting new residents.

4 THE CASE STUDY

The case study of the current research is the settlements-suburbs that are developed in the Mesogia plain (Figure 3). They are divided in two types. The interior areas, that used to be small villages of Athens and their economy was based on agriculture and livestock-farming and the coastal settlements that were developed as recreation areas, where Athenians residents used to go for their vacation. These areas used to have a steady pace of development until the 21st century when infrastructures were developed. The new airport that was constructed and was supplemented by a new rail connection and a highway that served the basin with the wider area, led in a rapid population increase that was not expected. So, as planning was lacking, land uses followed a "laiser faire", for their allocation.

The current research will evaluate the changes of land uses in these two types of settlements and investigate if they have mutated to urban areas or they still have their initial functional character. The records from the 1991 and the 2001 population and employment censuses will be used are. The statistical technique that will

be used is Principal Components Analysis, which will reveal if land uses structures have been developed or if functions kind and allocation are random. This is possible because for these areas, informed plans still do not exist and the existing urban legislative framework provides the freedom to the majority of land uses to be allocated wherever they prefer.

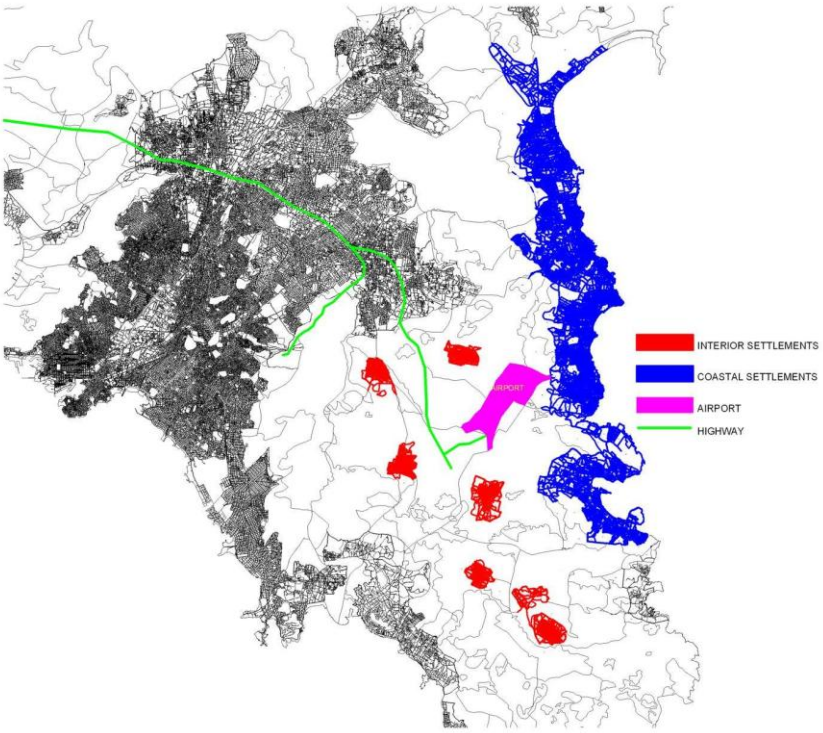

Figure 3: The areas of the case study.

4.1 The interior suburbs

The six interior suburbs that will be examined are Spata, Koropi, Peania, Markopouloo, Kalivia and Keratea (Figure 4). These settlements used to be small villages with economy based on the production of goods that intended for the big city.

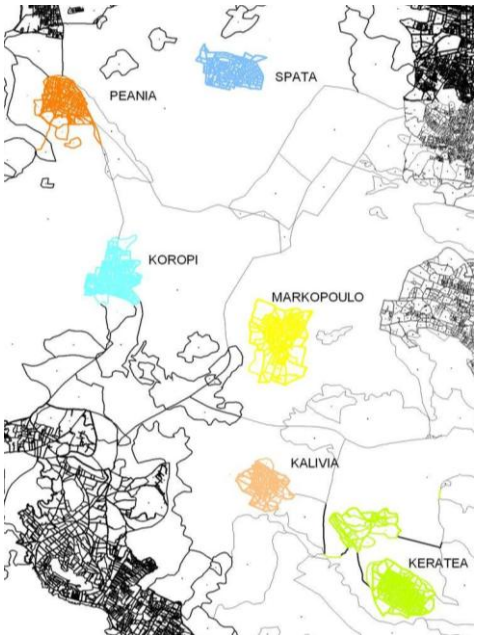

Figure 4: The interior suburbs.

These areas population has rapidly increased in the last twenty years and the employment on the tertiary sector on some of them has doubled during the examined decade. The fact that the Greek state had not

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predicted this rapid increase is shown by the lack of flood preventing and sewerage network while illegal constructions are constantly created around these settlements without planning.

The detailed changes of population and employment in the six areas are shown in Table 1. The changes that have been recorded show that in all sectors the employment has increased. It is the tertiary sector where more new employees are recorded. A more detailed investigation shows that this increase is not caused by big enterprises but from small new activities that are allocated in these areas. As for their kind, the new activities are mainly public infrastructures as schools and administrative units but also retail trade services. Therefore, supralocal activities have not been developed but the majority of functions aims to the satisfaction of these areas residents needs.

SETTLEMENTS	DATES	POPULATION	EMPLOYEES	MANUFACTURE AND INDUSTRIES	TERTIARY SECTOR
SPATA	1991	7.796	2.355	597	1.758
	2001	10.203	3.119	883	2.236
	2001 - 1991	2.407	764	286	478
PEANIA	1991	9.727	2.532	592	1.940
	2001	13.013	4.337	1.502	2.835
	2001 - 1991	3.286	1.805	910	895
KOROPI	1991	16.813	3.407	1.515	1.892
	2001	25.325	4.766	2.067	2.699
	2001 - 1991	8.512	1.359	552	807
MARKOPOULO	1991	6.716	2.330	775	1.555
	2001	7.614	2928	840	2.088
	2001 - 1991	898	598	65	533
KALIVIA	1991	7.357	2.611	800	1.811
	2001	12.202	4.235	1.519	2.716
	2001 - 1991	4.845	1.624	719	905
KERATEA	1991	6.712	2.134	840	1.294
	2001	7.430	2.430	902	1.528
	2001 - 1991	718	296	62	234

Table 1: The changes in the six interior settlements.

Kalivia settlement has the biggest population increase while Koropi (Figure 5) is the most populated area. The execution of Principal Components Analysis in Koropi, the settlement where the majority of employment is concentrated, shows that in 1991, a date when still planning did not exist, 18 groups of functions are recorded.

Figure 5: Koropi settlement

The first and most frequently faced grouping of functions is composed by incompatible functions that are allocated in Koropi's centre. It is a phenomenon of many small Greek settlements, the majority of urban

activities that are not compatible, are concentrated in the centre, while in the rest areas, houses and other small activities are allocated.

One decade later, the groupings that are shaped are not different. Still incompatible groupings are composed and are allocated in the settlements core with a random way as regulations in the kind and post of functions have not revealed. The fact that new activities are allocated in the settlement and restrictions do not exist has led to an erratic development that is characterizing the majority of the Greek cities and is through time incrementally controlled.

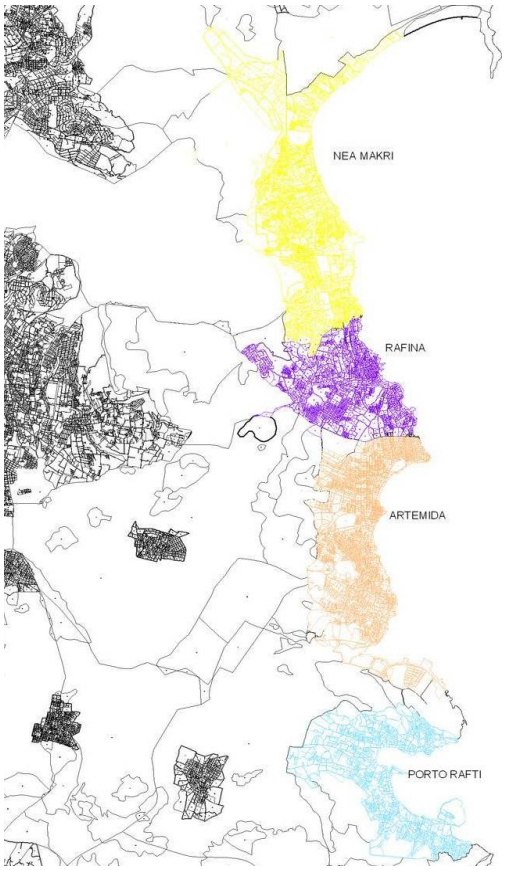

Figure 6: The coastal suburbs

COASTAL SETTLEMENT	DATE	POPULATION	EMPLOYEES	MANUFACTURE AND INDUSTRIES	TERTIARY SECTOR
ARTEMIDA	1991	9.485	3.151	946	1.777
	2001	17.391	6.751	2.070	3.968
	2001 - 1991	7.906	3.600	1.124	2.191
PORTO RAFTI	1991	3.293	1.196	322	702
	2001	7.131	2.757	683	1.677
	2001 - 1991	3.838	1.561	361	975
RAFINA	1991	8.611	2.669	659	1.672
	2001	11.909	4.613	1.197	3.012
	2001 - 1991	3.298	1.944	538	1.340
NEA MAKRI	1991	13.009	4.533	1.051	2.689
	2001	14.809	5.315	1.229	3.494
	2001 - 1991	1.800	782	178	805

Table 2: The changes in the four coastal settlements.

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4.2 The coastal suburbs

The four coastal suburbs that are examined, have diachronically shaped a continuous in the east coast of the basin (Figure 6). Initilally they were cores that are sprawled in the coastal area taking advantage of the freedom that has been provided. They are preffered because of their adjacency with the sea and they have gradually mutated to main residence areas.

It is characteristic that on the contrary with the interior suburbs, a more intense population increase is realised, while the employment has increased in a slower pace (Table 2). The settlement that will be examined is Artemida which concentrates the majority of population.

The biggest increase is recorded in the tertiary sector, as uses of trade and services have been allocated. The manufacture and the industrial sectors have also increased but with a slower pace. The examination of the structures of land uses that have been shaped will be revealed with the use of Principal components analysis on Artemida's recorded employment of 1991 and 2001.

Figure 7: The Artemida sprawl

The Principal Components Analysis that is realised in the 1991 employment shows that the allocation of functions is completely random (as 23 groupings have revealed from 49 activities) and they are allocated in a scattered form with small concentrations in the coastal zone.

The corresponding Analysis in the 2001 employment shows that a grouping of tertiary activities has been shaped but is still allocated in a scattered form. So, it seems that some activities tend to create cores of similar or related functions but they still have not shaped areas with specific functional character. If we take into consideration that the majority of constructions were illegal and planning for this area is recent, the fact that functions tend to auto-regulate is a sign of urban development.

5 THE EVALUATION OF THE MUTATION OF SUBURBAN TO URBAN DEVELOPMENT.

The process of urbanization is a complicated procedure that is influenced by many factors. The research tried to examine if areas that have recently concentrated new residents, have mutated to urban or if they still have their initial character. It focused on the areas that accept pressures on land demand and searched for the changes that have been realised in them.

The research examined two types of areas, the interior and the coastal. The interior areas were closer to the urban centre, the capital of Greece and they were functioning for two centuries with economies based on rural and livestock-farming activities. The coastal areas were distant from the centre and they were exclusively recreation areas with very small permanent population.

It is concluded that it is more difficult for the interior areas to mutate to urban than the coastal, as land uses are concerned. The interior areas have concentrated a variety of new activities that are randomly allocated in the total of the area. They have also not shaped groupings of uses. This can be explained by the fact that it is more difficult for areas that have been functioning in a certain way for years to adjust in new conditions.

This phenomenon is overloaded by the fact that urban plans do not exist so a regulative framework that would manage the kind and the allocation of the new activities is lacking.

On the contrary, the coastal areas have concentrated not only new residents but also activities that tend to auto-regulate as during a decade they have shaped groupings of activities that are still randomly allocated. They have the characteristics that make them more attractive for new residence areas and they are more easily adjusted in the new conditions, as they have not yet been shaped.

Therefore, in the Greek suburbs the first stage of development, the population's increase has been achieved, while the second and the third stage have been accomplished up to a point, as land uses still have not shaped the structures and the areas that would mutate their suburban functional character to urban.

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City Region of Short Distance for ALL? Planning the 'Everyday' for a Diversity and Mixity of Users in Functional Areas

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1 ABSTRACT/KURZFASSUNG1

The region/city of short distances is mostly linked to small scale and neighbourhoods and planning focus is local at the level of a quarter. But: women and men, girls and boys in the 21st century are no longer reduced to a quarter/¬village but are living in functional areas which includes several quarters, village and neighboured city, the whole country and with support of social media, Europe and the world.

Demographic change remixes the cities and city regions: Ageing society, migration flows from rural to urban, multiple residences, changes in working life careers and changes in partner and family models as well as a shift in societal roles of women and men, young and old as well as the related spatial impacts and demands for updating infrastructure are necessary. Looking at these dynamics from a gender planning prospective means, recognizing a growing diversity of time space patterns, looking very closely at users' needs and integrating the „everyday" of daily routines and the spatial requirements of the care economy like social infrastructure and services into spatial concepts. As a planner, I am interested in the interplay between changes in time space patterns (going regional to functional areas) and the necessary adaption of instruments for a gendered planning approach local to regional scale.

Rethinking planning for changing population is in focus of two research and planning projects of the author: „DEMOCHANGE – adaptation strategies to spatial planning and regional development" (Alpine Space countries, www.demochange.org) and an ESF-founded project on "Gender equality in Bavarian rural areas".

Examples and experiences of the authors work from these two projects and further examples from Spain and Finland shall bring some evidence for adapted planning approaches and pathways for the much needed innovations in planning theory and practice for a participative approach for a user oriented infrastructure planning.

Following key questions will be treated:

(1) Which infrastructural needs are emerging and which planning instrument can enhance to plan for functional areas?

(2) How can basic infrastructure co-developed and maintained in times of budget cuts without ?

(3) The everyday at regional scale? How can we plan for functional areas?

(4) What does "integrative planning" and "transdiciplinary" mean in practice?

2 NEIGHBOURHOOD IN FUNCTIONAL AREAS – A GENDER PLANNING APPROACH

It is assumed that spatial planning is intended to provide equal living conditions for all, to combat spatial and social disparities and to ensure equal access to services and labour markets, and that it incorporates the public interest into the development of land by suppressing selfish actions (Fainstein 2009).

It is generally assumed that gender planning supports the everyday life of women and men and opens up perspectives for sustainable development at a communal and regional level (Fainstein and Servon 2005, Horelli and Wallin 2009). Suitable spatial conditions may, for example, alleviate the everyday life of men and women through short distances and good public transport connections and accessibility, through appropriate open spaces, local proximity and a range of infrastructures (Zibell 2006, Damyanovic 2007).

Women have still to combine housework, family work and paid work. They look after children or persons in need of care, manage the household, are gainfully employed and undertake all the trips related to these duties. If planning efforts are to succeed in providing a better quality of life for men and women, it is imperative to include the principles of gender (and diversity) in planning tasks.

[1] The paper is based on a presentation held on Oct 4 2011 at Universitat Politechnica de Catalunya in Barcelona at the ETSAB (=Escola Tècnica Superior d'Arquitectura de Barcelona) during a conference on Urban studies, gender and feminism.

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But from a feminist perpective, these societal roles of women and men cannot be accepted and confirmed as gendered roles but they have to be de-constructed and changed (Massey 2004, Fainstein & Servon 2005).

Figure 1: Gender planning – key concepts and elements (photo Wankiewicz 2004)

Furthermore, spatial conditions, time space patterns and the scale of daily routines and activities of women and men, boys and girls are changing (Tummers 2007a and b)

In the paper I argue that space time patterns for care economy and for work, recreation and community work and citizens participation are changing from local and neighbourhood areas to regional scales the so called "functional areas".

To give an example about functional areas from the Demochange project: The map shows daily working commuters in 68 communities in Pinzgau, Lungau and Pongau. The spatial commuter patterns show, that the 68 communities – representing the local and the neighbourhood – are oriented towards 6 – 8 working centres, their functional areas. The same upscaling from neighbourhood level to functional areas is happening for care infrastructure, for public and private services and for shopping centres. We can also see a geographical change of personal networks (family, friends and business networks) from neighbourhood and local scale to regional, national and global scale (Demochange Salzburg 2011).

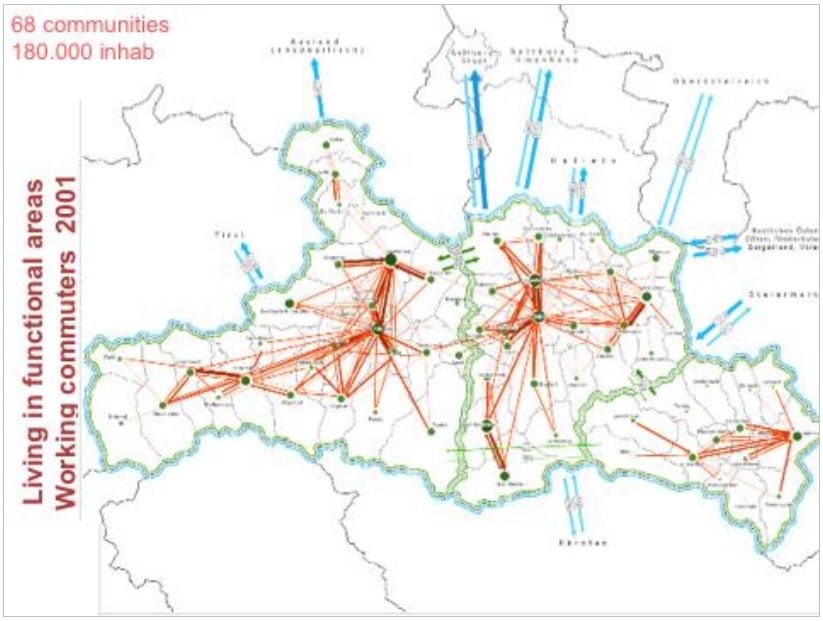

Figure 2: Daily working commuters between communities of the southern districts of Salzburg: Pinzgau, Pongau. Lungau (line sizes shows the number of commuters. (Demochange Salzburg – map iSPACE 2011).

Hence, it is enormously important to upscale a gender planning approach from neighbourhood and local scale to strategic and regional scale: according to Larssons, the integration of gender planning approaches is neglected for spatial strategies and comprehensive planning concepts (Larssons 2006, 25ff). It is much more difficult to ask for the visions and experiences of people, women and men, girls and boys at this complex planning scale. But an essential condition for delivering good local gender planning concepts is the integration of the "everyday" and of the experiences and know how of women and men into strategic planning concepts.

Larssons and others describe the difficulties and obstacles within our planning cultures to involve people into plan making and to transfer the collaborative planning approach from local and neighbourhoods scale to city regions and beyond (Healey 1994, Jacobs 1961). The big challenge is to overcome administrative boundaries from the very strong municipal level – which have much power in planning legislation and implementation in most of the European countries – to weak regional level or functional areas without any administrative or legal power.

The following chapters show several practical examples and propose some core elements and the potential of an upscaled participatory gender planning approach for functional areas.

3 PRACTICAL EXAMPLES OF "PLANNING FOR FUNCTIONAL AREAS"

3.1 Bavaria – gender equality in rural areas[2]

The project has been initiated by the Bavarian State Ministry for Labour, Family and Women as "gender atlas". Atlas means just mapping and analysing data to know more about inequalities of women and men in Bavaria. The author was involved as gender expert for the Grontmij Gmbh Munich in both stages, in project design and in implementation.

One effort of the project team was to involve people into the development and the analysis of the Bavarian districts and communities. So a series of workshop with stakeholders from district level in five so called "reference districts" has been organized. About 160 civil servants, policy makers, heads of local and regional associations and vocational training and educational institutions have been involved into a "reality check": this means to check the results of the quantitative statistical analysis with the perception and qualities as seen from their professional view. In further workshop they brought in their experiences and interests on the definition of a set of goals and fields of action.

The second aim of the team Grontmij – Magel – planwind for the project was to sensitize on the gendered distribution of paid and unpaid (care) work. Then to set benchmarks and to initiate discussions in order to have some impact on policy makers and equality policies.

So the spatial analysis of the Bavarian communities (more than 2800 communities) and districts not only shows the situation of women and men, but also highlights the differences between women and men: Based on the methodology developed in 2007 by the German Federal Institute of Research on Building, Urban Affairs and Spatial Development (BBSR 2007) for a german atlas of gendered differences – the so called "difference map" shows how big are the differences between the sexes. Figure 3 shows the difference of percentage of women and men aged 15 – 65 working in industry and production in district of Oberallgäu, Bavaria: between 13 and 33% more men are working in this sector than women (dark blue)

One important element of the project was to bring into discussion the unequal distribution of care and family work and to show regional differences between metropolitan areas and rural areas.

To give an example: figure 4 shows that more than 90% of parents on parental leave for caring for their young children are women (left map) and less than 30 % even less than 10 % of these parents have been men.

[2] ESF-funded project. Warum Frauen nicht arbeiten können und Männer das Geld verdienen. Mehr Chancen¬gerechtig¬keit im ländlichen Raum Bayerns durch Vereinbarkeit von Familienarbeit, Erwerbs¬arbeit und Freiwilligenarbeit. English translation of the title „Why women cannot work and men earn the money. More equality justice in rural Bavaria through balanced care work, paid work and voluntary work" (author's translation) Munich http://www.stmas.bayern.de/gleichstellung/atlas. online Access 22.09.2011

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This big difference also has been shown in a difference map to highlight the big inequalities and the gendered distribution of tasks between care work and paid work.

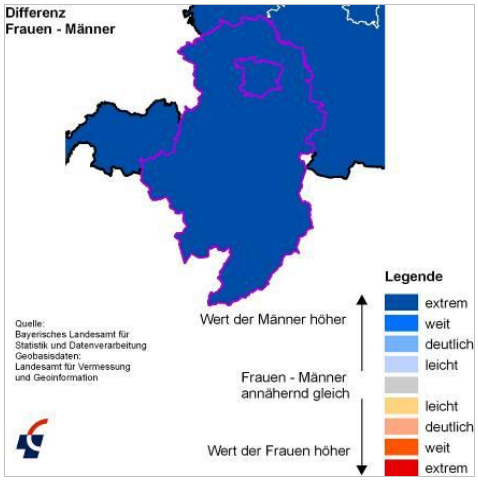

Figure 3: Difference in percentage between women and men working in industry, production and building enterprises in district of Oberallgäu (blue means: value of men higher, red means values of women higher) (Grontmij-Magel-planwind 2011)

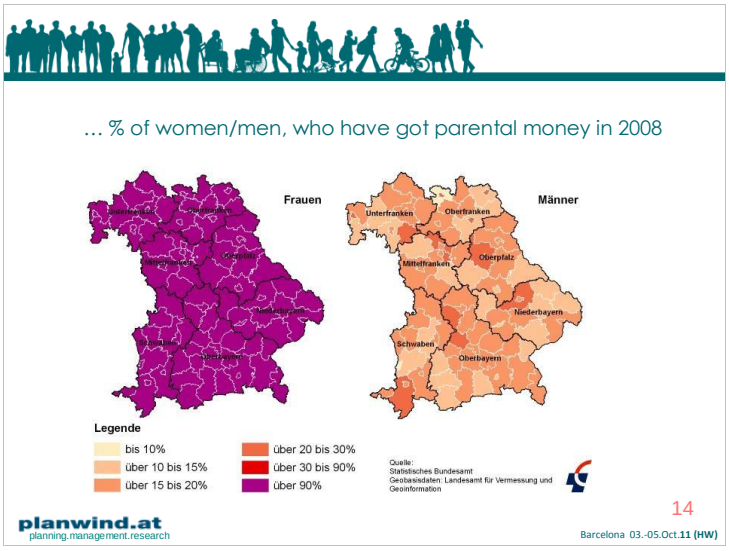

Figure 4: Gendered distribution of child care work between women (map on the left side) and men (right side). The map shows the percentage of women/men of all women aged 15 – 65 being in parental leave. (Grontmij, Magel, planwind 2011)

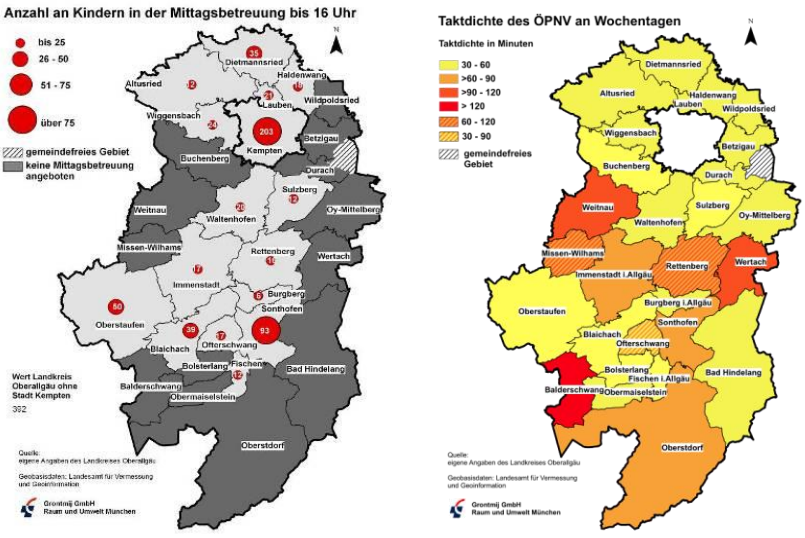

Figure 5: Left: Day care infrastructure with lunch and opening hours till 4 p.m. for children aged 0 – 15 in district Oberallgäu. Size of the cercle according to the number of children. 12 communities are without any day care offer (dark grey areas) Right: Bus schedule at weekdays – dark red colors show frequence less then all 120 minutes (Grontmij, Magel, planwind 2011)

Finally, in four Bavarian districts the statistical analysis has been deepened and linked to spatial conditions and to public and private infrastructures: infrastructures like shops and services for daily needs, the location number, type and the opening hours of child care facilities, the location of schools, the frequency of public transport services at weekdays and at the weekends, the number of households with broadband internet access, etc..

The analysis and the mapping of these infrastructures was done for district level (between 20 – 29 communities) and not only for community level to be close to the concept of functional areas. By this, a discussion about accessibility and quality of services, autonomous mobility of children and adults (without car) and the lack of infrastructures and services could start for district level and for local level. The project focus was limited to research and basic discussions.,

Figure 5 shows two examples of infrastructures closely linked: day care infrastructure with lunch for children aged 4 – 15 and frequency of bus services on weekdays in communities.

3.2 To summarize

The project gives a first overview on gender differentiated statistics in Bavarian districts and communities with focus on imbalances and inequalities in care work, labour market, income, participation in political decision making, education and mobility. But: the quality of statistical data is not satisfying: very few data are available for community level to give detailed information about the local level and show differences and qualities within districts. Within the project, it was not possible to analysis the spatial situation and the location, number and quality of public infrastructure for Bavaria, but only for

Participation and involvement of people only was possible for the spatial analysis and a general set of goals and measures.

It is just a starting point for regional and local gender planning projects to co-create the essential infrastructures for everyday life and to initiate projects for more equality between women and men.

4 DEMOCHANGE SALZBURG.[3] A PARTICIPATORY APPROACH FOR CO-CREATION OF INFRASTRUCTURE AT LOCAL LEVEL FOR FUNCTIONAL AREAS

DEMOCHANGE – demographic change in the Alps is an INTERREG IV B – Alpine Space project funded by EU 2010-13. 13 partners from Germany, Austria, Slovenia, Switzerland and Italy cooperate to raise awareness, decide on strategies and pilot actions to face the challenge of ageing, multicultural and gendered societies. In focus of the project are the spatial effects of demographic change and the development of strategies and measures in spatial planning and in regional development. The author is project manager and gender planning expert for the federal state government of Salzburg, department of spatial planning.

Each of the 13 partners started a participatory process in a so called model region to co-develop a common diagnosis of the challenges and options (regional analysis), to choose a focus issue and than to co-develop appropriate strategies and measures with regional and local policy makers.

Salzburg model region is the southern rural part of Land Salzburg. Three very different districts in size, in accessibility, in landscape, built environment and cultural life. 184.000 inhabitants (2008) – this is about 40% of Land Salzburg population – 68 communities. This means 66 male mayors and 2 female mayors, in total 68 local administrations and community councils governing communities from 250 up to 15.000 inhabitants with 8 regional centres with more or less urban housing, shopping and service structures.

Not only the size but also landscape and settlement structure, accessibility, economic and social structure of the communities are different. From suburban situation – 30 minutes driving or public transport distance from city of Salzburg – to remote and periphery situation with travelling distance up to 2 ½ hours to city of Salzburg.

Economically, the region is highly touristic with strong winter tourism industry: in some smaller communities the number of tourists per inhabitants is very high, e.g. in the ski resorts of Region Amadé, in Obertauern, in Kaprun-Zell/See and in Saalbach-Hinterglemm. There is also summer tourism linked to national park ‘Hohe Tauern’, hiking, climbing, mountain biking and trekking activities.

[3] Details on project structure, partners and results see www.demochange.org (international webpage) and www.demochange.at (Salzburg webpage)

There is a considerable number of industry and commerce enterprises, in building sector, in metal construction (Liebherr cranes), plastic industry (Senoplast), aluminium industry (SAG-Lend) and skiing industry (Atomic & Blizzard – already in international ownership).

Strong changes in age structure, migratory movements, labour and family models: The population in the 3 districts has been growing within the last 20 years, it is foreseen that till 2030 the population stays stable. There is only one region which looses population and is shrinking a long term – the district of Lungau (district of Tamsweg). The average age of the population in the model region now is 40 years, 2032 it will rise up to 45 – 47 years.

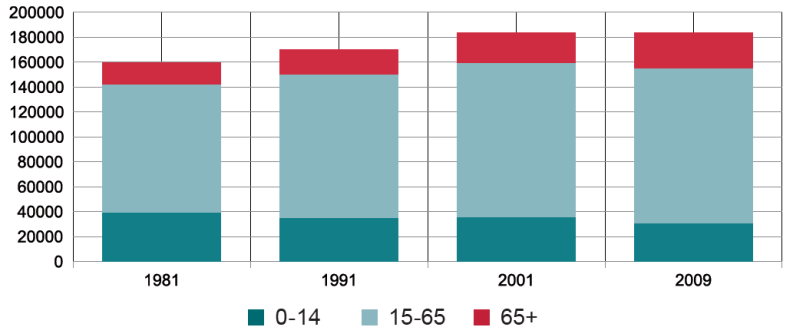

Figure 7: Change in age structure 1981 – 2009 per age cohorts in the Salzburg model region. (Statistik Austria 1981,1991, 2001, 2009, Demochange Salzburg, 2011)

We see strong migration movements from small communities to centres, loss of services and infrastructure in smaller communities and growth of shopping areas and infrastructure in the regional centres. We see strong in-migration of work-force since the seventies into tourism and industry: from ex-Yugoslavia, Germany and Turkey. We also see in migration from Germans, Dutch and British newcomers who first bought secondary homes, than stay as new residents, this brings more diversity of nationalities, lifestyles and family models. We see out-migration of young people, more women than men, following higher education opportunities, urban cultures of cities and job offers. This causes a mismatch between job offers and job demand as well as educational careers of young people (see UPIRS 2011).

Family models have been changing, from couple 2 children models to "patchwork families" with children from different parents, single mothers, LAT partnerships (="living apart together") and lesbian-gay partnerships. Female participation in the labour market – strongly demanded by EU and chambers of commerce to fill the gap in workforce – is raising but still restricted if women become mothers: part time work is female, child care is still mother's affair and day care for children aged 3 and less and full day care is only offered in district centres. Same for day care for elderly and ambulant assistance and terminal "hospice" care.

Figure 8: Public participation for co-developing infrastructure at local and subregional level . focus group interviews with young girls and boys (picture Demochange/ Kurt Kaindl 2011).

4.1 The pilot action "Public participation in Fusch and Lend (Unterpinzgau region)" builds on the two focus questions of the DEMOCHANGE project in the Salzburg region:

- How to define and keep quality of life and basic services in small communities with shrinking budgets in competition with the regional centres?
- Which strategies and measures for mobilizing civil society together with politicians in small communities to face regional dynamics on a boarder crossing level?

Main aim is to mobilize citizens for action in two very small and shrinking mountainous communities, Fusch and Lend. The focus is first to co-define quality of life and standards in social and supply infrastructure, second to co-develop models of implementation and maintenance for these infrastructures in times of budget cuts and recession.

Methodologically, in each of the communities a public debate/citizen forum as well as a survey of different social population groups has been carried out. The results are used as basis for a wider discussion with local and regional decision makers to upscale the question of infrastructure to the functional area.

Extended concept of demographic change: To address the challenges within the model region and in these communities, it has been useful to use a broader understanding of the demographic change concept: Merging the complexity of demographic change with the complexity of social change processes and bring these changes in wider discussion among politicians, regional developers, local stakeholders and the general public. This means not only analysing and discussing demographic trends in population development, like low fertility rates, changes in age structure, shrinking or growing population. But also looking closely at societal changes – caused by the progress in gender equality and in shifting gendered roles. Societal changes described as individualisation, lifestyles, polarisation between social groups. Societal change caused by migratory flows from rural to urban and from urban to rural, European and global migratory flows. Change of labour & working conditions for women and men and new information and communication technologies (Definition based on ZGB 2005).

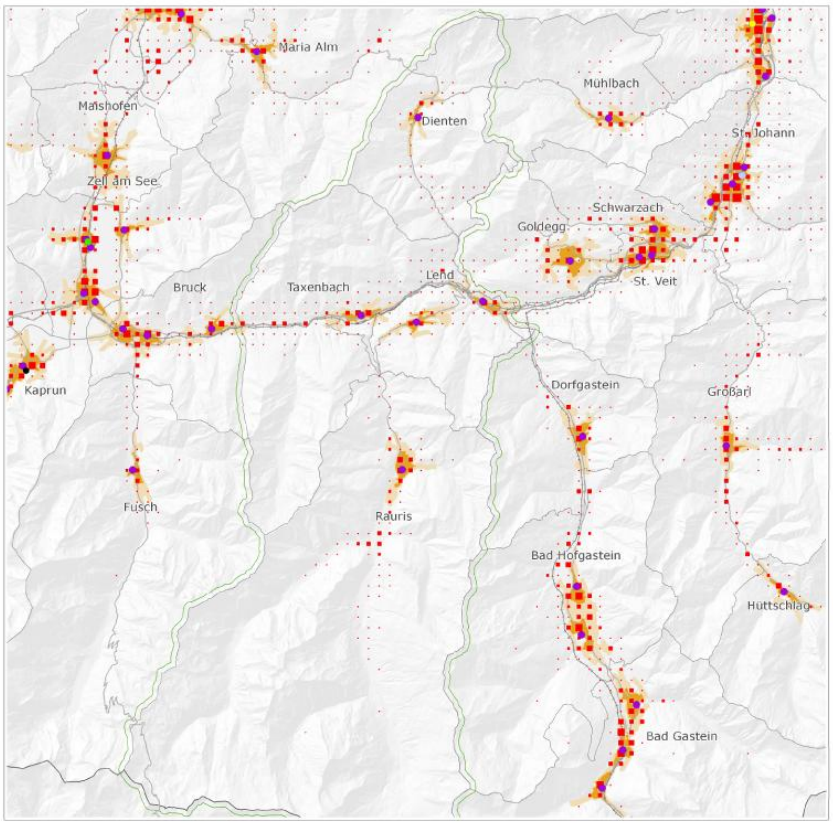

Figure 9: Demochange Model Region Pinzgau. Distribution of residents (size of orange squares show the number of residents), care and educational infrastructure (colored cercles) in communities (typed name of the community) in Lower Pinzgau region, Salzburg: (Demochange Salzburg., map iSPACE-2011)

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Further the distribution of services and the number of residents within easy access (pedestrian distance) has been mapped to discuss accessibility and mobility issues within the community and in the region (see Figure 9).

Finally, the extended concept of housing from Barbara Zibell has helped a lot to understand the wider spatial implication of infrastructures beyond the building, beyond neighbourhood (see Figure 10). 'Housing' includes the quality of the building as shelter and home. It also includes the function of housing as place of recreation but also as place of (care) work and by this the need for accessible infrastructure. And on top of the triangle, housing includes the social process of integration, growing up into a family, into a neighbourhood, settling/immigrating into a neighbourhood, into a city, region and state.

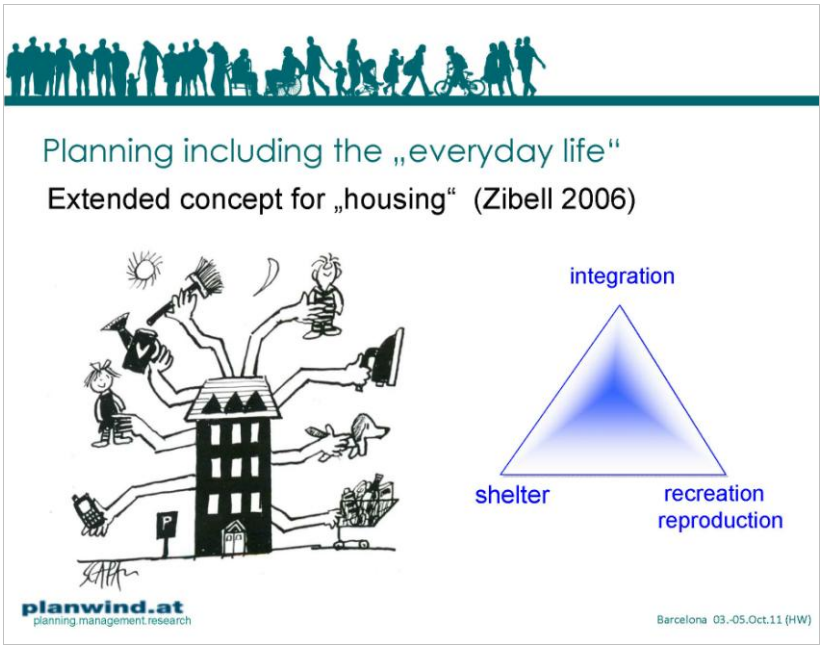

Figure 10: Extended concept of housing applied for the Demochange project for planning the everyday for Pinzgau region (Zibell 2006, Cartoon by Scapa 1999).

4.2 To summarize

DEMOCHANGE project by integrating social change into the concept of demographic change makes it possible to work on gender planning issues for local and regional planning tasks. By this, the Demochange approach brings back the essential of spatial planning principles and legislation: spatial planning as a task to provide spatial structures for equal living conditions, appropriate number and quality of housing, care, services and educational infrastructure and to (co-)develop new infrastructures for the interests of everyday life (Larssons 2006).

Concerning the pilot actions for co-creation of infrastructure: it is difficult to upscale the discussion and the participatory process from local and community scale to functional areas and regional scale: functional regions are clearly in the heads and everyday lives of citizens; but planning for these regions is still a challenge.

5 PUBLIC TRANPORT SCREENER (PTS) – ACCESSIBILITY FOR ALL CITIZENS TO BUSES IN CITY REGIONS

The research project Public Transport screener[4] is the last example of a planning approach to improve infrastructure offers and accessibility in functional regions is. Research Studio iSPACE realizes the project in cooperation with 3 complemen¬tary business partners: TraffiCon, Prisma solutions, planwind.at.

PTS develops target group specific spatial planning tools for the assessment and planning of accessibility of public transport stops and the quality of service within public transport. A special focus is given to people

[4] PTS-Public Transport Screener is funded by Austrian Ministry for Transport, Technology & Innovation in the 3rd Call for ways2go in 2010 and is cofinance by the research team Reseach Studio – iSpace, TraffiCon, PRISMA solutions and planwind.at. (for more information on the project see http://www2.ffg.at/verkehr/projektpdf.php?id=765&lang=en)

with mobility impairments like senior citizens with walkers and wheelchairs but also parents with push chairs and children bikes. On the basis of existing scientific findings, specific requirements of mobility as well as aspects of traffic and urban and regional planning are merged. By this a demography-oriented evaluation and planning model for the accessibility and quality of services within public transport is generated within the project PublicTransportScreener.

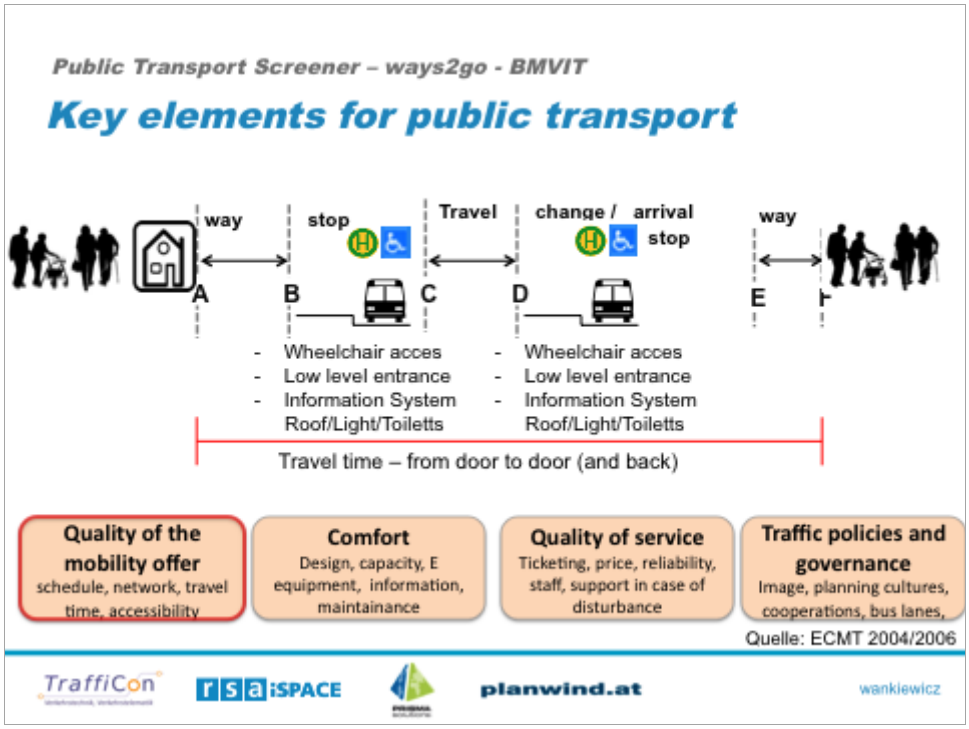

Figure 10: Key elements for assessing the quality and accessibility of public transport offers within the project PTS.

A target group specific assessment of the quality of services (e.g. service interval, travel-time) will be carried out via an interlinkage of traffic demand and offers of public transport. The imple¬men¬tation and evaluation of PTS is done in the Greater Salzburg Region for a Bus offer which crosses the whole region from more rural area Mondsee till urban Salzburg.

5.1 To summarize

For me as a planner, I am very concerned about the priorities of infrastructure planning and applying technical tools like GIS and Webapplications. Being the ("social") planner within the research team, I argue not using out of sight users needs and priorities: The interesting thing for me as a planner is the big gap between the potentials of the data—application on the one hand and the reality and the human side. As shows the project Public Transport Screener and other infrastructure projects for barrier-free and accessible mobility offers for a diversity of people: it is much more important to have a basic frequence and service quality than to have an 'app' for the schedule and the ticketing. There is no use to have an app about the quality and accessibility of bus stations (barrier-free) if there a no busses adapted to wheelchair users and walking frame users (which is the case for the chosen bus line). Finally, the service quality of bus drivers and the politeness and patience of passengers who not only accept longer stops to wait till aged people with walking frames, parents with push chairs and people with heavy luggage enter the bus but even give a helping hand to them. So it is evident, that planning infrastructure for the everyday for a mixed and divers city and city region has to integrate people into a participatory approach for assuring needs oriented planning.

5.2 Further examples for planning the everyday for a mixed city region

The number of (gender) planning approaches for functional regions which go beyond local level and is aiminga at a diversity of users and – by this – supported mixity – are limited. To the author's knowledge the following examples have to be mentioned:

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- Spatial Strategy for the Greater Salzburg region – binding for local level, no participatory approach (Land Salzburg – GenderAlp! project, Wankiewicz 2009)
- Zuid Holland – Room for everyone's day, a complementary spatial strategy and a Do it yourself tool developed by a participatory approach the "group decision room" (Tummers & Wankiewicz 2008, Provincie Zuid-Holland)
- Perspective Munich 2030 – Greater Munich spatial strategy with a broad participatory approach for the long term development of city of Munich and its neighbour communities.
- Helsinki community development for co-creation of infrastructure with focus on health and happiness (Horelli 2009)
- The Vienna Strategy plan including strategic elements of gender mainstreaming and gender planning

6 CONCLUSIONS & OUTLOOK

If we want to plan for the "just city" or the "just region" (Fainstein 2009) –we need a gender planning approach at all scales: local planning needs good structures and spatial strategies at regional level in the functional areas. The regional plans and spatial strategies set the framework for the local and neighbourhood planning. If accessibility within the city and the city region is not assured, local activities cannot be successful.

If we want to reach the vision of a just city/region with mixed uses and mixed population, spatial planning has to adopt a holistic approach: crossing boundaries between communities, city and surrounding regions, what we call "functional regions" instead of administrative boundaries.

A holistic approach also means crossing boundaries between sectors like social infrastructure planning, family policies, transport planning, built environment and equality policies. But also: involving people to ask for their needs, their quality standards and their definition of accessibility, mixity and userfriendly environments and service offers.

If we want to develop a just and divers (mixed) city/region, we have to experiment with participatory and collaborative planning approaches, experiment with the knowledge, the visions and successful policies of citizens of both sexes as residents, as members of grassroots groups, as commuters how to plan AND govern a functional region, a city region (cf. Andrews/Tummers 2006).

We need methods and instruments for involving people and their experiences as everyday users into comprehensive planning like we have for local and neighbourhood level. We need a "Jane's walks" or the methods of Col-lectiu punt6 (cf. Muxi Martinez & Ciocoletto 2009) or other successful neighbourhood planning approaches for large scale functional regions. Planning is about people – webtools and gis-tools are only supporting instruments. To quote Fainstein in this matter from her paper on the equal just city 2009:

In furtherance of democracy:

Plans should be developed in consultation with the target population if the area is already developed. The existing population, however, should not be the sole arbiter of the future of an area. Citywide considerations must also apply. (Fainstein 2009)

Transdisciplinarity, as defined and put into practice by Cassinari et. al (2011) could be the key concept to assure user satisfaction and to support diversity and mixity in the city.

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Selected links

[1] Project DEMOCHANGE: Demographic Change in the Alps. Adaption strategies to spatial planning and regional development
http://www.demochange.org/
http://www.demochange.at/
[2] Project Gender Equality in Bavarian rural areas: Grontmij-Magel-planwind 2011
http://www.stmas.bayern.de/gleichstellung/atlas.
[3] Project Public Transport Screener – http://www2.ffg.at/verkehr/projektpdf.php?id=765&lang=en
[4] European Network for Gender, Diversity and urban sustainability
http://www.rali.boku.ac.at/gdus.html

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🏆 *reviewed paper*

Climate Change in Cities – Can Remote Sensing Help to Optimise Mitigation Strategies?

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1 ABSTRACT

Urban planners become more aware that climate change is likely to have influence on the liveability in cities. Therefore, the number of planning authorities increases that want to evaluate the climatic effects of urban developments. However, the information required to do so is often not easily available. Remote sensing data provides independent, area wide and up-to-date spatial information. Therefore, this contribution addresses the question if remote sensing techniques can help to optimise mitigation strategies for climate change in cities. Several parameters describing the urban climate can be directly mapped by remote sensing, such as albedo and surface temperature. However, the main use of remote sensing is expected in the mapping of the urban land cover and morphology. The urban climate is strongly influenced by the spatial characteristics of the city. Area wide maps of spatial parameters such as impervious surface or vegetation fraction can provide insight in expected climatologic situations because of the strong relationship of these spatial parameters to climate and humidity. Climate models, used to evaluate different planning scenarios, can make advantage of accurate spatial description of the area of interest. However, existing climate models will need adaptation to be able to use the remote sensing data.

2 INTRODUCTION

The awareness about climate change and its possible consequences for urban areas is growing. The prospects of global warming will be specifically dramatic in urban areas (KUTTLER, 2004). In Germany this resulted in an increasing interest of planning authorities who want to evaluate the climatic effects of their planning activities. Their objective is to maintain the liveability of cities in the future. With climate changes such as the expected increase of hot summer days (DWD, 2011), it is important to create places with reduced temperatures and to facilitate corridors of fresh air.

To assess the consequences of climate change for urban areas and to develop effective mitigation strategies, information is required on the possible changes of the climate and on the effect of changes in the city structure and land use (new buildings, parks, streets) on the local climate. By combining this knowledge, it can be learned which urban changes will likely aggravate unwanted climatic effects and which urban changes can mitigate them. The local climate depends on the regional climate and the local surface and morphology characteristics, such as the size, number, shape and orientation of buildings and other urban objects, the materials used or the amount and type of vegetation (OKE, 1988a; OFFERLE ET AL., 2007; CHEN ET AL., 2009). The interaction between those variables, determine the actual temperature, the wind speed, humidity and air quality. In table 1 it is shown for a selection of urban spatial characteristics how they contribute to these four main climate surface parameters. Information on these four main climate parameters can be derived directly by using in situ measurements, indirectly by using indicators or based on simulations. In situ measurements, for example by weather stations, are highly accurate and often provide long time series of data. The variation over time is relevant to understand the relations with human activities and seasons or to monitor the change of the situation. However, the spatial variation of the values of the parameters is important to gain an overall impression of the complex climatic structure of the city as well (XU ET AL., 2008). This information can seldom be provided by in situ measurements, because the observational network is often too coarse. Measurements with equipment installed on vehicles are an improvement, but still cannot provide area wide coverage (WENG, 2009). By making use of spatial indicators, parameters such as temperature, humidity etc. can be estimated area wide. Many studies have been carried out to quantify the relationship between the surface parameter and the climate parameter of interest (e.g. WENG ET AL., 2011, ZHANG ET AL., 2009). Finally, powerful tools to study both the actual and future climate are models and simulations. Models allow the assessment of many different situations while requiring a limited amount of in situ measurements. For example, SHASHUA-BAR & HOFFMAN (2003) and ZHANG ET AL. (2004) studied the influence of street and building geometry (street canyons) and trees on air temperature and wind using numerical modelling.

Area-wide spatial knowledge is of crucial importance to understand the climate situation in cities, but such information is often too generalized, outdated or not even available. Remote sensing data provides independent, area wide and up-to-date spatial information on the earth's surface. Remote sensing data is thus suitable for the mapping of surface characteristics which influence the urban climate (see table 1). Hence, this contribution addresses the question to which extend remote sensing can help to find out what the effect of climate change on urban areas will be. For that purpose we provide and discuss examples of relevant remote sensing products from literature and several studies in the city of Munich, Germany.

3 MEASURING CLIMATE PARAMETERS

Remote sensing makes use of the electromagnetic radiation reflected or emitted by the Earth's surface (LILLESAND ET AL., 2004). Different surface types reflect, absorb or emit the radiation (light) with different intensity in different wavelengths. This information is used in the analysis of remote sensing data to map different land cover types. The net radiation is an important parameter in the urban energy balance which describes the heat fluxes. The net radiation is the sum of the incoming minus the reflected short-wave radiation (albedo) and the incoming minus the out-going long wave radiation (thermal radiation) (OKE, 1988b).

Surface albedo is a key terrestrial variable controlling the surface energy budget. It is defied as an Essential Climate Variable (ECV) by the Global Climate Observing System (GCOS, 2011). There are several global albedo products available, such as those derived from the MODIS satellite (SCHAAF ET AL. 2002) or from the Meteosat and GOES satellites (GOVAERTS ET AL. 2008). Although these products are updated regularly (at least weekly), the spatial resolution is very coarse (> 1 km). For the calculation of the urban energy balance, higher resolution data is required. In RIGO & PARLOW (2007), Landsat data (30 m) is used to derive the albedo of the city of Basel, Switzerland. The objective was to calculate the ground heat flux, which contributes significantly to the development of urban heat islands. To calibrate their models, they used ground measurements. Figure 4c shows an example of the surface albedo for a building block in Munich, derived from airborne HyMap data with a spatial resolution of 4 m.

The thermal radiation measured by remote sensors is usually converted into surface temperature. Surface temperature is important for the estimation of the energy budget and for bio-climatic studies, among others (MITRAKA ET AL. 2012). Figure 1 shows the surface temperature of the city of Munich for a summer day in 2007 as recorded by two different sensors. The whole city is recorded by the space borne Landsat sensor, with a spatial resolution of 60 m. A subset of the city was also recorded by the airborne Daedalus sensor with

Urban spatial characteristics	**Climate surface parameters**			
	Temperature	**Wind speed**	**Humidity and precipitation**	**Air quality**
Building structure	●	●	●	●
H/W ratio of street canyons	●	●		●
Sky view factor	●			
Land cover	●	●	●	●
Albedo	●			
Emissivity	●			
Thermal inertia	●			
Impervious area	●	●	●	
Vegetation fraction	●	●	●	
Surface water	●			●
Land use	●		●	●
Traffic density	●		●	●
Industrial areas	●		●	●

Table 1: Overview of urban spatial characteristics that influence the four main climate surface parameters. H/W ratio = height/width ratio.

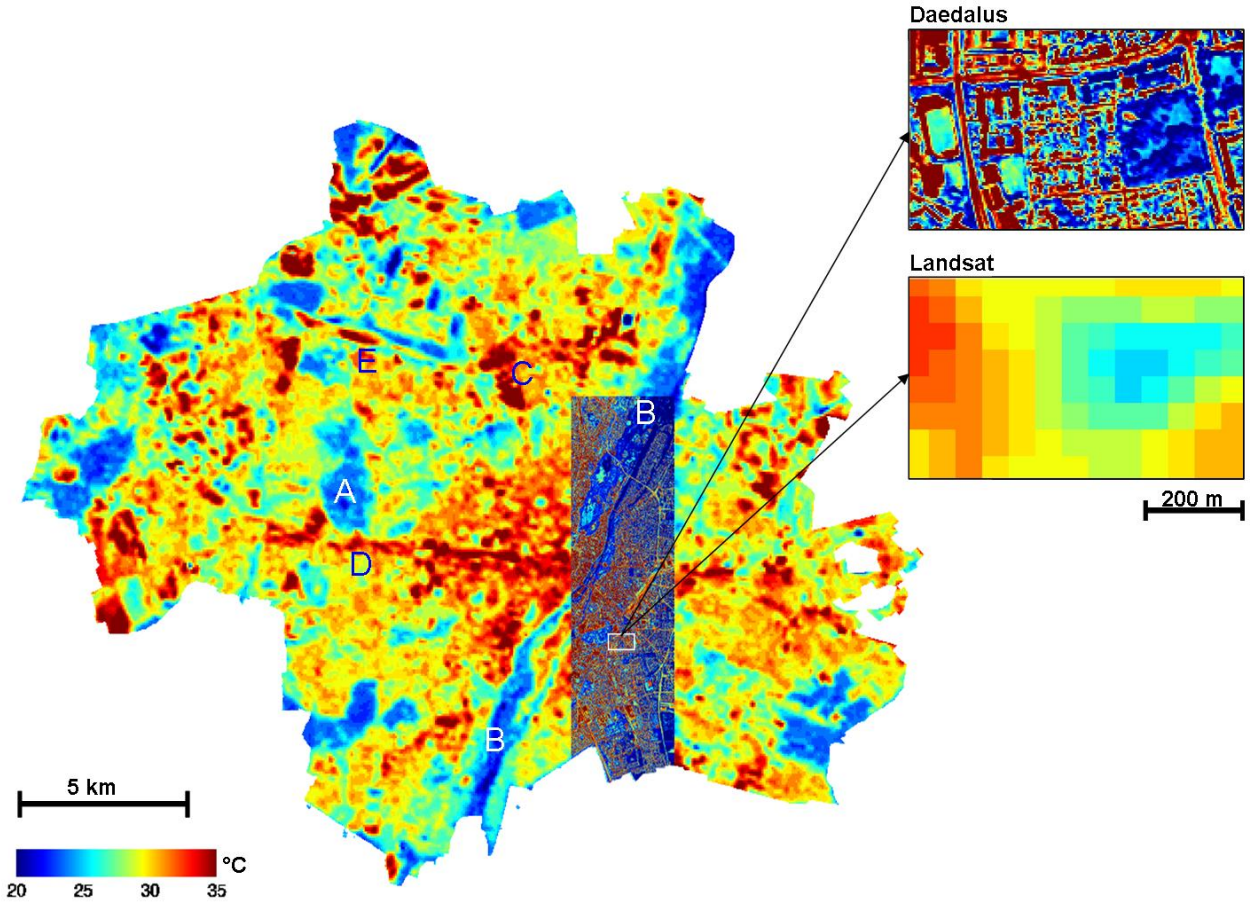

Figure 1: Surface temperature of Munich at a summer day in 2007, mapped by the space borne sensor Landsat (30 m spatial resolution) and the airborne sensor Daedalus (4 m spatial resolution).

a spatial resolution of 4 m. The image shows several interesting thermal patterns. Clearly recognisable as colder areas are for example the large park belonging to the castle Nymphenburg (A) and the flood plains along the river Isar (B). The densely built city center has high surface temperatures, as does the industrial site in the north of Munich (C). Also the two main railway tracks (D, E) with neighbouring industrial and bare surfaces are warmer than their environment and clearly recognisable as line structures. The zoom images on the right show the difference in detail between the two sensors. In the Landsat image almost no differentiation except for a larger park is possible. In the Daedalus image, on the other hand, the differences in surface temperature between buildings, vegetation and roads is clearly visible.

4 MAPPING SURFACE CHARACTERISTICS RELATED TO URBAN CLIMATE

As already shown in table 1, many surface characteristics influence the urban (micro) climate. Nine of the twelve characteristics listed in the table can be derived with remote sensing by different sensors. The retrieval of building structure, H/W ratio and sky view factor require a digital elevation model which can be derived from stereo imagery or laser scanning. Commonly, airborne sensors are used because they can provide spatial resolutions that are high enough for this purpose. Land cover, impervious area, vegetation fraction and water can be mapped with a large range of airborne and satellite-based sensors, since also satellite-based sensors provide sufficient spatial resolution for the discrimination of individual urban objects such as buildings. For the measurement of albedo, a sensor is required that records the radiation in a broad range from the visible to the short wave infrared. On the opposite, emissivity requires thermal remote sensing that records the radiation in the long wave infrared.

Since these spatial characteristics can be very well mapped with remote sensing, many studies exist in which the relation of such spatial characteristics with climate parameters are analysed. Most studies are concerned with the climate parameter temperature. For example the relationship with imperviousness (e.g. ZHANG ET AL., 2009; YUAN & BAUER, 2007; XIAN, 2008) and fractional vegetation cover (e.g. JENERETTE ET AL., 2007; WENG ET AL., 2004) has been analysed. Also the relationship of spatial characteristics to the climate parameters wind (OFFERLE ET AL., 2007; ELIASSON ET AL., 2006) or air pollution (WENG &

YANG, 2006) have been studied, although less frequently because the influence of spatial characteristics on these parameters is not as strong and often indirect via changes in temperature.

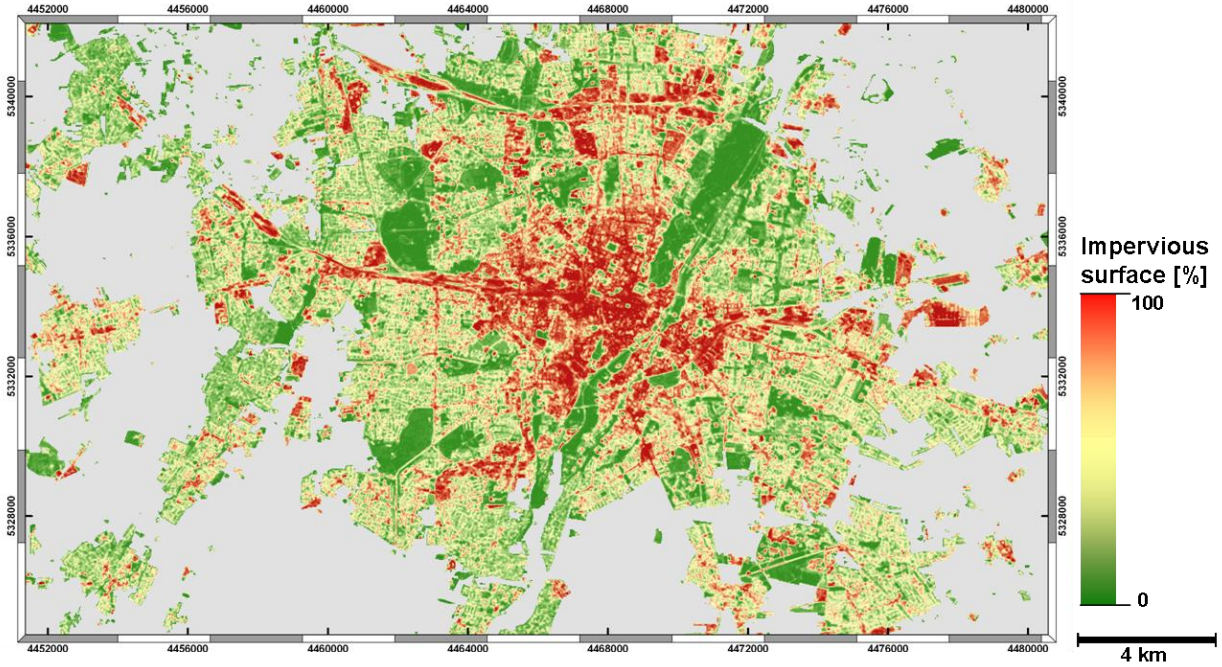

Figure 2: Impervious surface for the city of Munich, derived from space borne Landsat data.

Making use of known correlations, a map of surface parameters such as imperviousness or fractional vegetation cover provides already a lot of information on locations in the city where the (surface) temperature is likely to be higher or where the humidity will be lower. As an example, a map of impervious surface derived from Landsat data and a map of vegetation density derived from airborne hyperspectral HyMap data is shown in figures 2 and 3. They both show the city of Munich. The map of impervious surface in figure 2 has a spatial resolution of 30 m and was derived using a Support Vector Machine approach (ESCH ET AL. 2009). The city center has a much higher percentage of impervious surfaces than the residential areas in the outer districts of the city. The inverse pattern is visible in the vegetation density map (figure 3). The vegetation density is calculated using a spectral unmixing approach and is subsequently aggregated to building block level (HEIDEN ET AL., 2012). Both maps seem to indicate that in the city center higher temperatures can be expected. However, there are several areas within the center where people can retreat if it gets too hot: the small parks (green spots in figure 2) in the northern part of the city center and the large parks along the Isar, forming an SW-NE green corridor.

5 SUPPORTING CLIMATE MODELLING

The use of models is common praxis for climatologists and meteorologists. The most well-known examples are of course weather forecasting models. Dynamic models, or forward models, have the possibility of simulating ongoing processes. Because of their predictive capabilities, such models can be used to simulate different scenarios. This is a useful feature for urban planning. It allows the evaluation of climatic effects of planned urban development projects prior to the, often irreversible, realisation of a project. Many different climate models exist. They vary among others in the climate parameters they address, the spatial scale and complexity (ARNFIELD, 2003).

For the evaluation of urban developments, local scale models are most suitable. Examples of local scale urban climate models are MISKAM (EICHHORN & KNIFFKA, 2010), ENVI-met (BRUSE & FLEER, 1998) or MUKLIMO_3 (SIEVERS, 1995). The spatial environment is always one of the input parameters of climate models. Vegetation fraction, imperviousness and surface roughness are some of the parameters commonly used in climate models to describe the environment. Some models assume default values for these parameters. Other models, mainly at global and regional scale, retrieve land cover or land use types from maps or remote sensing data (e.g. GlobCover) and assign to each type a defined set of spatial parameters. Only few models allow for a detailed description of the environment and the according parameters (PINTY

ET AL, 2006). An example of such a model is ENVI-met (BRUSE & FLEER 1998). This model requires a detailed description on the location and characteristics of all urban objects in the modelled environment. In a study carried out in the city of Munich, as many input parameters as possible required by the ENVI-met model were derived from hyperspectral remote sensing and airborne stereo imagery. Table 2 shows, that more than half of the required parameters can be generated on the basis of remote sensing data. Remote sensing comes to its limits when soil or material properties are required. Due to the bird's view it is also not possible to provide data on vertical or hidden structures, e.g. building walls. Also the weather conditions cannot be derived from the remote sensing data. However, the weather conditions can be used for the description of different scenarios, to simulate different (future) climate conditions.

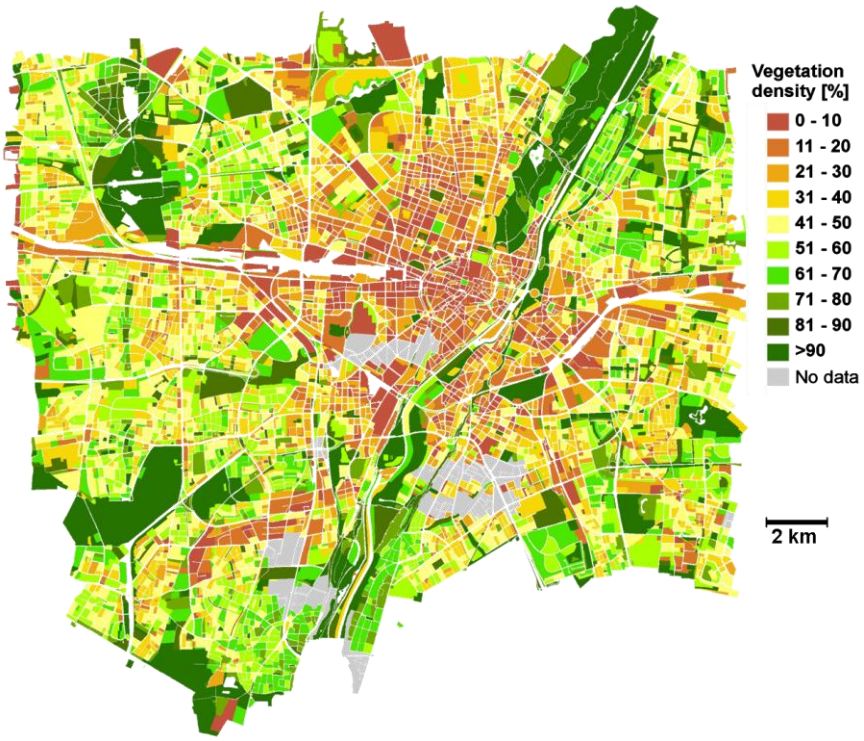

Figure 3: Vegetation density per building block derived from airborne hyperspectral remote sensing data for a subset of the city of Munich.

Input parameter		**Source**
Buildings	Location	HyMap data
	Roof material	HyMap data
	Height	Stereo imagery
	Material properties: reflectance properties	HyMap data
	Material properties: thermal inertia	Literature
Vegetation	Location	HyMap data
	Type (deciduous, coniferous, grass)	HyMap data
	Height	Stereo imagery
	Leaf area density	HyMap data
	Photosynthetic and evapotranspiration properties	Literature
Non-build surfaces	Location	HyMap data
	Type (impervious, pervious)	HyMap data
	Soil properties (hydrological)	Literature
Weather conditions	Temperature	Weather station or simulation variable
	Wind speed	Weather station or simulation variable
	Date, sun dawn, sun set	Depending on location

Table 2: Input parameters and their sources required for urban micro climate modelling with ENVI-met

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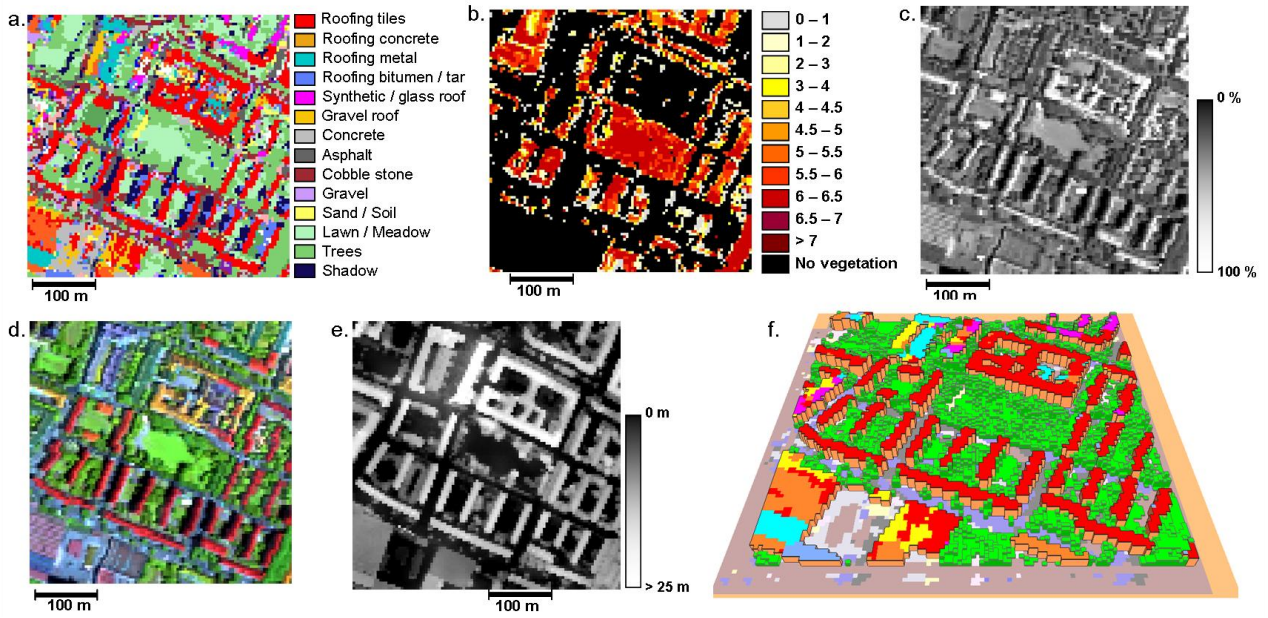

Figure 4: Input data for the micro climate model ENVI-met. Upper line: maps derived from the HyMap data: surface materials (a), leave area index (b) and albedo (c). Lower line: the HyMap subset (d) and DEM subset (e) of the study area and the final 3-D input file for the model (f).

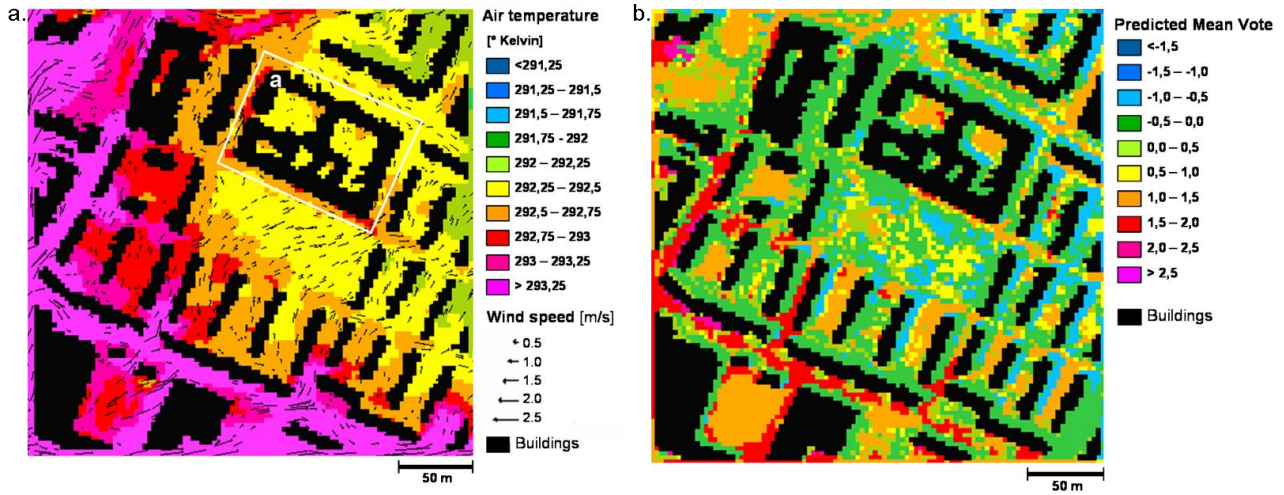

Figure 5: Simulation results of the ENVI-met model using input data from remote sensing: a) air temperature and wind speed, b) the human comfort index PMV.

From the hyperspectral data, the land cover type is derived at the level of surface materials (figure 4a). This airborne data set is also used for the retrieval of leaf area index (fig. 4b) and albedo (fig. 4c). The digital elevation model (DEM) provides the height of the buildings and vegetation (fig. 4e). The methodology is described in detail by HELDENS (2010) and HELDENS & HEIDEN (2010). This results in a 3-D input file for the ENVI-met model (figure 4f). The 3-D file is then used for the simulation of the urban micro climate over 24 hours. Because of the long computation time to date, only a small area of a few building blocks can be simulated at once. Some results of the simulation are shown in figure 5. It shows the simulated air temperature and wind speed at 15:00 at 1.5 m height. In the simulated scenario a south-western wind is assumed. Figure 5a shows that the wind influences the air temperature. In the building block marked with A the wind speed is almost zero. The temperature lays around 292.3 K (19.2 °C) in this building block. At the sun-exposed sides of the buildings the air temperature is higher: around 292.8 K (19.7 °C). It should be noted that the temperature variation within the area is all within 3°. Figure 5b shows another result from the simulations: the predicted mean vote (PMV) at 15:00. The PMV is a human comfort index, which provides information on the well-being of humans. Originally PMV was developed for the assessment of indoor climate by (FANGER, 1970), but was then adapted for assessment of the outdoor climate (BOUYER et al., 2007). The index is based on micro climate characteristics and physiological, clothing and movement

characteristics of a person. The values range from -3 (a person would feel uncomfortably cold) to 0 (comfortable climate situation) to 3 (a person would feel uncomfortably hot). Figure 5b shows that there are no very uncomfortable locations in the study area at this time of the day. However, on the west and south sides of the buildings, a person would feel slightly warm (PMV around 1.7). On the other hand, at the east (and thus shaded) sides of the buildings a person would feel slightly cold (PMV around -1).

6 DISCUSSION AND CONCLUSION

In the previous sections, a range of remote sensing products has been shown that are relevant for urban climate analysis. The large variety of sensors that are available enables the mapping of a vast number of parameters. The area-wide and large spatial coverage of remote sensing data enables the analysis of complete neighbourhoods or even cities at once. Frequent images acquisitions and automated mapping algorithms allow the fast updating of maps. Can remote sensing help to optimise mitigation strategies for the influence of climate change on urban areas? The examples in the previous sections show that except for albedo and surface temperature, remote sensing products provide only indirect information on the urban climate. In order to draw conclusions on the urban climate, in situ measurements or climate simulations are indispensable. But, since the spatial characteristics play an important role in the urban micro climate, remote sensing can certainly contribute to the assessment of the urban micro climate and its interaction with the urban environment. The combination with remote sensing data seems especially valuable for the support of in situ measurements and for the support of climate modelling.

Remote sensing-based mapping of impervious surface, fractional vegetation coverage etc. can provide a first impression where unwanted climatic conditions are likely to occur first. These locations can then be selected for in situ measurements or climate simulations. Because of the frequent and large spatial coverage of remote sensing data, detailed monitoring of urban areas is possible. This way, climatologically undesirable urban developments can be recognised fast and without extensive simulations, by using relevant spatial parameters as indicators. Time series dating back to the 1970s allow us to learn from changes in the past. Combining a time series of spatial parameters, e.g. impervious surface, with long time measurements of air temperature will provide valuable information.

A further promising application of remote sensing products for climate analysis is to use them as input data for climate modelling at different scales. This supports a fast and flexible generation of the input data for such models and enables the models to simulate the actual situation. By simulating different scenarios, it can be assessed which urban developments successfully mitigate unwanted climate change effects. However, existing climate models will need adaptation to be able to use the remote sensing data.

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Compact Development as Land Use Planning Tool for Urban Disaster Management

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1 ABSTRACT

Cities are dynamic and complex in nature and have interdependent systems that are vulnerable to urban hazards and natural hazard risks (Godschalk, 2003). At one hand cities are hubs of intense resources, technological development and they offer solution to various global issues like technology for low carbon development; use of renewable resources; energy efficiency developments; green buildings and mitigation strategies at large for sustainable human development. On the other hand, cities are sources of environmental degradations and green house gas emissions. The urban areas of cities of developing countries are characterised by low density urban sprawl, fragile infrastructure, low resilience and poor coping capability of people. Thus people and development are vulnerable to disasters and climate change which wipe off years of development causing death and injury.

The need for urban disaster management emphasises on identifying and reducing risks and vulnerabilities, along with tapping potential opportunities for low-carbon urban development. Sustainability and resilience are interdependent and can be promoted through a combination of strategies such as integrated urban planning, high density compact planning, mixed land uses; identifying synergies between disaster risk reduction and adaptation; improving urban service quality and promoting green buildings and sustainable transport [1]. There is a need of paradigm shift in traditional urban planning concepts to high density compact planning, which proves to be successful emerging model for development.

In high density Compact City model, the smaller, high density cities reduce the spatial extension of cities; create places where people can live closer to work, rely less on environmentally damaging methods of transportation, and reduce the collective carbon footprint. As compared to previous planning models, the compact city model does not limit the population of a certain area; it is by default a high-density development. Nor does it persist in defining and segregating zones of activities. The limited availability of land calls for a mixed-use approach with a mixed of commercial, residential, institutional and recreational facilities.

This paper tries to explore the role of compact city development in urban disaster management and its implications in future. The paper also tries to identify the relationship of sustainable development strategies, and disaster resilience for safe future cities. Here it aims to identify the problems associated with this concept in the present context of the cities.

2 INTRODUCTION

Cities are life lines of society and are centres of technological development (UNISDR, UNHABITAT, 2011) which have the capacity to deal any kind of problem whether environmental, social or economical due to advancement of science and technology, with the concentration of human resource and political activities. It is due to these advantages it invites urbanisation which when uncontrolled poses inumerable challenges in cities and even more due to incapability of the city administrators to cope up with the pace of urbanisation. Cities have become highly vulnerable to live with poor housing, almost no infrastructure in poverty ridden areas; are sources of green house gas emissions and are impacted by more severe and frequent attack of disasters and climate change. Although with this advent devastation world administrators have realised the importance of disaster management and many national and international efforts have been taken in the context.

It is not only the mitigation strategies that are important, but the integrated approach of landuse planning that would be most effective and implementable. In this light presumably strengthening building byelaws and

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codes is one of the key measures of urban disaster mitigation being focused. But recent earthquake and tsunami in Japan (which has well-enforced building codes are crucial tools for mitigating disaster risk though saved many lives by reducing the death toll) gave an important lesson that we cannot "build away" all disaster risk through building codes and other structural solutions alone inspite of its best enforcement practice(Sun, 2011). Even when life can be preserved, the cost of property and other economic damages can be staggering. It is thus "the location" that is key factor in determining a community's natural hazard vulnerability. Thus the "smart growth" integrated with the disaster mitigation and climate change strategies, can result in stronger livable and highly resistant communities, with a breathable environmental has been foced in next two sections of the paper. It is important to identify the challenges while adopting smart growth especially with respect to disaster management has been discussed in the last section. This discussion gives light to the way forward in this direction.

3 CITIES ARE DYNAMIC MODELS

"The 19th century was a century of empires, the 20th century of nation states, the 21st century will be a century of cities."

Wellington E. Webb, Former mayor of Denver, Colorado

3.1 Cities as Efficient Models

Cities are intense resource centres with technological advancements and high development. They are economy generators as about 600 urban centers generate about 60 percent of global gross domestic product (GDP). By 2025, 136 new cities are expected to enter the top 600, all of them from the developing world .[2] GDP is an important indicator of development and it becomes even more when we talk about sustainable development. Strong economy of an area is an absolute contributer in making any development initiatives sucessful and in achieving sustainable disaster resistant cities.

Cities generally have complex interconnected urban functions such as sanitation, utilities, land usage, housing, and transportation, building, energy etc. which provide opportunities for improvements in the urban environment through institutional factors that include urban planning, governance, land management, legislation and financing, thus contribute in economic, social development of the region. It is because increased density and better management that reduce the cost of service delivery, promote innovation, and enable prosperity through economic development. They are centres of major political and social changes in a country [3].And play active role in global dialogues and have unique ability to respond to a global issue, such as climate change/disaster management.

They offer dynamism to deal with Environmental factors and phenomenon such as climate change, risks and hazards, quality of air, land and water etc. in terms of scale, stronger linkages, and a greater sense of urgency among residents and their local leaders (World Bank, UN 2010). Co-benefits of urban disaster management and mitigation are largest in cities(World Bank, 2010). It is these benefits of development that urban centres attract population, and are subjected to high vulnerabilities which is discussed in the next section.

3.2 Vulnerability of Cities

As cities are concentrations of resources, technology, population, they are vulnerable to greater extent. Cities of developing countries are characterised by low density urban sprawl, fragile infrastructure, low resilience and poor coping capability of people which is a resulut of uncontrolled urbanisation. By 2030 nearly 60 percent of the global population is projected to be urban with the developing world housing nearly 80 % of this population (TERI, 2010). The 20 largest cities consume 80 % of the world's energy and urban areas generate 80 % of greenhouse gas emissions worldwide(Ewing, et al. 2007.) [4].

Corelationship of urbanisation and increasing hazards: Urbanisation is thus contributing significantly to climate change and poor disaster management along with urban poverty. Urban poverty increase

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vulnerability and fragility of socioeconomic systems resulting in extensive setbacks to development. The total poverty in India, has doubled from 15 % in the early 1960s to nearly 30 % in 2004 [5] . Majority of the urban poors are usually built on hazardous sites in high-risk locations, or located in low-lying areas prone to direct and indirect risks due to environmental degradation such as regular floods, landslides occurrences, together with lack access to basic urban services and un-regulated and unsafe construction .[6] These people cannot afford insurance, savings or asset accumulation, and their socio economic vulnerability is immense (TERI 2010). As the goverments in urban centres are unable to keep pace with urbanisation coupled with low political will power, the cities have become even worse physicaly, socially and environmentally. Administrations in large cities are often confronted with a multitude of key problems, like poor governance, high unplanned urban densities, traffic congestion, energy inadequacy, unplanned development and lack of basic services. This leads to illegal construction within the city and in its periphery, informal real estate markets, proliferation of slums, poor natural hazards management in overpopulated areas climate change and, environmental degradation.

Corelationship of climate change and disasters: About 75 per cent of the world's major natural catastrophes between 1970 and 1997 occurred in the Asia and the Pacific region, mostly in poverty-ridden developing countries (UNESCAP and ADB 2000).There has been a general upward trend in the number of natural disasters due to hydrometeorological as seen from Figure 1. Increase in no and frequency of disasters during past 4 decades is mainly due to climate change which is an impact of global warming due to increase in CO_2 emissions in the atmospheres. To mitigate as a long term strategy we need to use low carbon development strategies. This is greatly possible with the advent of technology and smart growth principles. (CRED-OFDA 2002)

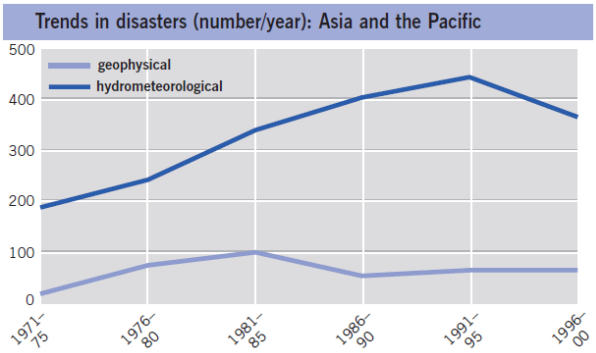

Figure 1: Increasing trends of hydrometerological Disasters in Asia and Pacific [7]

Corelationship of vulnerability and land degradation: These vulnerabilities are increased manyfold as cities often expand or grow in ways that may degrade natural buffer systems. People construct impermeable land surfaces that prevent percolation of water into the soil (Moser, 2008).The poor spatial arrangement of population and assets create risks to urban systems, to populations and to the nature and probability of hazard occurance. Constraints on the availability of land as a resource in urban areas often results in proliferation of slums and informal settlements. The combination of factors- such as faulty land use and planning, low density urban sprawl, rapid urbanisation, migration from rural areas, lack of integrated land use and transport planning that enables mass transit and efficient clustering of settlements and industries; result in unsustainable development. Sustainable development cannot be an expansive development in present context; it needs to be comprehensive (compact with smart growth principles) considering the changing environment (which triggers the disaster) and changing societal needs in terms of development. It is thus important to the impact of present development on degrading environment, which is becoming a major concern in terms or disasters and climate change.

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4 DEVELOPMENT AND URBAN DISASTER MANAGEMENT

There is an indirect relationship between urban growth pattern and disaster occurrence (Dickson et al. 2010). Disaster is a function of risk and results from the complex interplay between developmental policies, existing vulnerability, population and areas exposed; hazard events, as well as climate change (World Bank, 2010). It has been observed that Africa and Asia, which have the highest rates of urban growth globally, are also experiencing the fastest rate of increase in the incidence of natural and human-made disasters over the last three decades (UN-Habitat, 2007).

4.1 Impact of disasters on development:

Natural hazards and emergency management are major issues in most cities. They have caused major losses of human lives and livelihoods, destruction of economic and social infrastructure, as well as environmental damages. In addition to the projected estimation of 100,000 lives lost each year due to natural hazards, the global cost of natural disasters is anticipated to top $300 billion annually by the year 2050. (UNISDR, WSSD, 2002). Not only this, disasters exacerbate poverty, damage infrastructure and critical facilities, disrupt business, disable lifelines vital for economic activity and service delivery. They halt or slow progress towards the achievement of the Millennium Development Goals (MDGs) [8] (Scott 2009). They delay development programs by reducing available assets and utilizing the financial resources allotted for development being used for rehabilitation and post disaster recovery. Disasters have negative impacts on environment as they affect natural resources. Changes in climate risk in particular imply that urban areas may face hazards in the future which are outside their past experience.

While no country in the world is entirely safe, lack of capacity to limit the impact of hazards remains a major burden for developing countries. An estimated 97 % of natural disaster related deaths each year occur in developing countries. Vulnerability to disasters is closely linked with population density and economic resources. The highest number of deaths occurred in South Asia (the sub-region with the highest population density and the lowest per capita income) (UNPD 2001, World Bank 2001). Given these trends, without major changes in the management of disaster risks and of urbanization processes risk to city residents will increase in the future as populations grow (World Bank 2010).

4.2 Urban Disaster Management:

Disasters can result from the way development occurs, and conversely can change the way development takes place (World Bank, 2010). The three components of disaster risk - hazards, exposure, and vulnerability are increasing in urban areas. (World Bank 2010). The disaster management needs to (1) assess disaster risks-by risk assessments and vulnerability mapping, (2)mitigate through urban planning – by mainstreaming Disaster Risk Reduction (DRR) into planning through risk sensitive landuse planning and (3) build resilience and coping capacity to combat disasters. Land use and urban development practices need to take into account susceptibility to natural hazards. The investments in new city infrastructure offer a tremendous opportunity to build sustainable (smart and efficient) and resilient cities using less energy and water especially in developing and least developed countries. Smart choices in housing, energy and public transport could reap massive local and global benefits. the right choices will save water, energy and carbon, and improve health and quality of life(Prabhakar et al., 2009) Developing resilience by capacity building, adopting strong legislative, administrative measures, decreasing carbon emissions by stratifying planning measures, going for compact development, reducing travel time; tapping dense local knowledge and adapting local strategies are some measures which are needed to be taken up in an integrated manner with the planning principles (UNDP, 2002).

5 COMPACT DEVELOPMENT AS URBAN DISASTER MANAGEMENT TOOL

Compact Development can be used as a tool for development and urban disaster management; because it specifically directs land use (directs the location and concentration of socioeconomic activities (TERI 2010) and transportation systems. Planning can reduce population vulnerability by facilitating improved access to resources, services and amenities. The urban planning approach needs to bridge the gap between urban

[8] Millennium Development Goals (MDGs) are eight goals to be achieved by 2015 that responds to the world's main development challenges. These are drawn from the targets and actions contained in the Millennium Declarations in the UN Millennium Summit in September 2000

disaster mitigation, sustainable human development and climate change. As stated earlier the new development should not increase the vulnerability to disasters, there is a need for smart principles of development.

5.1 Concept of Compact Development towards Urban Risk Reduction

The term "compact development" implies higher average "blended" densities and features a mix of land uses, development of strong population and employment centers, interconnection of streets, and the design of structures and spaces at a human scale (Ewing et al. 2007). Compact development planning help people live within walkable distances to work, shops, home, education recreation, parks and transit points. The street network can be designed to interconnect, rather than end in culs-de-sac. Finally, by building more homes, offices, stores and other destinations "up" rather than "out," communities can shorten distances between destinations. This makes neighbourhood more economically viable, allows more frequent and convenient transit service, and helps shorten vehicular trips. Compact development is a part of Smart growth.

The 10 Smart Growth Principles that have been identified by researchers and practioners are- mix land use development , take advantage of compact building design, create a range of housing opportunities and choices , create walkable neighbourhoods, foster distinctive, attractive communities with a strong sense of place, preserve open space, farmland, natural beauty, and critical environmental areas, strengthen and direct development towards existing communities, provide a variety of transportation choices, make development decisions predictable, fair, and cost effective, encourage community and stakeholder collaboration in development decisions.(emerine, et al. 2006). Based on these principles the smart growth development, helps to achieve sustainablility. It is first important to understand the benefits of "Smart Growth" (high density compact development) over Urban sprawl. When we analysez these with respect to their impact on disaster management, the influence is remarkable and has been further discussed.

5.2 Smart Growth versus Urban Sprawl

Smart growth policies are one which result in more compact, accessible development within existing urban areas. A comparitive table showing urban sprawl and compact development.

	Smart Growth	Sprawl
Density	Higher Density, Clustered Activities,	Low Density ,Dispersed Activities
Growth Pattern	Infill (brownfield) Development	Scattered , prepheiry (Greenfield) Development
Urban Form	Cluster development, High Density High rise Development	Sporadic Development, Leapfrog pattern, Commercial strip, Low Density plotted Development, Single Use Development
Land use mix	Mised landuse	Homogeneous(single use, segregated) Landuses
Scale	Human Scale, smaller buildings, blocks and roads, designed for pedestrians	Large scale, Large Blocks, Hierarchial roads, increased road areas, less details
Services(shops, Schools, parks)	Local,well distributed, smaller, easily accessible (withing walking distances)	Regional Consolidated, Stripped Development, Larger zones, requires automobile access
Transport	Multimodal transport and land- use patterns that support public transit, walking, and cycling	Automobile-oriented transport and land-use patterns, poorly suited to walking, cycling, and use of less public transit systems
Connectivity	Highly connected roads, sidewalks and paths.	Hierarchical road network with numerous dead-end streets, and unconnected paths and sidewalks
Street Design	Streets designed to accommodate a variety of activities.	Streets designed to maximize motor vehicle traffic volume and speed
Policy Formulation and Planning Process	Planned and coordinated between jurisdictions and stakeholders	Unplanned, with little coordination between jurisdictions and stakeholders
Public Places	Emphasis on the public realm (streets, sidewalks and public parks	Emphasis on the private realm (yards, shopping malls, gated communities, private clubs), sporadic public places, mostly unmaintained

Table 1: Comparison Showing Smart Growth Development and Urban Sprawl.(Ewing, 1996; Galster et al, 2001, Litman 2011)

When these are compared with respect to their impacts to disaster management (which needs comprehensive integrated planning approch), it is seen that the smart growth provides development of high density clustered activities, with strong resilient urban infrastructure (which will increase the coping capability when disasters strike), characterised by infill development, mixed landuses, local services accessible near the residential areas within pedestrian movement, multi nodal transportation which encourages walking, cycling and public transit which also prevents environmental dgradation, pollution. The connectivity of roads is simple and strongly linkes compared to hierarchical road network with numerous dead end streets; the former makes it possible to desig the evacuation routes during emergency management.

5.3 Reduction in green house gas emissions can affect intensity, magnitude and frequency of Disasters.

Disasters are impacted by climate change and urban growth pattern. Low density urban sprawl results in increase in the number and length of trips and rapid motorisation. This has resulted in dramatic rise in Green House Gas (GHG) emissions. The rate of motorisation inextricably links to urbanisation. Figure 2 shows that while urban population has increased by 50 % during 1990–2004, the number of Registered Motor Vehicles (RMVs) has risen by nearly 400 % in India.(Saxena 2008).

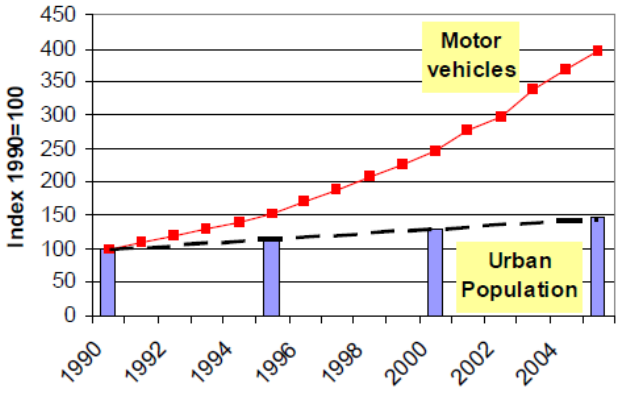

Fig. 2: Motorisation and urbanisation trends in India[9]

The transport sector is responsible for almost 25 % of global CO_2 emissions (IISD, 2004). Transport emissions are growing at approximately 2.1 % per year worldwide, and 3.5 % per year in developing countries (IEA, 2002).These impact climate change which inturn affects the frequency, magnitude and intensity of disasters especially hydro- meterological disasters like flooding, extreme temperature, high and intense rainfall etc.(Saxena, S. 2008). Growing Cooler, a study published in 2008 by the Urban Land Institute and EPA, examined the research on compact development, vehicle miles traveled, and carbon dioxide emissions to determine that more efficient development patterns could help reduce our impact on the climate. The study concluded that compact development can reduce vehicle miles traveled by 20 to 40 percent compared to conventional development patterns. Further, based on the amount of development by compact infill, the study estimated that compact development could reduce CO_2 emissions by 7 to 10 percent in 2050. As reduction in CO_2 emissions is a strategic need for urban disaster management, it can be achieved through policy measures and/or by comprehensive integrated development using smart growth principles, providing mixed landuses to reduce vehicle dependency.

5.4 Chanelling growth away from vulnerable locations

Disaster mitigation calls for channelling growth away from hazardous locations. Land scarcity enforces urban sprawl in vulnerable locations like; in floodplains, along the coast line, along the earthquake fault lines etc. As these lands are easily affordable, mostly urban poor locate themselves in such locations. Smart growth plays a role in mitigating disasters firstly compact development reduces the spatial extent, not reaching the hazardous locations, secondly by integrating vulnerability and risk maps with smart growth principles it channelizes the urban growth into safe zones within the city. Therefore it helps in creating greater resilience. A sucessful example of chanelling growth away from hazardous area, is Metro, the the Portland metropolitan area, which encourages towns to use seismic hazard maps when designating “urban reserve areas”—areas that will “eventually be brought inside the urban growth boundary” using smart

[9] http://epa.gov/dced/climatechange.htm

growth principles.(Sun, 2011). Thus integrating urban disaster management tools like risk mapping and microzonation produce technical information for the identification of hazardous areas, and serve in developing zoning regulations and establishing population density levels and also enable the managers to design mitigation action plans and support the smart growth concept. These can be very effective since they integrate socioeconomic factors and technical factors (housing, infrastructure, lifelines, and critical facilities).

5.5 "Urban resilience"- can be increased by using smart growth principles

Disaster mitigation can be achieved by making wise decisions for locationg new infrastructure and/alternatively by increasing the resilience of the existing infrastructure to incorporate the increasing demands. Compact development makes more efficient use of land and resources by reducing the environmental footprint of new contruction and preserving the open spaces(UNESCAP, UNISDR, 2010). By strengthening the existing urban infrastructure, will serve the dual purpose of catering the new development requirements , reduction in infrastructure costs and energy usage and second creating greater resilience. Smart growth acts as a boost up for other structural mitigation strategies in urban disaster management. It can benefit by inviting greater public investments, creates a stronger tax base; more employment opportunities; closer proximity to jobs and services; increased efficiency associated with using already developed land, reusing/repurposing existing buildings, and using existing infrastructure; and reduced development pressure on the edge. Several economic incentives and tax policy options may be used to direct business development toward existing communities (UNESCAP, UNISDR, 2010). Once redevelopment and infill development occurs, it intensifies calls for structural protections for urban hazard mitigation. This boosts up the economy of the region and increases its resilience and reduces socio economic vulnerability of people. This suggests that the largest potential gains in disaster mitigation can be achieved.

5.6 Reduction of impervious surface- mitigation strategy for water related disasters

Compact Development policies tend to reduce per capita impervious surface area (land covered by buildings or paved for roads and parking facilities). Benefits like better stormwater management and reduction in heat island effects can be achieved by increasing pervious surface. It leaves more land for other productive uses, like farming, it reduces the capital and operating costs of providing public infrastructure and services (such as roads, utility lines, garbage collection, emergency services and school transport). It improves overall accessibility , reduces transportation costs, including the per capita costs to consumers to own and operate vehicles, road and parking facility costs, traffic accidents, and pollution emissions. Therefore it reduces 'every day risks' in urban areas, which otherwise acts as catalysist in greater intensity risks of natural and man made hazards.

	Dispersed	Compact	Difference
Roadways	$17.6	$11.2	$6.4 (-36%)
Transit	$6.8	6.2	0.6 (-9%)
Water and Wastewater	$5.5	$2.5	$3.0 (-54)
Fire Stations	$0.5	$0.3	$0.2 (-46%)
Recreation Centers	$1.1	$0.9	$0.2 (-19%)
Schools	$3.0	$2.2	$0.8 (-27%)
Totals	$34.5	$23.3	$11.2 (-33%)

Public services infrastructure costs tend to be higher for more dispersed development.

Fig. 3: Public Services Capital Costs, Billions (IBI 2008): The City of Calgary Plan program compared the capital costs in providing infrastructure and public services [10]

The City of Calgary Plan-it program compared the costs of providing infrastructure and public services to more compact and dispersed development patterns as seen in Figure 3. The study found that the more compact land use saves about a third in capital and operating costs for roads, transit services, water and wastewater, emergency response, recreation services and schools.This not only indicates the economic savings but also the savings that would be achieved in terms of land usage(Litman 2004).

[10] Image source: T. Litman, "Understanding smart growth savings," vol. 9, p. 2007, 2004

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5.7 Efficient Emergency Response Management:

Compact Development improves emergency services response times as fire departments, emergency responders, and police stations are closer to the areas they serve and have more route options, easy accessibility and immediate response inability to respond to emergency calls (EPA, 2010). As the spatial extent of the city is less, the roads are shorter and wider and infrastructure are better designed, it is possible to plan the shorter evacuation routes during emergency management and the collape time of the structures (buildings) is also delayed which gives little more time to save lives. Strong infrastructure serves as a lifeline during emergency. Nevertheless there are some channenges while implemention and acceptance of this concept by people and administrators. These have been discussed in the next part.

5.8 Reduction in urban heat island effect

Microclimate of a place is greatly affected by the pattern of urban development, density of buildings(both horizontal and vertical), suface heat emissions from buildings and open spaces and carbon emissions due to human activities. One of the worst effects of urbanization is the urban heat island (UHI) effect, which develops when urban cooling rates are slower than rural ones. The compact development (high-density buildings) reduce the heat release back to space by blocking the view; dense development in urban areas, reduces wind speeds and inhibits cooling by convection as seen in Figure 4.

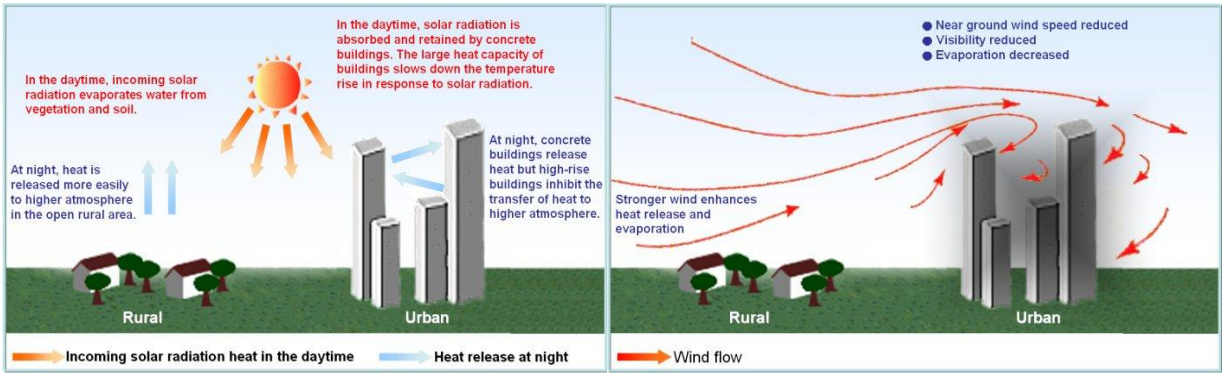

Figure 4. Urbanization effects on the heat energy balance and effects on the low level wind flow in the urban area.[11]

6 CHALLENGES

Compact Development is not popular with the managers and planners. Benefits of compact development cannot be achieved without effective participation of all the stateholders, in public, private and government domains. Urban Disaster Risk Reduction (DRR) when integrated with smart growth principles towards achieving sustainability would lead to effective urban disaster management. It would lead to communities which are more livable, cost effective and environmentally adaptive to low impact of climate change. But as rightly said "Smart Growth in dumb places"—those that are particularly disaster prone—is the antithesis of true sustainability. (Sun , 2011). This would make the communities more vulnerable. Therefore the challenges in adopting smart growth for effective DRR lie as below.

6.1 Sustainability and urban disaster risks

As many of the existing old cities are located in vulnerable locations, such as in low-lying coastal areas, along major earthquake faults, and along major rivers, and much of the land available for redevelopment and infill are often lands along waterfronts or land is particularly hazard- prone (Sun 2011). Increasing the density presents several serious challenges for managing growth in disaster risk areas as this will certainly exacerbate vulnerability of population and other elements at risk (infrastructure, lifelines, transportation, and housing, urban services). Compact development therefore must be integrated with structural and non structural measures of disaster risk mitigation. It needs to be adaptive to a given location. It should address the local issues and guide development with respect to specific urban risks through the types of projects to be adopted. Outsmart choice of density development might increase unsustainability. Secondly the smart growth needs to be supported by governance and legislation. New York, for example, recently passed the State Smart Growth Public Infrastructure Policy Act to halt public funding of sprawl by requiring state

[11] (http://www.hko.gov.hk/climate_change/urbanization_e.htm)

agencies to submit a "smart growth impact statement"for public projects and to "advance projects" that meet the state's Smart Growth criteria. . Another example is Portland, the city's Bureau of Planning and Sustainability has adopted "Neighborhood Design Policies" that encourage "new development" in areas that are losing housing and "increases in residential density" through "residential infill development."

6.2 Retreating from Hazardous areas

Retreating from the disasters areas is the most effective method of mitigating- in highly vulnerable locations or where population is extremely at risk due to greater socio economic vulnerability.Redevelopment efforts (Ieven though integrated with Disaster Risk Reduction strategies), in urban areas particularly those along coasts or inland waterways may not prove to be effective and retreating from these hazardous areas is perhaps the most cost- effective, long-term disaster mitigation strategy and is suggested by disaster scholars and practitioners. Unfortunately, retreat from hazardous areas is difficult to implement due to property rights, the costs associated with buy-outs, the likely disruption of existing community ties that relocation entails, and local political opposition to relocation efforts. (Sun 2011).

6.3 Density is a serious problem in case of failure or disaster response

Increasing density concentrates not only population but also resources—including the resources needed for effective disaster response. This concentration of response resources can be advantageous if those resources emerge from the disaster unscathed. If, however, they are destroyed in the disaster event, the resulting equipment shortages and communication failures can seriously hamper response and relief activities. Thus compact development strategies are relatively important with respect to planning of resource locations.

6.4 Current Growth patterns

The development does not take into consideration the local landuse planning, disaster management plans and the importance and involvement of Disaster Management authority into planning process which are greatly deciding factors in smart growth principle. As land-use planning is more of a state and local prerogative and approaches to land-use planning vary from state to state, national and state legislatures may be in the best position to encourage integration of hazard mitigation into land-use decisions(of smart development). When a state or locality adopts sustainability (smart growth) policies or legislation, it should include disaster mitigation as an important component and goal of sustainability and vice-versa. India, for example, should consider amending its Disaster Management Act (2005) to include attention to Smart Growth criteria in consideration to disaster risk Planning as well as UDPFI [12] guidelines in India (provides guideliens for urban Planning in India at National Level) should address the principles of Smart Growth and Disaster Management.

6.5 Evaluation of risks of redeveloping urban areas to the cost of alternative growth:

The risks of redeveloping urban areas must be weighed against the costs and risks of alternative growth patterns. For instance, planning for new urban cores in less risky locations is more weighted, rather than low density sprawling or shifting the existing urban cores toward hazardous areas through strategies like waterfront redevelopment. Sometimes the creation of urban centers of growth may be inevitable, as existing urban centers are unlikely to be able to accommodate all future growth.

6.6 Urban Form should support development in Disasterous areas

The cities which choose to redevelop particularly vulnerable areas despite the disaster risks, those redevelopment efforts should employ an urban form that either helps mitigate current risks or will facilitate strategic retreat in the future.(Sun, 2011) For example, some experts have suggested that strategic retreat can be more easily accomplished if a waterfront community is built around a series of roads (and utilities) that run perpendicular to the coast, rather than being built around a coastal road that runs parallel to the waterfront's edge. Such an urban design allows communities to make some concessions to the water over time (by ceding the property and stretches of road closest to the water) without losing all coastal access and

[12] UDPFI (Urban Development Plan Implementation and Formulation), formulated in 1996 under the Maharashtra Regional and Town Planning Act 1966, by Ministry of Urban Development for guiding urban development in India.

road and utility infrastructure. Urban redevelopment, then, can at least be an opportunity to ease the way to more permanent mitigation measures that may be necessary down the road.

6.7 Inaccurate assessment and Information may lead to vulnerable planning

Compact development can be vulnerable in disaster prone sites. Inaccurate risk assessment and information may lead to channelling growth to hazardous locations in unsustainable manner. People underestimate the everyday risks/disaster risks and incorrect risk perceptions might lead to wrong decisions associated with redeveloping or increasing the density of existing urban areas. As researchers have frequently argued, individuals faced with imperfect information about risk (and limited time, resources, and mental energy to devote to seeking out and processing further information) may form their own assessment of risk by relying on the perceived collective judgment of others.(Sun 2011).

6.8 Existing Bylaws and legislation does not support the Smart Principles

Existing byelaws and building code do not support smart growth principles. In most of the countries especially taking example of India, the building byelaws define the density of residential areas, promote setbacks in plotted development, the Floor Area Ratio (FAR) restriction is allowed maximum upto 2.5 which is only allowed in concentrated zones, promotes zoning of landuses which is against mixed landuse development, and it increases dispersed development which is against sustainability in the present context. The National Commission on Urbanisation of India (NCU, 1988) [13] recognized the need for adequate supply of land, efficiency and equity in allocation of land and promotion of flexibility in land use, thus suggested low rise development as the most efficient growth pattern.

7 CONCLUSION

Sustainability will reduce everyday risks along with mitigating the disasters and building stonger resilience to climate change.The 'Hyogo Framework for Action 2005-2015 [14] says in its priority actions that "An integrated, multi-hazard approach to disaster risk reduction should be factored into policies, planning and programming related to sustainable development,.." . Thus the protocol for disaster management calls for integrated sustainable (smart) development to be energy efficient, resilient to climate change and disasters with strong coping capability. This can be achieved successfully with the smart growth principles emphasing high density compact development. Smart growth consists of various development features that create more efficient land use patterns. Numerous studies indicate that smart growth can reduce public infrastructure and service costs, providing savings on roads, water, sewage, garbage collection, utilities, school transportation, delivery services, and parking facilities. This serves in strong economy. The major challenges associated with the concept are that there are no laws to support this planning, secondly more research needs to be done in this area to understand the various positive and negative implications(for example traffic congessition still remains the problem even though the per capita vehicle mileage gets reduced) of the smart growth. With respect to disaster smart growth need to be located in safe areas otherwise it may increase vulnerability manyfolds. More capacity building of people and administrators is needed for application of this concept. The governments need to take action on their part by changing the legislations to support and promote smart growth because if they don't do now, it will be too late tomorrow!

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Comparing Metropolitan Governance in Germany and the US: A Social Network Analysis

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1 ABSTRACT

The context for this paper is a comparison of metropolitan governance of specific metropolitan regions in Germany and the United States. In Germany, the Academy for Spatial Research and Planning (ARL) describes metropolitan regions or spaces as high-density locations, which are centers of the global network of goods, capital, information and migration flows. In the United States, metropolitan regions or metropolitan statistical areas are based on the concept of a core area with a large population nucleus, plus adjacent communities that have a high degree of economic and social integration with that core. On the surface, the German definition appears to focus more squarely on building social capital and creating metropolitan governance structures capable of achieving "centeredness".

In this paper, we compare aspects of metropolitan governance for the metropolitan areas of Hamburg, Germany and South Florida, USA. To simplify the empirical analysis, we focus on a single governance function – planning for adaptation to climate change. UCINET network analysis software is used to examine the pattern of interaction among stakeholders. The software returns indicators of size, connectivity, and cluster. Each of these indicators tells us about different attributes of the governance structure. The formal null hypothesis is that all three types of measures (representations of metropolitan governance) will be identical for both metropolitan regions. The formal null hypothesis is mostly rejected. The two regions demonstrate markedly different planning networks in dealing with adaptation to climate change. The final part of the paper reflects on the general method of using social network analysis to characterize metropolitan governance structures.

2 THE QUESTION OF GOVERNANCE IN METROPOLITAN REGIONS

The first question is "what is metropolitan governance?". Most would define "governance" in relation to the "government". Government is a formal administrative structure; governance is more than that – it includes the voluntary sector, NGOs, private organizations, and intergovernmental (and multi-scalar) linkages. Williams (1971) distinguished between "systems maintenance" issues and "lifestyle" issues; the former are best accomplished at the metropolitan scale. Yet, metropolitan governance continues to elude both the public eye and the academic lens (Feiock, 2004).

The metropolitan governance literature articulates two competing or different schemes that, for the sake of simplicity, can be termed "centralized" and "decentralized". Centralized governance schemes rely on a central government. Decentralized governance schemes are witnessed by a lack of a central government. The assumption in this paper is that German cities are more likely to have central governmental structures, while the US metropolitan areas are typically devoid of such mononucleated institutions. It is an empirical question as to which system of governing is better; it is likely that there is no clear answer. For example, Salet, Kreukels and Thornley (2003) argue that there is no one best method; governance systems are idiosyncratic and contextual. The proponents for any governance system – be they public choice theorists (Ostrom, 2005, Bickers and Stein, 2002), metropolitan reformers (Oakerson, 2002), or new regionalists (Savitch and Vogel, 2000, Wheeler, 2002) are simply making pronouncements. Empirical verification is sorely missed.

To simplify matters, we have chosen to focus on the governance of a single issue: planning for adaptation to issues raised by climate change (this is, we believe a systems maintenance issue and thus appropriately organized and governed at the metropolitan scale). Our approach is to compare how planning is accomplished in two metropolitan areas similar in most regards with the exception of how planning functions are organized. In Hamburg, Germany, such planning is accomplished at the regionwide scale by a central authority; in South Florida, the planning is organized as a decentralized network of stakeholders.

This paper is organized as follows. The next section provides both the development of the comparison methodology and context including some descriptive statements about the Hamburg and South Florida metropolitan regions. This is followed by a exposition of the social network analysis approach, including a

discussion of its methodology and measures. The fifth part reports results in terms of data collection, data preparation, and computation. This is followed by a discussion of the results in terms of preliminary expectations and a reflection of the method and general conclusions about how social network analysis enhances understanding of metropolitan governance.

3 DESIGN OF THE COMPARATIVE CASE STUDY

3.1 The Design of the Comparative Case Study

There are a number of similarities and differences between the two metropolitan areas. Similarities include: rough equivalencies in terms of location (on major water bodies), function (ports trying to become knowledge centers), administrative and political complexity (multiple jurisdictions), and size (roughly equivalent). Differences include:distinct variations in both how governance is organized and in functional approach. The Hamburg region has a metropolitan wide planning agency, wherein the planning for adapation to climate change is accomplished in a "top down" fashion; while the South Florida region does not and thus such planning could be characterized as "bottoms up". Moreover, planning in Germany continues to function along technological lines; while the South Florida region seems to function along process lines. The essence of the comparative study is to calibrate and discuss differences in social network attributes between the planning systems.

The two systems are the KLIMZUG-NORD project in Hamburg and the SOUTHEAST FLORIDA REGIONAL CLIMATE CHANGE COMPACT in South Florida. Both are described more fully below.

3.2 Hamburg Metropolitan Region

The Conference of Ministers for Spatial Planning designated the Hamburg Metropolitan Region as a European Metropolitan Region in 1995. It is defined as a dense populated area with a surrounding region, which has global integration, as a result of its economic, political and traffic and international importance (Heimpold, 2006). The spatial boundary of the Hamburg Metropolitan Region is defined in the treaty from 2005 between the Freie und Hansestadt Hamburg, Niedersachsen, and Schleswig-Holstein (Grotheer 2011). It consists of fourteen administrative districts (6 within the Federal State of Schleswig-Holstein and 8 within the Federal State of Niedersachsen) and the entirety of the Federal State of Hamburg

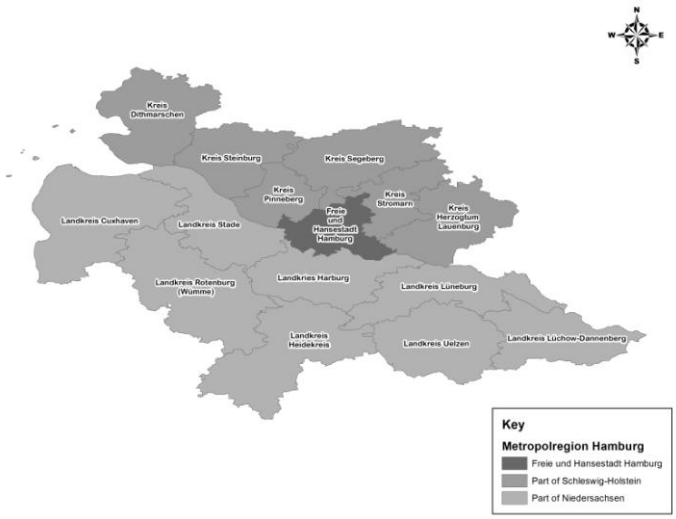

Fig. 1: The Hamburg Metropolitan Region

Overall, the Hamburg Metropolitan Region has a total population of 4,301,920, with a population density of 207 persons per km² (Statistikportal der Metropolregion Hamburg, 2012). The region extends over a large area in the North of Germany and includes very different structured sub-spaces: from the prosperous subspaces of Hamburg and its direct environs to rural and structurally weak sub-regions such as the administrative district Lüchow-Dannenberg.

The region offers a high standard of living and diversity, with a defined urban core and rural areas. The international airport, the port of Hamburg with cruise ships and international train connections define the role of the Metropolitan region in the international network. These international traffic functions are all

concentrated in the core, or the city of Hamburg (Grotheer, 2011). The region has qualified specialist companies prepared to innovate, and highly qualified research centers. For example, the 9,000 researchers and 85,000 students at 27 universities emphasize the position of the region as an academic/scientific location.

The KLIMZUG-NORD Project

KLIMZUG (Klimawandel in Regionen zukunftsfähig gestalten) is a funding initiative of the Bundesministerium für Bildung und Forschung (BMBF), which supports the preparation for adapting to climate change. The purpose of this funding initiative is to embed the awareness of the need for adaptation to climate change in our society. The BMBF is supporting seven model regions, from 2009 through 2014, with a total of approximately €83 million.

The KLIMZURD-NORD project, one of the seven national pilot projects, is focused in the Hamburg Metropolitan Region. The project is described (KLIMZUG-Nord Strategische Anpassungsansätze zum Klimawandel in der Metropolregion Hamburg, 2012) as:

"Partners of KLIMZUG-NORD are going to research the consequences of climate changes to urban areas, agricultural sites and the tidal riverbed of the Elbe within the city of Hamburg. Taking into account research data, environmental planning, city law, and economic plans, a range of action plans are going to be recommended. The target entails a coordinated action plan for the city regions, including a master plan which reaches to the year 2050."

The overall KLIMZURG-NORD project is focused on three topics – estuary river management, integrated urban development, and sustainable cultivated environment. The overall project is coordinated by "TuTech Innovation" and has a total of 76 partners and supporters. There are 25 sub-projects.

3.3 South Florida Metropolitan Region

The U.S. Office of Management and Budget and the US Census designate metropolitan areas in the United States. The area designated as the South Florida Metropolitan Region is made up of three counties (Broward, Miami-Dade and Palm Beach), and had a 2010 population of 5,564,635 (8th largest in the US).

The MSA itself is separated into three distinct divisions that fall along county lines. The Miami-Miami Beach-Kendall divison (Miami-Dade County) has a population of 2,496,435, the Fort Lauderdale-Pompano Beach-Deerfield Beach division (Broward County) has a population of 1,748,066 and the West Palm Beach-Boca Raton-Boynton Beach (Palm Beach County) divsion has a population of 1,320,134. The OMB also designates principal cities; these are: Miami, Fort Lauderdale, Pompano Beach, West Palm Beach, Miami Beach, Kendall, Boca Raton, Deerfield Beach, Boynton Beach, Delray Beach and Homestead.

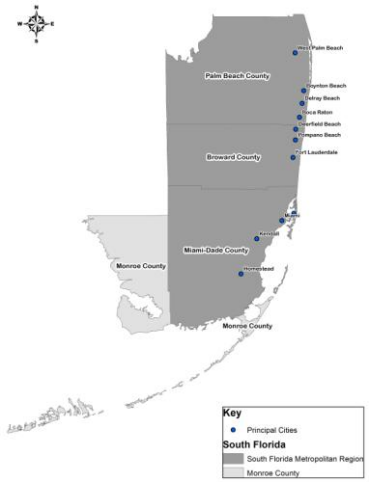

Fig. 2: South Florida Metropolitan Region.

3.3.1 Southeast Florida Regional Climate Change Compact

The Southeast Florida Regional Climate Change Compact was the principal result of the Southeast Florida Climate Leadership Summit, held in 2009. The compact's principal members are the four counties that make up the Southeast Florida region (Broward, Miami-Dade, Monroe, and Palm Beach; Monroe is the county that includes the famous Florida Keys). The compact became official with the signing in January 2010. This

compact allows the counties a framework and structure for working together by developing a coordinated response to any proposed climate legislation policies, to dedicate staff time and resources towards the creation of a Southeast Florida Regional Climate Change Action Plan, which would include mitigation and adaptation strategies, and to meet annually in Regional Climate Summits to mark progress and identify emerging issues. (SOUTHEAST FLORIDA REGIONAL CLIMATE CHANGE COMPACT, 2012)

The Draft Regional Climate Action Plan was released on December 9th, 2011 (open for public comment until March 16th, 2012). This plan is both a summary of work done and an update on what is still left to accomplish. Among the completed highlights are the establishment of a Greenhouse gas Emission base line for Southeast Florida and the creation of a unified methodology among all four counties in regards to sea level rise.

There are 91 nodes (actors) involved in three major work groups (tasked with data collection and eventual recommendations). These are: Built Environment, Transportation, and Land and Natural Systems. To date, recommendations are grouped in six categories: (1) Sustainable Communities and Transportation Planning; (2) Water Supply, Management and Infrastructure; (3) Natural Systems and Agriculture; (4) Energy and Fuel; (5) Risk Reduction and Emergency Management; and (6) Outreach and Public Policy.

4 SOCIAL NETWORK ANALYSIS: WHAT IS IT?

Social network analysis (SNA) is not new; indeed, the idea has been around for over a century. Its use as a systematic tool dates from the mid 20th century (A.J. Barnes, 1954). What began as a "metaphor" has morphed into an "approach" and is approaching "paradigmatic" status. The key difference between SNA and traditional social science analysis is the focus of measurement. In SNA, the key attribute to be measured are "links" between actors (called nodes); in traditional social science analysis, the key attributes to be measured are aspects of the nodes (income, race, gender, etc.).

This section relies on two major sources – Knoke's (1982) introduction to social network analysis and Hanneman and Riddle's (2005) manual for the UCINET program. The discussion is structured into methodological perspectives and a discussion of the specific measures and their operational versions.

4.1 Methodological Perspective(s)

Freeman (2006) and Wellman & Berkowitz (1988) distinguish major analytic tendencies. These are: (1) there is no assumption that groups are the building blocks of society; (2) a focus on the structure of ties rather than treating individuals (persons, organizations, states) as discrete units of analysis; and (3) a focus on how the network affects ties.

Generally, the shape of the social network determines a network's usefulness to its individuals. For example, prevailing wisdom suggests that: (1) smaller, tighter networks can be less useful to their members than networks with lots of loose connections (weak ties) to individuals outside the main network; (2) more open networks, with many weak ties and social connections, are more like to introduce new ideas and opportunities to their members than closed networks with many redundant ties. In terms of environment, centralized structures may perform better when there is not much in the way of upheaval or change, but when there is a lot of change, a less centralized structure may be preferrable (Knoke and Kuklinski, 1982).

4.2 Measures

SNA analysts generally focus on a number of attributes of the network, including size and core component, connectivity, and centrality and cluster analysis. We discuss each below. We used UCINET to calculate these parameters of the network. The specific measures produced by UCINET are also listed below.

Size

The size of the network is critical in defining the social structure. Larger networks require greater resources for developing and maintaining social relationships (Hanneman & Riddle, 2005). Focusing on the number of actors – size of the network, the number of possible ties and the number of actual ties – is the first step in analyzing a network. The size of a network and the number of ties is directly related, as Hanneman and Riddle note, 2005, p. 80).

"Imagine a group of 12 students in a seminar. It would not be difficult for each of the students to know each of the others fairly well, and build up exchange relationships (e.g. sharing reading notes). Now image a large

lecture class of 300 students. It would be extremely difficult for any student to know all of the others, and it would be virtually impossible for there to be a single network for exchanging reading notes. Size is critical for the structure of social relations because of the limited resources and capacities that each actor has for building and maintaining ties."

This data gives us the first critical information about the network and about the actors, specifically how many ties are possible compared to how many are present and also how many ties each actor has (Hanneman and Riddle, 2005).

Connectivity

Going a step further in analyzing a network, examining the connectivity and the distance gives a more detailed insight of the network.

The distance is the amount of steps is needed to move information from one node to another. It shows us how embedded a stakeholder is (Hanneman and Riddle, 2005). If the distance is 1 between two stakeholders, then these are directly connected and the information flow is the shortest and does not have to go through anyone else. This short path between two nodes is called a geodesic (Knoke and Kuklinski, 1982).

The maximum number of steps or "largest geodesic distance" defines the diameter of the network (Hanneman and Riddle, 2005). The average distance is the mean of all geodesic distances and gives us on average the shortest distance needed to move from one node to another.

According to Hanneman and Riddle (2005) the distance-based cohesion or "compactness" coefficient is in the range of values from 0 to 1, whereby closer to 1 the network is more cohesive or "well connected".

The density of a network is easily derived. It is the number of the present ties (a) divided by the amount of possible ties (N2-N, self-directed relations are not permissible in our case) (Knoke and Kuklinski, 1982). The dependence of the number of stakeholders, or the size of the network itself, is trivial. Thus, a large network with the same number of relationships has a lower density than it is the case in a smaller network (Schnegg and Lang, 2002).

Cluster Analysis

The clustering coefficient is a measure of the likelihood that two associates of a node are associated themselves. A higher clutering coefficient indicates a greater "cliquishness". UCINET gives us two alternative measures for clustering. Again quoting from Hanneman and Riddle, 2005, p 105,

"The "overall" graph clustering coefficient is simply the average of the densities of the neighborhoods of all of the actors. The "weighted" version gives weight to the neighborhood densities proportional to their size; that is, actors with larger neighborhoods get more weight in computing the average density."

Centrality is a rough indication of the social power of a node based on how well they "connect" to the network. The Bonacich Power coefficient measures the power of the actors. The idea is that stakeholders who have more ties than others may have a good position. But following Bonacich, a stakeholder does not have power through it is the amount of connections but due to its position in its neighborhood. If your neighbors are dependent on you, that puts you in a powerful position. Here, the amount of connections is not as important as having the right connections.

Example:	Stakeholder A	Stakeholder B	Stakeholder C
Stakeholder A		1	0
Stakeholder B	1		1
Stakeholder C	0	1	

Figure 3: How the Matrix is filled

5 DATA COLLECTION AND PROCESSING

In order to best encapsulate and capture the relationship of the actors, a matrix was used to map the connections. The matrix is a straightforward way to present the relationship among (between) stakeholders. The UCINET software uses the matrices to perform its calculations. The matrix consists of n rows and m columns. The number of stakeholders determines the size of "n" and "m". The matrix shows the relationship

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between the members of the project by using the number 1 to represent a connection and the number 0 to represent no connection. This is done regardless of the degree of intensity of the relationship, see Figure 3.

The example matrix consists of three rows and three columns. Stakeholder B has a connection to stakeholder A and C, and thus has a "1" in its cell. Relationships between stakeholders and themselves are excluded.

5.1 Preparing the Matrix for Hamburg

The first step was to collect all stakeholders that are part of the project KLIMZUG-NORD. The project website had a subsection labeled "Partner" in which there were lists of the partners and supporters of the project, those were already briefly discussed above. These names were used to create the framework of the matrix.

After this step all sub-projects of KLIMZUG-NORD were analyzed looking for the relationships between stakeholders. If the stakeholders work together on a project, like for example the Technische Univeristät Hamburg-Harburg (TUHH) and the company Wasserbau River and Coastal Engineering, like they do in the project Hochwasserschutz an tidebeeinflussten Nebengewässern der Elbe, then there is a connection and this was recorded in the matrix. Actors that were not listed in the partner list described above but were listed as stakeholders in a specific sub-project were added to the matrix. TuTech Innovation is the coordinator of the whole project, and because of this, they appeared in every sub project. This was also true for the Bundesministerium für Bildung und Forschung, the Freie und Hansestadt Hamburg and the Hamburg Metropolitan Region. These institutions finance the project by way of the KLIMZUG funding initiative.

5.2 Preparing the Matrix for South Florida

The data collection for the creation of the matrix was done by examining the documents that the Compact had created, much in the same manner as the Hamburg portion of this analysis, and seeing which organization and/or governmental agency had collaborated on a project. The first step was to see if the counties themselves had created units for collaboration on this project. Broward County created the Broward County Climate Change Task Force (BCCCTF) and was a mix of private and public organizations. The other counties also created units but those were made up of solely county groups and did not have the diversity that Broward County did. The next step was to look at the Draft Regional Climate Action Plan, which had been put up for public review on December 9th, 2011 and is open for review until March 16th, 2012. This plan included a section titled, Contributing technical and Staff Experts. This part of the appendix broke down the contributors into three groups: Built Environment Work Group Participants, Land and Natural Systems Work Group Participants, and Transportation Work Group Participants. These three groups along with the Broward Climate Change Task Force were used as the basis for the analysis.

Organizations and/or groups were deemed to be connected if they resided on the same list of members. So everybody in the BCCCTF would be connected to everyone else in that group and would be represented with a 1 in the matrix. A member on that list would only be considered as connected to someone in another list if they were also on the other list. So if the South Florida Water Management District (SFWMD) was present in the BCCCTF and the Land and Natural Systems Work Group Participants list, then the SFWMD would be connected to every member in both of those groups. Care was taken to leave departments within a county as separate if they were listed as separate entities. So if example if both Broward County and Broward County Planning and Zoning were listed, then they would both have separate entries into the matrix. This was done as it would also allow for mapping of interdepartmental connections.

6 RESULTS

Perhaps the most compelling result from the UCINET program is a graphic representation of the SHAPE of the social network. We show this first (Figure 4), and then examine in more detail the results of the more "numeric" parameters (Table 1).

The shape of the network also gives insight into how the network functions. The results of the UCINET program for the two planning for adaption to climate change reveal vastly different shapes. The KLIMZUG-NORD network resembles a star. We believe that this result is due to the influence of both the coordinating stakeholder and the financing stakeholder that are connected to every member of the network. Indeed, an interview with the public relations office of TuTech Innovation confirms the need for a coordinating stakeholder – the face in front of the funders.

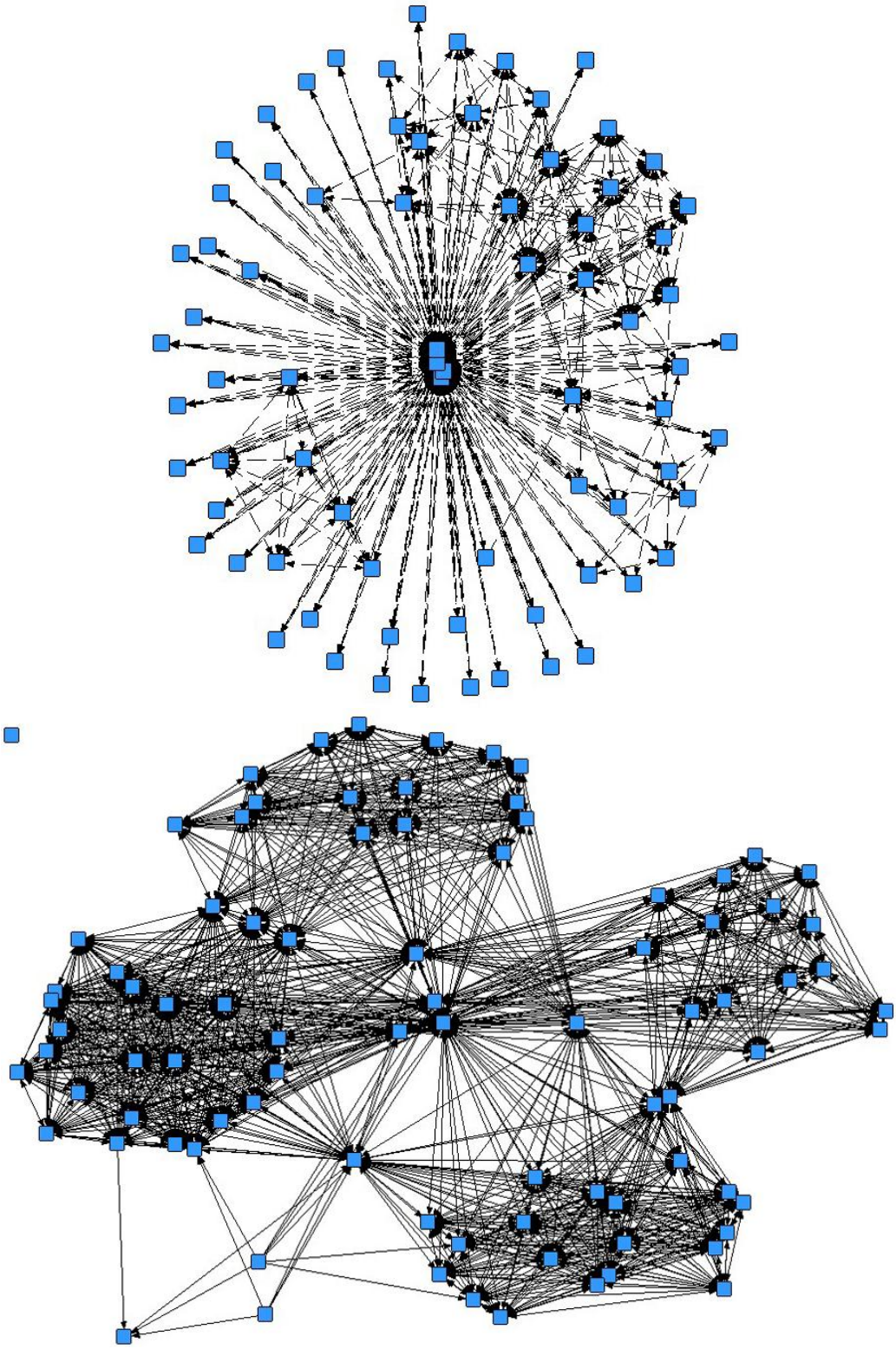

Fig. 4: Network Maps for Hamburg and South Florida

The shape of the Southeast Florida Regional Climate Change Compact network resembles a spider web with four big sub-webs connected through the main stakeholders – the individual counties. The four sub-groups represent the three technical work groups (Built Environment, Transportation, and Land and Natural Systems) but also the Broward County Climate Change Task Force. The shape shows that each group is a relatively self-contained entity.

6.1 Size Results/Analysis

The size of both planning networks is roughly similar. KLIMZUG-NORD (hereafter KN in the remainder of section 6) has 76 partners/stakeholders. The Southeast Florida Regional Climate Change Compact (herafter

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SFRCCC in the remainder of section 6) has 91 identified institutional partners. While these numbers are not exactly the same, they are in some sense roughly proportional. This reduces one of the sources of variation between the two case study networks.

South Florida				Hamburg		
91			Number of Stakeholders	76		
8190			Number of possible Ties	5700		
2358			Number of Ties	845		
29.44%			Density	15.23%		
1.713			average Distance	1.848		
0.622			Distance-based cehesion (Compactness)	0.576		
0.378			Distance-weighted fragmentation (Breadth)	0.424		
5			longest Distance	2		
0.896			Overall graph clustering coefficent	0.917		
0.767			Weighted Overall graph clustering coefficient	0.273		
Institution	Clus Coef	nPairs	Clustering Coefficients	Institution	Clus Coef	nPairs
BC NRPMD	0.400	1953		Stadt Hamburg	0.129	2701
Broward County	0.461	1431		Bundesministerium für Bildung und Forschung	0.129	2701
Palm Beach County	0.504	1128		Metropolregion Hamburg	0.129	2701
Monroe County	0.496	1128		TuTech Innovation GmbH	0.129	2701
Maimi-Dade County	0.872	435		Universität Hamburg-Harburg	0.532	325
Institution	Power	Normal	Bonacich Power	Institution	Power	Normal
BC NRPMD	63	2.225		Stadt Hamburg	74	3.856
Broward County	50	1.766		Bundesministerium für Bildung und Forschung	74	3.856
Palm Beach County	45	1.589		Metropolregion Hamburg	74	3.856
Monroe County	45	1.589		TuTech Innovation GmbH	74	3.856
Miami-Dade County	27	0.953		Universität Hamburg-Harburg	26	1.355

Table 1: Coefficient and Parameter Results for Hamburg and South Florida Networks

6.2 Connectivity and Density Results/Analysis

The possible number of ties is based in part on the number of participants in the network. In our two examples, the SFRCCC network has 2,358 possible ties; the KN network has 845 possible ties.

UCINET computes a number of connectivity and density parameters. The average distance of the KN network is 1.848 compared to 1.713 for the SFRCCC network. This indicates that the average number of steps between individual stakeholders is shorter in South Florida than in Hamburg. On the other hand, the longest distance between stakeholders is longer in South Florida than in Hamburg, 5 steps to 2 steps. This might indicate that the connections in the South Florida network tend to be more local and not network wide. This can be seen in the visualization and reinforces the notion that the sub groups are self-contained.

The compactness coefficient measures how "well" the network is connected. This coefficient has a value of .622 for the SRFCCC network and a value of .576 for the KN network. This is also reinforces the fact that sub-groups in South Florida are more connected within.

The density coefficient measures how "solid" the network is. The SFRCCC has a density coefficient of 29.44% compared to the KN network derived coefficient of 15.23%. This measure reinforces the visual graphic representation of the two planning networks. The KN network operates in a hub-and-spoke fashion; stakeholders are connected by the fact that all have a common partner, which are coordinating stakeholder and the financers. This cuts down on connections between stakeholders and lowers the density. The SRFCCC network is similar to this but has more interconnectivity between stakeholders within a sub-group, which accounts for the higher density.

6.3 Centrality and Cluster Results and Analysis

UCINET returns both overall and weighted graph clustering coefficients. The weighted overall graph clustering coefficient shows a huge difference between the SFRCCC network coefficient of .767 and KN coefficient of .273. This coefficient indicates the weight densities of their neighborhood proportional to their size. In the KN network they are not dense or big neighborhoods and that's the coefficient is that low. In the case of the overall graph, the KN clustering coefficient is .896 compared to .917 for SFRCCC; these are nearly identical. This is because this value shows us the average of all the actors relating to the densities of their neighborhoods. The coefficient per stakeholder shows us that the technical groups in the SFRCCC network operate in their own neighborhood; we daresay that every technical group has its own sub-network. This is not the case in the KN network as the four most powerful players are only in one neighborhood but are connected to all other stakeholders in the network.

UCINET also computes the relative power of individual stakeholders by calculating Bonacich Power coefficients. The Bonacich results reveal that the most powerful stakeholders in the SFRCCC network are the four counties and the Broward County Office of Natural Resources Planning and Management. This is perhaps an obvious result, but encouraging in methodological terms since it captures the real organization of the SFRCCC effort. The same is also apparent in the KN network. The most important stakeholder is a university – the TuTech Innovation GmbH, which has the mission to connect Hamburg University of Technology with businesses. The TuTech acts as the coordinating stakeholder and because of this has the most power. Only the financing stakeholders – the Freie und Hansestadt Hamburg, the Bundesministerium für Bildung und Forschung and the Hamburg Metropolitan Region have the same power.

7 DISCUSSION OF RESULTS IN TERMS OF EXPECTATIONS IN THE CASE STUDY

Though nearly the same size as expected, the two social network graphic and numerical results show vastly different "shapes" and "values". One is a top-down-structure and one is bottom-up. As we learned, the shape and the institutionalization of a network is based on the genesis, the structure of stakeholders within a governance system, and the reasons why this network was implemented.

The two networks validate the assumption that German metropolitan areas are more likely to have a centralized governmental structure whereas US metropolitan areas have more decentralized structures. The KLIMZUG-NORD project is a metropolitan regional government project while the Southeast Florida Regional Climate Change Compact shows an example of a bottom-up approach. The difference is reflected in the strong suspicion that some parts of the South Florida network existed before the region-wide project. In the case of KLIMZUG-NORD we weren't able to tell if there had been such connections.

However, both networks confirm the idea that municipal governments play an important piece in the governance of metropolitan area. The most connected and powerful stakeholders are "government players". These give the resources and have access to governmental authority. In the case of KLIMZUG-NORD the stakeholders, the Hamburg Metropolitan Region and the Freie und Hansestadt Hamburg, provide the network access to the local metropolitan government or are in fact the metropolitan government. The Bundesministerium für Bildung und Forschung connects the project with the state. In the South Florida Network, the counties are the governmental authorities; this pattern points to the overarching need for interjurisdictional collaboration.

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Concepts Of Urban Renewal in an Aging Society in the XXI Century – Case Studies in Polish Cities

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1 ABSTRACT

In the twenty-first century many cities are at risk of losing the ability to function properly, due to progressing demographic changes. This is particularly evident in the European developed countries, where, in the cities, one observes an increasing number of senior citizens and a decreasing number of young people, both facts being the causes of the process of ageing. In modern world, we all depend on cars, while their availability to the elderly may be restricted. This results in the seniors having limited access to city services and other facilities, hindering integration with the rest of the society and exposing them to the risk of social exclusion. Modern cities require rearrangement and renewal so as to satisfy the needs of senior citizens. The purpose of this article is to indicate what actions are taken with reference to the ageing population in selected cities in Poland and what general concepts of urban renewal may be said to emerge out of these actions. The survey of Polish case studies will be compared and contrasted with similar initiatives involving age-friendly urban renewal which have been carried out in Barcelona and London as a part of the Age Friendly Cities project. The author is looking for trends and transformations in contemporary urban development taking place in Polish cities with reference to the aging population, in order to gain knowledge on what is missing in contemporary functional and spatial structure in the city and today's state of research on the subject.

2 INTRODUCTION

We are witnessing the emergence of a new era which will alter the methods of energy production. Industry will be reasonably minimized, changing the social system: there will be more and more elderly people and fewer and fewer children. This trend is associated with progressive demographic change that includes aging of the population which has been clearly visible in Europe and the U.S. for some time, affecting almost every aspect of life, from economy to culture, including the functional and spatial structure of cities. The following table shows the implications of spatial and socio-economic demographic change which include: migration, declining birth rate and ageing of the population.

Demographic change	Spatial consequences	Socio-economic consequences
Migration	Abandoning the cities and moving to other locations or suburban areas - in turn, the lack of demand for developing services leads to the shrinking of cities and suburbanization	The economic potential in the region is reduced due to migration; increase of imbalance in public finances caused by the loss of tax revenues from the working population
Declining birth rate	Decline in population contributes to the increase in empty living spaces; lack of demand for service development	Closing schools, kindergartens unemployment among teachers, paediatrician
Aging population	Increasing number of the elderly generates demand for the development of medical care, specially adapted living spaces for the elderly; development of services aimed at this social group	Collapse of the pension system; high expenditure on welfare for the retired; weakening of the economy's growth potential; losing the most energetic, enterprising and well educated.

Table 1: Demographic change and its spatial and socio – economic consequences

3 AGEING OF THE POPULATION IN THE SPATIAL CONTEXT

Ageing is a permanent feature of all visions of the future that take into account the growing number of the elderly. By 2050, most European Union countries, including Poland, may see significant changes in the demographic structure of the population. Eurostat demographic forecast indicates that by 2050 the amount of the retired population (over 65 years) in EU countries will have increased by 70 percent, causing a 12 percent decline in the number of working population (15-64 years). As a result, the ratio of the working population to the retired, which now is four to one, will only be two to one in 2050, causing difficulties in obtaining sufficiently high tax revenue needed to provide for the senior citizens. So far, the debates on how to deal

with ageing properly have focused on issues such as pensions and social security, health and social care at a national level. But now, a new approach to the challenges and opportunities posed by an ageing population gradually emerges in the European Union. We are dealing with an innovative, broader definition of the problems of ageing, including a number of issues:

- Pensions and income.
- Economy and employment.
- Health care and other services.
- Rights of individuals.
- Housing and communities.

One can notice among local authorities a growing awareness of the importance of introducing specific policy in areas such as: housing, transport, urban renewal and taking into account the growing diversity of needs of the elderly, the lonely, the disabled and those living in the poorest areas of cities. The process of ageing and its socio - economic consequences have become the objects of attention of demographers, politicians, sociologists, psychologists, geriatricians, architects, as well as urban and spatial planners. The fact that this process is an important aspect of spatial planning should not be overlooked in the global debate on the social effects of ageing. Not only will Polish society not avoid ageing, but the demographic changes in Poland will occur even faster than in other EU countries. By 2050, Poland will have recorded a rate of decline in the number of people of working age twice as high as the Western European countries. However, the Polish have not been yet affected by the urban problems that resulted in the shrinkage of the cities in Britain and Germany. On the other hand, many cities in Poland have been affected by the ageing of the population. This concerns mainly the post-war housing estates and blocks of flats of the 1960s and 1970s This is mostly due to the fact that in the last decade the financial situation of Poles has significantly improved. They have more and more cars, more and more leisure time and they increasingly move outside the cities.

As in many European cities, the phenomenon of suburbanization exists also in Poland. People move outside the city to have more living space, at the expense of increased commuting time. In Poland, local authorities do not seem to express proper concern about attracting and keeping residents longer in cities so that they could continue to invest or spend their money both on housing and urban life, while migration to the suburbs causes transformation of their surrounding which leads to the degradation of natural environment. Suburbanization incurs additional costs related either to creating new building sites in the countryside, building new roads, schools and kindergartens, or to accessing remotely located educational facilities and services. Life of a pensioner in suburban areas can be very difficult and complicated, due to limited access to services, health care, cultural events and entertainment, which may have a negative impact on the well-being of senior citizens alienating them from the social life.

4 KEY TERMS

In order to clarify the issues of ageing in relation to urban renewal it is necessary to specify the key terms: the ageing of population and urban renewal. Old age and ageing are concepts that have not been clearly defined by either the natural or social sciences. The first of these concepts is treated as a static phenomenon, a phase of life, the other is a process. Old age as a stage or status in life is static; ageing, however, regarded as a developing process, is a dynamic phenomenon. Progressing socio–economic changes, rapid technical progress (e.g. information technology), increased standard of living, development of medicine all contribute to the extension of life expectancy. As a result, the number of elderly citizens grows faster than the number of the new-born.

Ageing has changed over the centuries both in terms of its pace and form. The pace of ageing in the first few centuries AD was characterized by relatively small changes in the length of human life. A person between 27-35 years was already considered elderly. But in the twentieth century a significant change in the length of human life occurred. In 1950 the average human life expectancy was 47 years, and in 2000 it increased to 65 years. Predictions show that by the end of this century, average life expectancy will have exceed 80 years. To put it differently, in the period from 2005 to 2050, in Europe, the percentage of people over 65 years old (according to Eurostat estimates) will increase from 17 % to 30 % of the total population, while the percentage of people below 24 years will fall from 30 % to 23 %. Currently in Poland 13 % of the population

represents retirement age and by 2020 this figure will have increased to 25 % and, consequently, in 2030 one third of the Polish population will be retired. It follows that the pace of aging has been accelerating rapidly with an impact on spatial planning, what can rebound negatively on European cities.

Urban renewal is the key issue in contemporary urbanism. Its aim is to improve the quality of life of all citizens and increase the competitiveness of cities on a regional scale. Urban renewal is understood as adjusting the city to the changing needs of individuals and urban communities. Renewal is a social process that concerns the city's architecture, technical infrastructure, as well as legal, economic, administrative and political issues. Bearing in mind the changing needs and aspirations of future seniors, it is necessary to adapt the cities, in terms of their functional and spatial structure, to the ageing society, and, in a broader sense of the urban policy addressing the needs of older people, to motivate the elderly and encourage them to use what the cities offer, contributing to their integration with society. These actions are conducive to raising awareness, creating new jobs, developing the local economy, and improving living conditions in society. If the elderly are to become a significant social group in the cities whose needs and decisions will influence the structure of property market or services, then local authorities should provide them with favourable conditions of living, because otherwise they are at risk of not only losing the ability to participate in social life but also to function as individual beings.

5 CASE STUDIES

5.1 Age-friendly cities project

In Europe, numerous declarations pronounced by international organizations and governments, as well as academic conferences and innovative research programs contribute to the widespread attention drawn to this issue. The world community forums and organizations such as the UN, EU, OECD and many of their agencies have intensified their actions to respond to the challenges of the ageing population. In Western Europe many countries worked out methods and techniques of urban management with reference to ageing. New non-governmental international organizations such as the "Age-Friendly Cities" (created by WHO in 2002) are established and developed. WHO encourages local governments to plan age-friendly cities. An age-friendly city should adapt its structures to the needs of the elderly. For example, buildings in an age-friendly city should be equipped with elevators, non-slip flooring, ramps, etc. The city should also provide an adequate system of public transport (low floor vehicles, clearly displayed bus routes numbers, priority seats for the elderly). In addition, most service centres in the city should be located on the ground floors of buildings. These facilities should ensure that older people feel their needs to be acknowledged and satisfied. The "Age-Friendly Cities" program identifies the main elements of the urban environment, supporting active and healthy ageing. These are:

- access to public transport,
- friendly urban spaces and buildings,
- social support and medical care,
- location and availability of services,
- communication and better use of information technology,
- employment and social and civic participation,
- overcoming social exclusion,
- building intergenerational relationships by sharing the urban space.

5.2 Age Friendly Cities urban policy in Western Europe

Age Friendly Cities is a partnership of 35 cities from all over the world whose aim is to make urban communities better, healthier, and safer for the elderly to live and thrive. In some of the major Western European cities that take part in the project, such as London and Barcelona, the effects of ageing have already become a more serious issue than in Poland. However, as a result of participation in the Age Friendly Cities project both of them implement a policy of urban renewal with an emphasis on the needs of the senior citizens. The following section presents some of the selected projects of urban renewal carried out in those cities.

Barcelona

Currently, citizens of retirement age (65 and more) make up to 20,5 % (334,273 people) of Barcelona's population. The city has experienced fundamental changes in the structure of its population during the last three decades. There has been a significant decrease in birth rates, and a simultaneous sharp increase of the population of 65 and over. In spite of the gradual increase in the birth rate during the last decade, the youngest segment of the population (0-14 years) makes up to only 12 % of the overall population, while in 1981 it was 21,3 %. The number of citizens of 65 and over increased from 234.033 in 1981 to 334.273 in 2010, which means an increase of 40 %. The total number of Barcelona citizens decreased in that period by about 9 %. Both tendencies explain the relative increase in the number of the elderly citizens in Barcelona which grew from 13,4 % in 1981 to 20,5 % in 2010.

Access to public transport

In order to improve and facilitate the access to public transport for the senior citizens, the city officials prepared a class of documents aiming at coordinating transport-related issues: Mobility Pact: Urban Mobility Plan 2006-2012 integrated with the Mobility Act 2003 and the Sustainable Mobility Plan as well as encouraging participation of various organizations. The documents are supposed to be the instruments of urban renewal, which should facilitate the access to many places and services around the city for the elderly. This plan embraces four major issues:

- safer mobility and sustainable development (reduction of the number of car accidents and car-related pollution);
- sustainable mobility and natural environment protection: minimizing pollution (Kyoto Protocol; easier accessibility with less harmful effects on the environment);
- equal mobility (a right to mobility for all the citizens, regardless of their financial capacities and their physical fitness)
- efficient mobility related with the economic aspect of sustainable development (the ability to access every location in the city using any means of transport available).
- As a result of approving other documents related to transport, several actions were taken in the city:
- eliminating the parking of cars and mopeds on the pavements, as they used to take too much space as well as trouble the senior citizens and increase the risk of accidents,
- widening pavements in order to create a safe and comfortable pathway – defining the minimal width (for those who need additional support tools such as canes, walkers or wheelchairs)
- introducing elements of street furniture (benches, posts, railings, etc.) that separate pedestrian areas from those restricted for vehicle traffic
- improving the general accessibility: lowering curbstones near pedestrian crossing, installing escalators and elevators
- placing visual cues near pedestrian crossings informing and reminding about the need to look around for approaching vehicles before crossing the road (especially useful for those suffering from dementia or Alzheimer disease)
- eliminating bikeways located between bus stops and bus lanes
- reducing public transport fares for senior citizens

Friendly and accessible urban spaces

One example of a tool of urban renewal created by the local authorities is the Green Strategic Plan, which, along with the Safety Plan, responds to many of the demographic challenges. The plan introduces new ideas about the use of parks in the city and about the development of some functionality solutions that were earlier consulted with the elderly. The city's policy is to recognize that both parks and urban greenery in general are areas of social integration that can generate new functions and encourage new activities.

Green Strategic Plan

Barcelona is a city which requires renewal of its green space in order to improve the quality of life. The city officials recognize the emergence of new problems and challenges such as conservation of biological

diversity, climate change and various social needs. In order to respond to these challenges, some new concepts of urban green space and its relation to the city's ecology and to the social infrastructure are needed These concepts should refer to managing regional green space conservation, communication and education, historical diversity of the region, social and health-related issues, and the structure of environmental services.

The aim of the Green Strategic Plan is to take long-standing actions (5-10 years). The strategic areas included in the plan are:

- Designing large-area green spaces in accord with the ideas of sustainable development and taking into consideration such elements as environmental services, integration and the risks related to climate change
- Improving communication by means of green belts
- Encouraging the use of allotment gardens; responding to new public needs; enabling interaction and conservation of green spaces
- Preserving and appreciating the historical heritage of allotment gardens
- Conservation of the natural heritage and of the biological diversity
- Managing the green spaces in accord with the principles of sustainable development
- Offering online courses informing about the value of green spaces in the urban area
- Educating about green spaces

Housing development

The Senior Citizens Advisory Council in Barcelona has prepared a document (Assisted Housing Plan) which aims at providing seniors with a choice of their place of residence and to ensure that medical care and social security are easily accessible and located in its proximity. One of the sections of the document is devoted to the topic of housing, encouraging construction of new housing estates that would provide all the necessary services for the elderly. In order to facilitate their accessibility for the elderly, some plans of subsidizing elevator construction were introduced. These housing programs combine ideas aimed specifically at the elderly with those for the general public, related to other urban projects in various areas around the city. The city renewal plan is an excellent example of a successful attempt to encourage adaptation and integration of the new apartments or estates in a new environment. Its purpose is to create new intergenerational housing estates in order to encourage and maintain contact between different generations. The plan focuses on the specific housing needs of the elderly and on the ways of adapting new apartments to their needs by means of various forms of housing benefits and assistance, including accessibility of various initiatives such as subsidies to interior adaptation or the elevator construction. In the social housing system, the residences for the elderly in a difficult financial situation have a usable area of 40-42 square metres (bedroom, living room, kitchen and a specially designed bathroom), and common areas located on the ground floor and accessible for all the residents. The project is intended for the citizens over 65 years of age who do not need special care or assistance in their daily activities, but who need to change their place of residence due to problems with service accessibility, or whose annual income is lower than 250 % of the IPREM income indicator, which is currently 24,604.43€.

The aim of other programs is to improve the senior citizens' conditions of life and service accessibility. They include removing structural barriers in order to facilitate access to some buildings and public spaces, the interior adaptation program (removing architectural barriers, elimination of dampness, sanitary renovation, etc.). The main point of this project is to guarantee that senior citizens do not lack the basic necessities of life. This also refers to those among the elderly with restricted autonomy, for the disabled, for those with lower income and those who cannot be under the care of their families. Barcelona's officials have established the Housing Office Network, whose aim is to inform and to manage all the housing-related issues. In the neighbourhood of Poble-Sec there are over 300 elderly people living on their own and isolated from the rest of the society because of a lack of elevator. To overcome this, the authorities have introduced a system of living assistance - a list of medical centres that take care of such people. The project is called "Let's get out and about" and it enables participation in weekly trips accompanied by other seniors and volunteers. The main aims of the projects are: improving the quality of the direct environment of the elderly, guaranteeing

decent housing conditions and renewal of the public spaces, along with stimulating cooperation based on social bonds. It also promotes better relations with the environment with reference to culture, entertainment, sport and health. The project consists of three stages:

1) Accepting citizens and integrating them with their environment

2) Adaptation - improving accessibility to various facilities in the vicinity of the place of residence (medical facilities, banks, pharmacies, markets, services)

3) Integration - the residents make use of services and participate in the social life of their communities

Intergenerational Neighbourhoods

The aim of this plan is to develop and to popularize housing projects based on criteria that encourage building relations between their occupants by means of making use of common interior and exterior areas, as well as utilizing those architectural features which all residents, regardless of their age, can jointly use. The access to services is the key element, and, thus, designing and developing housing estates whose aim is to promote intergenerational relations of the tenants is of utmost importance. Another crucial issue is to rationalize the use of accessible spaces and areas, develop energy saving, as well as promote the use of renewable energy. In order to achieve these goals, the Association of Architects of Catalonia has taken certain actions that aim at popularizing the aforementioned ideas, raising the local authorities" awareness of the issues, and involving some private entrepreneurs in the project.

London

London has conducted a research (in accordance with the principles set down by WHO) related to age-friendly city issues in the northeast boroughs of Waltham Forest and Newham. Several actions whose aim is the renewal of the aforementioned boroughs were taken as a part of the Age-Friendly Cities project.

Access to public transport

Improving access to public transport is often considered as a key to becoming a successful Age Friendly City, as it makes it possible for the elderly to go outdoors, integrate with other residents, and to make use of the necessary services. Some elements of an age-friendly public transport implemented for residents over-60s include: fare reduction which makes it possible for the senior citizens to use the public transport, adapting the buses needs of the disabled, or the introduction of a door-to-door taxi service for people with limited mobility who cannot use buses.

Friendly urban spaces

The research has shown that both boroughs can offer an age-friendly physical environment. In most cases, streets and squares were equipped with appropriate streetlight; the pavements were clean and had lowered curbs, as well as ramps for wheelchairs; the car parks had a proper ratio of disabled parking spaces.

Social support and medical care

Just as in the case of Barcelona, the support of local authorities, who organize certain activities and initiatives for senior citizens, is of utmost importance. The research shows that involvement in social life is absolutely necessary for the elderly. Establishing cultural centers is one of the most important factors that could contribute to achieving this. Cultural centers located in the city area offer a wide spectrum of social events and activities. Moreover, they facilitate access to medical care and other services.

5.3 Actions taken in polish cities with regard to the aging of the population

In Poland, some cities are beginning to implement age-friendly policies, as the issues related to the aging population start to play a significant role in various spheres of public life. The changes in the attitudes of Polish pensioners demonstrated by the growing popularity of services targeted specifically at them such as easy to use mobile phones, bank accounts or summer trip offers. One of the new services is the reverse mortgage which allows them to save money rather than spend it on costly housing rents. In addition, cities start many initiatives for the elderly. Krakow, for example, was the first city in Poland, to join the Coalition for the Digital Inclusion of the 50+ Generation M@turity in the Net. Several interesting projects are carried out in the city including Krakow for Seniors, or the Senior Friendly Place competition. Lesser Poland is the only region in the country which promotes active ageing, having organized a prestigious competition for the Senior of the Year five times so far. Poznan has launched a recreation place for seniors only. In Poland there

are about 350 Universities of the Third Age, and hundreds of senior clubs. However, these examples of initiatives are aimed mostly at the active and healthy among the senior citizens. The most difficult problem to solve is to provide care for the impaired. Some cities, such as Krakow, Stargard Szczeciński and Sopot, see the growing number of the elderly in the city as a challenge and carry out actions that are directed at improving the living conditions of senior citizens, participating in research programs and projects, implementing appropriate policies.

5.4 Krakow – urban transport for the elderly

Krakow is one of the most important cities in the southern Poland, belonging to the region of Lesser Poland, which in comparison with other regions in Poland will age more slowly. One of the city's activities aimed at counteracting the negative social effects of aging is to participate in the European project AENEAS "Attaining Energy-Efficient Mobility in an Aging Society," under the Intelligent Energy Europe (IEE) program. In principle, the project has become the basis of reference for other international projects in the area of urban mobility of the elderly. The project aims at improving the attractiveness of sustainable transport as well as raising public awareness of the senior citizens' needs and problems related to travelling. Its purpose is to encourage seniors to make greater use of energy-saving forms of transportation such as public transport, cycling, or hiking. This ensures that the elderly have much more independence and flexibility in comparison to using only a private car. Driving can be difficult, sometimes impossible for the seniors who need to find a more attractive, alternative solution that they will be able to use. Krakow continuously renews its fleet of public transport through the purchase of new vehicles, such as buses and trams. The old ones are often replaced with new low-floor vehicles. They also have more secure equipment within the vehicle, including priority seating for the elderly. Additional handrails are placed near the doors. There is also an electronic visual and audible information about bus stops on the route in a growing number of trams and some modern buses. Since July 2007, residents of Krakow have had the opportunity to use TELEBUS, an innovative service by means of which passengers can call a dispatcher and book a bus pick-up at a desired destination. The Polish - Italian initiative is a pioneer in introducing "flexible bus routes" (DRT) in Poland. The service is also a very good example of technology transfer and know-how on public transport on the international scale. One of the key benefits of "flexible bus routes" is a new, positive image of public transport in Krakow, which is associated with its flexibility and adaptability to customer needs. Soon after the service was launched, it was used by about 300 customers per month, but in a relatively short time the number rose to 2000. Above all, the real reason of its success was the positive change in the attitude of the inhabitants of these districts to the new public transportation offer. To sum up, City of Krakow conducts urban renewal with reference to ageing of the population by:

- improving the safety and attractiveness of public transport,
- raising public awareness of the problems of the elderly,
- organizing various community outreach projects for the seniors.

5.5 Stargard Szczeciński – assisted living residences

Stargard Szczeciński is a medium sized city in north-western part of Poland. It is the third biggest urban center of West Pomeranian voivodeship in terms of population and one of the oldest Polish cities. One of its problems is a decreasing trend of migration to the city and negative population growth. As a result, the number of older people increases. In recent years in Poland, seniors have become an increasingly important group of consumers in the property market. More and more concepts for the creation of settlements and neighbourhoods for people of advanced age appear. These projects offer elegant middle-class housing estates located in close proximity to the metropolis, where architectural solutions to make life easier for the elderly are introduced and where easy access to medical care is provided. This allows seniors to spend their retirement in a place that gives them a sense of security. The residences of many Polish pensioners are not only too big and too expensive, but often they are not even suited to their needs. Moreover, the elderly often suffer from loneliness. At the same time, housing designed specifically for seniors and tailored to their needs constitutes only a small percentage of the total national construction. An example of this is housing for seniors in Stargard Szczeciński which was the first of this type to be designed and built in Poland. The building was founded by the Society for Social Housing which implements many social programs, including: housing for children from orphanages and for the disabled, as well as housing for people older than 55 years

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of age. This is the first type of assisted living residences established in Poland and designed for people living there under the care of specialists. Living in assisted apartments provides the conditions for independent functioning in the environment and integration with the local community. Although the houses are located far from the city centre, and near some green areas, there is no problem with access to the services which are typically located in the centres of cities, as the assisted living residences consist of multi-family buildings with service centres and shops on the ground floors. Two-storey house consists of three segments whose scales and forms harmonize with those of neighbouring buildings. They are joined by an extended circulation path which is the axis of the complex and which merges into one whole, not only the three segments, but also the common areas. The building structure is fragmented, and the individual segments are separated from each other. As a result, they make an impression of almost independent, free-standing blocks which also blend harmoniously with the surrounding countryside. The main goal of the designers was to create a place which provides the residents both with the necessary intimacy and with the possibility of integration with their neighbours. Consequently, three types of space can be distinguished in the building: public, semi-public and private. Design work was preceded by public consultations and interviews with people who were potential tenants. During these meetings it became clear that one of the biggest problems was the lack of technical facilities, and the danger of not being able to call for help and being stuck somewhere in the building. In consequence, the system by means of which they can communicate with the volunteers who live nearby, as well as with a physician and a nurse, was created. Ultimately, in the next stage of implementation, a room for nursing procedures will be located in one of the buildings. The building in Stargard Szczeciński is a unique example of social construction, where design solutions are entirely subordinated to the program and the nature of the investment. The investor's and the designer's sensitivity to the problems of the tenants has resulted in the response of the residential environment to the needs of the senior citizens.

5.6 Sopot – public spaces

Sopot is a small city between Gdansk and Gdynia, in the middle of an agglomeration with almost one million inhabitants. The city, known as the "summer capital of Poland," is situated between the feet of the surrounding hills and the Bay of Gdansk. Due to its special micro-climate and abundant reserves of mineral water, Sopot has managed to preserve its special character and has become a famous tourist destination known throughout Europe. In addition, Sopot is one of the demographically oldest Polish cities, with a steady rate of decline in population. In 2009, for nearly 37,500 people, more than 24 % were of retirement age. Such age structure poses many new challenges to the social relations and the integration of residents. Sopot is located by the sea and has some features of a spa resort, so it could likely be a senior-friendly city and a model not only for other Polish cities, but also for the European ones. To achieve this goal Sopot uses the opportunities offered by a number of EU programs, aimed at seniors, as well as cooperation with international charities, such as the "Lions Club", "Rotary" and "Zonta". Since 2008 city of Sopot has participated in the Q -Ageing (Quality Ageing in an Urban Environment) project, whose purpose is to bring the public space to the needs and limitations of older people and to develop comprehensive, transnational solutions to the problems arising from the ageing of society in areas such as: vocational guidance for people over 50 years of age, health, entertainment and social integration of the elderly, architecture and infrastructure solutions tailored to the needs of senior citizens. Work on the preparation of the Project, initiated by a partnership of governments, institutions and NGOs from five countries (Hungary, Germany, Poland, Slovenia, Italy), began in February 2008. Sopot's priority areas are architecture and infrastructure adjusted to the needs of people with limited mobility. Local authorities take actions within the framework of the project with the support of several institutions and organizations, such as the Municipal Centre for Social Welfare, Sopot Center NGOs, local NGOs or Sopot University of the Third Age. One of the pilot projects in Sopot entails the creation of a map the city's architectural barriers and to develop guidelines to get around them. So far there have been no other attempts at devising a similar guide that would identify architectural barriers for the elderly or the disabled. It should be noted that the map of barriers is not to be merely a city map with inconvenient points marked on it. In fact, it has a rich, dynamic database containing information about the type of problem that is occurring, its detailed description and location, the proposals of possible solutions, as well as potential transport cost estimates, the hierarchy of urgency and the approximate time of arrival of an emergency service. The map will be one of the strategic documents of the city as the primary tool to assist in decisions relating to the source of investment financing, acquisition of external resources and introduction of local laws. On the barrier maps one can find mainly public facilities and urban open space

elements (e.g. streets, bus stops, parks, squares), and possibly other publicly accessible places (such as: shops, cafes, restaurants and historical buildings). More importantly, the map is a dynamic tool, and seniors themselves, as one of the most involved groups, will be able to report additional locations by means of user friendly computer terminals which are a part of the second pilot project of Q-Ageing. In some locations, there will be senior-friendly computer terminals with free Internet access which use appropriate software support (e.g. for the visually impaired). Administrators of these sites will serve to help and support those using the terminal. This will help to create the first points of the network of sites, where the senior inhabitants will be able to socialize and establish a form of mutual aid - while remaining in a safe and friendly environment. The two pilot projects will be accompanied by an awareness-raising campaign for the citizens informing them of the specificity of the social problems of the elderly. The campaign will combat social isolation of seniors and fight the prevailing stereotype of an elderly person. All of the accompanying measures are also designed to encourage seniors to go outdoors and take part in leisure activities in public places in the city.

6 CONCLUSION

These cases show that in recent times Polish local authorities in many cities have recognized the challenges of an ageing population. The growing interest in this subject among the local governments and in the academia results from their understanding of its importance in social life as well as from acknowledging the need for a long-term planning. For cities to become age-friendly it is necessary to face many different social, economic and spatial challenges.

The Polish cities participate in some of the European Commision's projects, such as AENEAS, Q-Ageing, etc. This can help to specify the course of action necessary in appropriate adaptation of the city to the needs of an ageing society. Major European cities, such as Barcelona and London implement urban policies that refer to various spatial issues related to carrying out age-friendly urban renewal. The urban renewal in the aforementioned cities is conducted in a comprehensive way and embraces many social, economic and spatial issues. The Polish cities unfortunately lack such a thorough approach which requires high-level coordination and integrity. Actions are taken in a selective and partial manner; they often refer only to very specific issues, such as housing and building of new estates for the elderly. There is no coordination of these actions on a national, regional, or even local scale. Property developers with necessary means to build such estates would often choose suburbs as its location. In effect, extending or building new infrastructure in the suburbs is essential, or otherwise, senior citizens are prone to face many difficulties related to the access to the basic necessities of life. Such approach to urban renewal results in isolation, rather than integration of the elderly. Resettling them to the suburban areas reduces their participation in social life and contact with their community, intensifying their isolation, even if they are provided with higher physical comfort. Moreover, most of the offers and services targeted at the elderly would still be located in the centres of cities, causing difficulties communication and limited accessibility.

Urban renewal with reference to the ageing population is understood as adapting the city to the changing needs of the elderly. It should, however, take into consideration such spatial planning which enables flexible shaping and using of the urban space. In other words, it is especially important to consider the functional flexibility of certain facilities: e.g. kindergartens that could easily be transformed into community centres for the elderly, and housing designed for the elderly could easily be adapted to the needs of the single residents (one person households), etc. Moreover, in order to be age friendly, cities have to notice the complexity of each of the factors. For example, social services - clubs, cultural centres are extremely important, but without adequate transport they will not function well, because older people will not be able to access them easily. Public toilets will be accessible if they are always open and well-maintained.

Any approach to creating age-friendly city should be comprehensive, hence, while speaking about the renewal of cities with reference to the ageing population, one should consider renewal on various levels covering different activities: social, economic and spatial. Urban renewal should also address the social participation of older people. Sociologists point out that ageing brings a profound change in almost all important relations. Senior citizens are an important but often neglected part of society. Encouraging mobility and more active lifestyle benefits all seniors, and the idea of age-friendly cities means a better quality of life for everyone. This approach can be described not only as an integrated urban renewal which includes both housing construction projects, institutions, networks, social infrastructure facilities and

technical support in the city, but also as a qualified restoration of the existing building structure and meaningful integration of new constructions with the existing ones, as well as economic and social renewal of the city. These actions can lead to long-term improvement in the quality of lives of all citizens, regardless of their age.

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🏆 *reviewed paper*

Considering the Impact of Future Climate Change on the Resilience of a City – Surface Run-Off due to Heavy Storm Events in the City of Wuppertal

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1 ABSTRACT

Environmental events are a big concern when looking at the safety and resilience of a city. This is even more true if climate change scenarios, and thus changed environmental conditions, are taken into account. Within the European FP7 Research Project SUDPLAN (Sustainable Urban Development Planner for Climate Change Adaptation) a Scenario Management System (SMS) is under development. The SMS combines large scale climate change models, downscaled model results and local high resolution simulations with interactive 3-D/4-D visualisations to facilitate the analysis of future climate change effects on city-scale environments.

The system will be applied by four european pilot cities which are part of the consortium: Stockholm, Linz, Prague, and Wuppertal. The project adresses the environmental topics air quality (e.g. temperature, emissions, etc.) and rainfall. In the case of rainfall, major concerns are combined sewage overflow (CSO) and surface run-off due to heavy rainfall events.

Due to the geographical situation of the german city of Wuppertal located in the steep, narrow, long valley of the Wupper river, the main concern regarding climate change impact is uncontrollable, extremely localized run-off from increased heavy, short rainfall events. The potential damage of public infrastructure and of private property is a major concern to the city managers. The potential needs for investments are huge, considering that the city copes with run-off from 350 kilometers of creeks (over 800 creek sections) and 650 kilometers of drainage channel system. To enhance the public awareness for investments due to future risks related to a changed climate, means to transport complex domain specific results into a clear and easy to understand "language" are needed.

In this paper we present the current results of the SUDPLAN project concerning the Wuppertal pilot. We will describe the workflow from the large scale climate model to the 3D/4D visualisation of local high resolution simulation results. We focus on the intuitive and easy to understand presentation of the effects on the resilience and safety of critical public and private infrastructures.

We combine widely used GIS features with highly interactive 3D/4D visualisation in order to provide insight into possible future problems caused by heavy rainfall events. This can be used for the analysis and comparison of simulation results from different climate and planning scenarios by domain experts (i.e. climate modellers) as well as endusers (i.e. urban planners). Moreover, the presented results are also suitable to illustrate and convey the necessity of investments even for non-experts (e.g. city administration, property owners, etc.).

2 INTRODUCTION

Environmental Information and Decision Support Systems (EDSS) are complex information systems containing complex information and performing complex workflows, that may not even be pre-defined (ad-hoc workflows). In general, these systems are composed of a number of highly heterogeneous components and tools solving a complex monitoring, analysis or decision support task. The component structure of such systems cannot really be generalized or even properly defined, because real world applications vary considerably depending on the concrete use of a concrete system. However, certain common elements are present in many systems [1,2] data management and data network components, geomatics components, decision support components, numerical simulation models and others. Even at the level of a single, stand-alone system for one single purpose, integration of data, models, visualization, analysis tools and decision support tools is often a very difficult and costly undertaking. Today's EDSS are very often hard wired ('all-in one systems'), which is not astonishing, as the complexity covered by EDSS is enormous. EDSS have to deal with complex space and time related data and its representation, furthermore they are asked to transfer a multitude of data into easy to understand visualization representation having complex algorithms in the back end – all this before the actual decision support begins.

Due to the lack of standards for data interchange hard-wiring the tools and the data in one monolithic application is still a common practice. This practice makes EDSS expensive and inflexible and this is one of the main reasons why there are not more decision support systems in real use.

In recent years an important trend in environmental informatics has been research and development on environmental information service infrastructures (in the case of geomatics components also called Spatial Data Infrastructures, SDI). The main driver for this research has been the practical need to overcome organizational boundaries in environmental management and to enable linking systems together which are operated by different organizations. In Europe, for instance, the INSPIRE Directive [3] set the goal in 2007 to establish an Infrastructure for Spatial Information in the European Union. The directive obliges member states to make available relevant geographic information for the purpose of formulation, implementation, monitoring and evaluation of Community environmental policymaking and for the citizen. Furthermore, by establishing from the onset cross-sector co-ordination mechanisms, INSPIRE aims at providing access to compatible information across sectors such as environment, transport and agriculture. INSPIRE has become a major driver for research in the area of environmental service infrastructures. This driver has triggered research in FP6 Integrated Projects OASIS [4], ORCHESTRA [5], SANY [6], OSIRIS [7] and other to achieve the overall goal of interoperability.

Projects funded through other programs contribute to the same goal, for instance SSE [8]. This research has reached a stage where generalized concepts are available, generalized architectures have been published, service specifications have been defined and service implementations become more and more available, in some cases as open source products. At the same time, the use of established industry standards, most notably those of the Open Geospatial Consortium [9], OASIS [10] and the W3C [11], has become a dominant requirement in order to achieve inter-operability amongst systems and stakeholders. More and more customers require systems which they order to comply with these standards, and at the same time the standards evolution also drives some of the technological changes, along with the ongoing research mentioned in the previous paragraphs. A common trend of both research and standards evolution is to compose systems in a loosely-coupled way through a service-oriented architecture (SOA).

These recent developments have dramatically changed the opportunities for EDSS development. The practice of monolithic systems, which integrate data and functionality into one system, built for this purpose only, will be replaced by flexible environments which make use of external resources (data, information and services), and which provide a framework for flexible delivery of functionality to end users. This means that the "software plumbing" (individual integration projects) for each individual EDSS will cease to exist. The vision of next generation EDSS is that of a dynamic composition of services in a SOA.

The dimensioning of urban infrastructure is typically based on a statistical calculation of historical time series data, e.g. to quantify the maximum river runoff during a 100 year period, the most intense rainfall occurring within a similar period or the risk for a combined air pollution and heat wave. The temperature increase, changes in precipitation and air pollution levels – both expressed as yearly totals and as extreme values – and storm frequencies expected to occur during the coming decades will invalidate those historical time series analysis and call for new statistical assessments based on forecasted weather scenarios up to and beyond 2050 [12,13]. There is a need for planning tools which will make it possible for city planners to include such analysis in a simple, early and cost-effective manner. In order to make these EDSS solutions affordable, data integration, integration of models as well as integration of other services must be possible at low cost, in an optimal case in an "on-the-fly" manner. Sustainable cities also require an integrated planning approach. They need to assess some of most important environmental factors in an early stage, in particular for applications like:

- coping with the risk for river flooding and inundations of built-up areas and other developed areas
- maximum rain intensity to be expected over sealed surfaces and for which water runoff systems must be dimensioned
- spatial distribution of air pollution, risk for extreme events and high ambient temperatures in built-up residential and work areas

The sustainability must be assured both during present and for expected future climate scenarios, as simulated by regional climate models (RCM's). Therefore the integration of RCM's into local decisions, and the integration of RCM's with local models, is a crucial factor.

2.1 The SUDPLAN Project

The SUDPLAN project aims at developing an easy-to-use web-based planning, prediction, decision support and training tool, for the use in an urban context, based on a what-if scenario execution environment, which will help to assure population's health, comfort, safety and life quality as well as sustainability of investments in utilities and infrastructures within a changing climate.

This tool is based on an innovative and visionary capacity to link, in an ad-hoc fashion, existing environmental simulation models, information and sensor infrastructures, spatial data infrastructures and climatic scenario information in a service-oriented approach, as part of the Single Information Space in Europe for the Environment (SISE). It will provide end users with 3D modeling and simulation as well as cutting edge highly interactive 3D/4D visualization, including visualisation on real 3D hardware.

The tool includes the SUDPLAN Scenario Management System with three so-called Common Services. The latter will allow downscaling of regional climate change model results to a spatial and temporal scale useful for urban planning in whatever European city. SUDPLAN Common Services include gridded information on present and future extreme rainfall, temperature, river runoff and air pollution.

Vital consequences of climate change are considered in 4 carefully selected urban pilot applications located in Austria, the Czech Republic, Germany and Sweden. The SUDPLAN Scenario Management System with Common Services information will here be used to execute and visualize results from local high resolution models and sensor systems, covering such diverse applications as: a) extreme rainfall episodes causing problems with b) uncontrollable, extremely localized runoff, and c) drainage and sewage systems, d) hazardous air pollution and high ambient temperature episodes causing health risks, e) social dynamics (movement of people) as function of climate change and quality of living.

More information about the SUDPLAN project (including demo applications) can be found on the project website http://www.sudplan.eu.

2.2 Wuppertal Pilot

The city of Wuppertal is located in the steep, narrow, long valley of the Wupper River. The location is so narrow that more than a hundred years ago, the city went in the 3rd dimension for public transport, and built the famous Wuppertal Suspension Line (Figure 1).

Figure 1: Because of the narroness (left) the city of Wuppertal decided to use the 3rd dimension for public transport (right).

Due to the geographical situation of the city, the main concern regarding climate change impact is uncontrollable, extremely localized run-off from increased heavy, short rainfall events. For instance, an event in 2007 caused heavy local damage and first went completely unnoticed in the city hall, located only 2 kilometers away, where the sun was shining. The potential damage of public infrastructure and of private property is a major concern to the city managers. The potential needs for investments are huge, considering that the city copes with run-off from 350 kilometers of creeks (over 800 creek sections) and 650 kilometers

of drainage channel system. Due to the complex geography, it is completely unpredictable where a heavy rainfall event might occur, and when it occurs it is today unknown whether there will be flood and where it will run off. Due to the huge investments required, it is also not possible to just increase the profile of all, or even only of major parts, of the drainage system. The Wuppertal pilot is therefore concentrated on heavy, short rainfall events and their impact on the infrastructure. The city administration has put a project underway to develop a master plan, during the coming 5 years, which shall identify the most vulnerable areas and shall suggest different localized planning options which are likely to prevent damage and are yet practical to be implemented, including being capable to cope with financial constraints.

3 SUDPLAN SYSTEM OVERVIEW

This section gives an overview of the complete SUDPLAN system and describes the different parts. A system overview is illustrated in Figure 2.

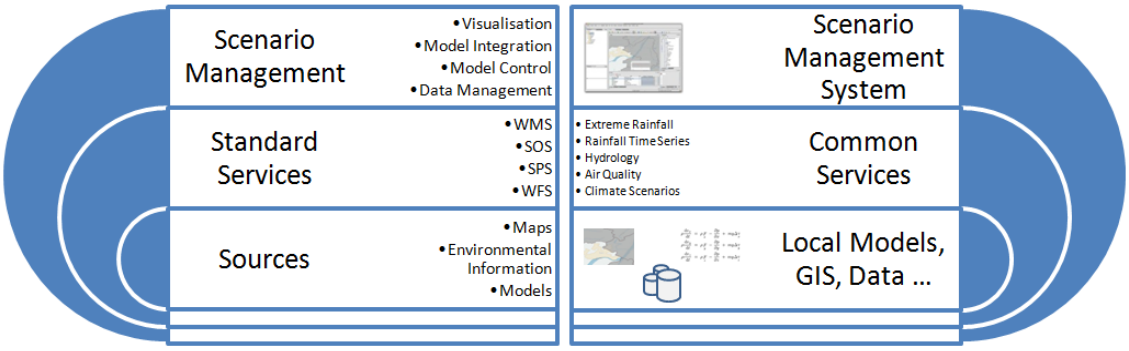

Figure 2: SUDPLAN system overview

3.1 Scenario Management System

The Scenario Management System (SMS) is the platform on which any SUDPLAN Application (or SUDPLAN System) is built. It consists of three distinct Building Blocks described in the following subsections. The SMS can be seen as a generic integration platform that will be able to facilitate climate change induced urban development planning in any city in Europe. The goal to provide a universal, flexible and adaptable planning tool is supported by the separation of the SUDPLAN System into several architectural layers as shown in Figure 2.

The top-level layer, the SUDPLAN Application itself, is the result of an extension, customisation and configuration of the underlying SMS. The SMS comes with everything needed to provide common scenario management tasks including data integration, model management and execution, workflow management, basic and advanced visualisation, and comparison of various temporal and spatial data sets, etc. It therefore relies upon standard services for data access and model management and thus greatly facilitates the task of integrating new models and data sources. Consequently, the same mechanisms used for interfacing the SUDPLAN Common Services with the SMS can be used for local model and data source integration. As shown in Figure 3, several services specified by the Open Geospatial Consortium (OGC) are supported by the SMS: Sensor Planning Service (SPS), Sensor Observation Service (SOS), Web Map Service (WMS) and Web Feature Service (WFS).

It is also possible to develop a custom model integration solution with respect to particular user requirements. The SMS Framework allows both standard and custom integration without the need to change the SMS itself. For this purpose, the SMS Framework exposes an API that enables the developers of a SUDPLAN Application to extend the SMS with their specific functionalities. The four pilot applications of the SUDPLAN project therefore validate not only the general approach of the SMS but also its adaptability/transferability and thus its applicability to any city in Europe.

SMS Framework

The Scenario Management System Framework (GUI shown in Figure 3) is the central component providing common SMS and integration functionality. Together with the Building Blocks for the integration of models through standardized services and for advanced visualisation capabilities it provides the basis for pilot

specific implementations and the necessary workflows to support the use of models as a basis for decision making.

The core functionalities provided by the SMS Framework include, for example, support for the management of models, i.e. model execution, result storage, parameterisation and basic model result visualisation (such as 1D time series, and 2D maps).

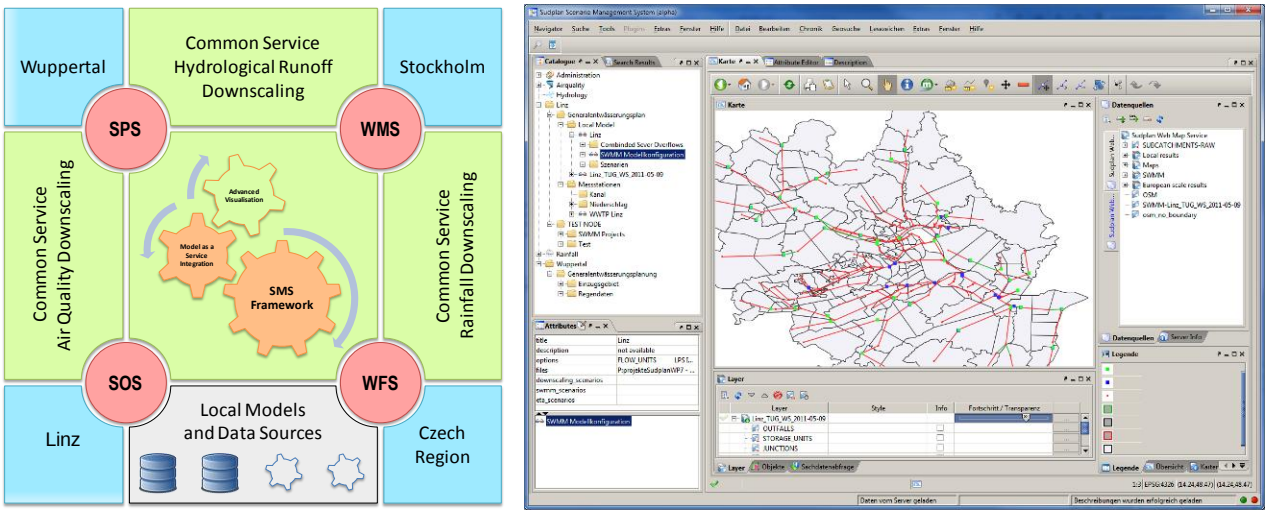

Figure 3: OGC Services Integration and SUDPLAN SMS GUI

Model as a Service

This building block of the SMS provides the means to control model implementations and access model results, including both SUDPLAN Common Services and local pilot specific models, via standardised web services. The selected standards are members of the OGC SWE [14] family, specifically SOS (Sensor Observation Service) and SPS (Sensor Planning Service), which are used for model result access and model control. This part of the SMS can be used to access the corresponding common service (section 3.3) as well as to encapsulate local models.

Advanced Visualisation

Using this building block facilitates the user of the SUDPLAN SMS the mean to interact and navigate with a virtual globe (based on NASA's World Wind SDK). Furthermore, the advanced visualisation component handles the visualization of data as well as simulation results in a geographical three-dimensional context. Moreover, the advanced visualization component provides a visualisation wizard called VisWiz. VisWiz enables the user to choose a suitable visualization technique for a data set. Even if the user is not familiar with visualisation techniques in general the intuitive VisWiz component provides the mean to visualize the data in 3D.

3.2 Climate Scenarios

Climate scenarios depict the resulting climate evolution over time, as simulated by global (GCMs) and regional (RCMs) climate models. Climate scenarios are products of certain emission scenarios that reflect different economic growth and emission mitigation agreements.

SUDPLAN uses available climate scenarios according to IPCC directed activities preparing for AR4 and currently for AR5 (through the CMIP5 coordinated model intercomparison, see http://cmip-pcmdi.llnl.gov/cmip5). SUDPLAN uses regionally downscaled (over Europe) results from some well reputed global models. Currently SUDPLAN includes the following climate scenarios downscaled by SMHI's RCA3 model:

- ECHAM5 (Roeckner et al., 2006; version: initialization 3), using A1B emission scenario
- HADCM3 (Gordon et al., 2000; version: climate sensitivity Q0), using A1B emission scenario

At the end of the project, an extended scenario ensemble will be available. Especially for rainfall downscaling, it is likely to also include the following scenarios:

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- ECHAM5 (Roeckner et al., 2006; version: initialization 1), using A1B emission scenario
- ECHAM5 (Roeckner et al., 2006; version: initialization 2), using A1B emission scenario
- ECHAM4 (Roeckner et al., 1996), using A2 emission scenario
- ECHAM4 (Roeckner et al., 1996), using B2 emission scenario

3.3 Common Services

Common Services are the climate downscaling services for rainfall, river flooding and air quality, developed in the SUDPLAN project and accessed through the SUDPLAN platform (Scenario Management System).

Common Services allow a common urban downscaling functionality for all European cities, based on how relevant environmental factors will evolve according to different climate scenarios. The application of Common Services for downscaling of environmental factors in a new city is simple and requires a minimum of local data. The results are communicated through open standards. The following environmental factors are possible to downscale within selected climate scenarios:

- Rainfall intensity, frequency and duration, with consequences for urban storm water flooding and sewer system capacities
- Hydrological conditions in terms of river runoff and soil moisture, with consequences for river flooding, surface water resources and farming conditions
- Air quality with consequences for city population health and life quality

3.4 Local Models, Data Sources and Services

Local models, data sources and services already existing within a city's infrastructure can be easily incorporated in the SUDPLAN application through standard services provided by the SMS (section 3.1). In addition the SMS Framework exposes an API to easily extend the application according to the users needs.

4 WUPPERTAL USE CASE

The city of Wuppertal, a town with approximately 350,000 residents, is the biggest town in Germany that is situated in hill country (from 98 to 353 m above mean sea level). It is located in the steep, narrow, and long valley of the Wupper river. There are several creeks on both sides of this valley that open into the storm water sewage system before they finally end in the Wupper. During a heavy rainfall event the city's storm water sewage system is quickly blocked by those swollen creeks causing the precipitation to runoff on the surface. The storm water run-off may thereby affect valuable public infrastructure and private property. This is a major concern to the city managers. Due to the complex geography it is completely unpredictable where a heavy rainfall event might occur and therefore unknown whether there will be flooding and where it will runoff.

Figure 4: Damage due to uncontrolled storm water run-off.

Up to now the mid- and long-term planning of the storm water sewage system has been accomplished with iterative model runs of a hydrological model (for the creeks) and a hydrodynamical model (for the sewage system). This planning process is called 'Generalentwässerungsplanung' (GEP), what could be translated as 'General Drainage Strategy'. Wuppertal's first main objective is to expand the GEP: the modelling of surface

run-off after heavy rainfall events should be integrated into the process. To achieve this goal, a hydrodynamical model should be used to detect the critical spots (high risk of flooding plus valuable and vulnerable facilities).

Wuppertal's second main objective is to mitigate the risk of flooding for the detected critical spots. The traditional strategies to achieve this are either the enlargement of the profiles of the sewage system or the construction of retention basins. Given these two options the potential needs for investments would be immense, considering that the city copes with water run-off from 350 kilometres of creeks (over 800 creek sections) and 650 kilometres of sewage channel system. An alternative and much more cost-efficient strategy is to look for localised planning options which are likely to prevent damage. Examples for such structural measures are the alteration of street profiles by means of higher road kerbs or the installation of stationary (or mobile) walls. Wuppertal's third main objective is to find the most cost-efficient measures for the flood risk mitigation for each critical spot. These measures shall give a higher probability to prevent damage and should yet be practical to implement, including being capable to cope with the ever growing financial constraints of the city. Please see [15, 16] for more information on Flood risk management.

The fourth main objective is to provide the responsible planners and hydrological modellers in Wuppertal with a tool that enables them to simulate a multitude of modelling experiments with the model component for the surface run-off, both to detect the critical spots and to simulate the effects of different structural measures at the critical spots. The tool should be able to store the parameters and results of such a model run and to visualise the results. The SUDPLAN project provides such a tool – the Scenario Management System (SMS).

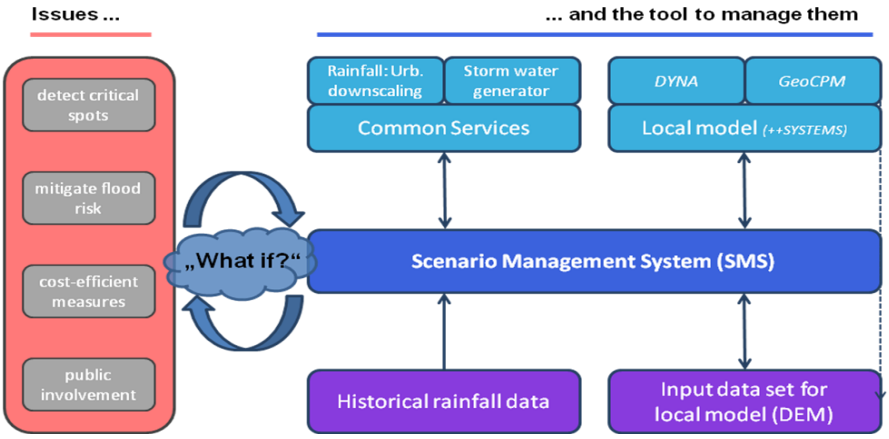

Figure 5: Wuppertal objectives and tools used for solving.

5 WUPPERTAL WORKFLOW

In this section we present the current results of the SUDPLAN project concerning the Wuppertal objectives. We describe the workflow from the large scale climate model to the visualisation of local high resolution simulation results.

Figure 5 depicts the objectives which need to be solved and the tools which are involved on the application side. All these components are incorporated within the SUDPLAN application. The general component chain used in the Wuppertal pilot is shown in Figure 6.

After selecting a climate model the Common Services for rainfall are used to project historic rain data into the future based on the chosen climate scenario. This information is then combined with input data for the local model (DEM, simulation preferences, etc.) which can be edited within the SUDPLAN SMS. After running the local models for the sewer network and the surface run-off the data can be visualized either in the 2D GIS component or with the 3D visualisation component.

In the following subsection the different steps of the workflow are briefly described and depicted with screen shots of the SUDPLAN application.

5.1 Select/Inspect Climate Scenarios (European Scale)

To get a first overview of the available climate scenarios the user can simply drag and drop the scenario from the repository onto the map component of the SUDPLAN application (Figure 7 left). By using a time slider

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the different time steps of the results can be inspected. To get further information for a specific geospatial position/city the user can query the map to show the time series information for the selected point (Figure 7 right)

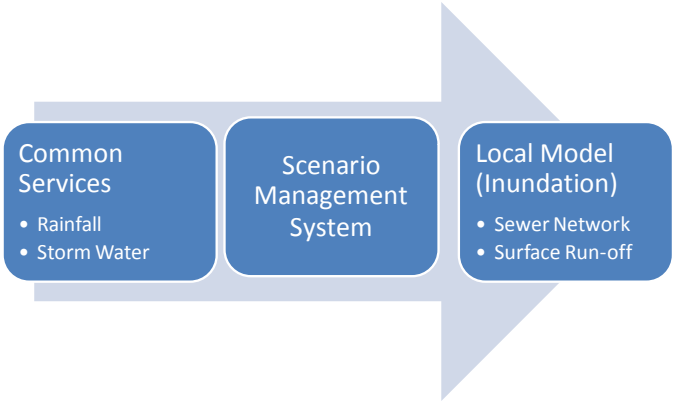

Figure 6: Wuppertal pilot component chain

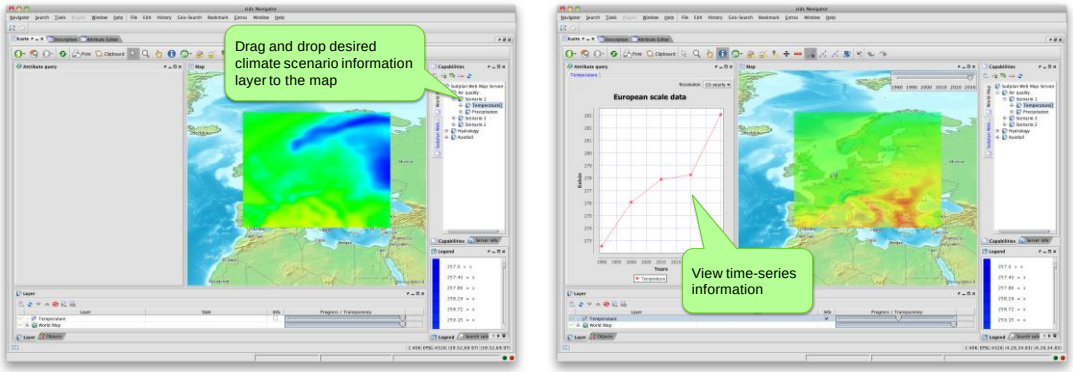

Figure 7: Inspecting a climate scenario on the European scale.

5.2 Urban Rainfall downscaling using historical time series

To downscale the selected climate scenario to the urban level using the SUDPLAN common services the user needs to provide historical rainfall data. This can be provided either as IDF curves or measured rainfall time series. In this use case historical rainfall time series are available and incorporated as local data in the SUDPLAN application.

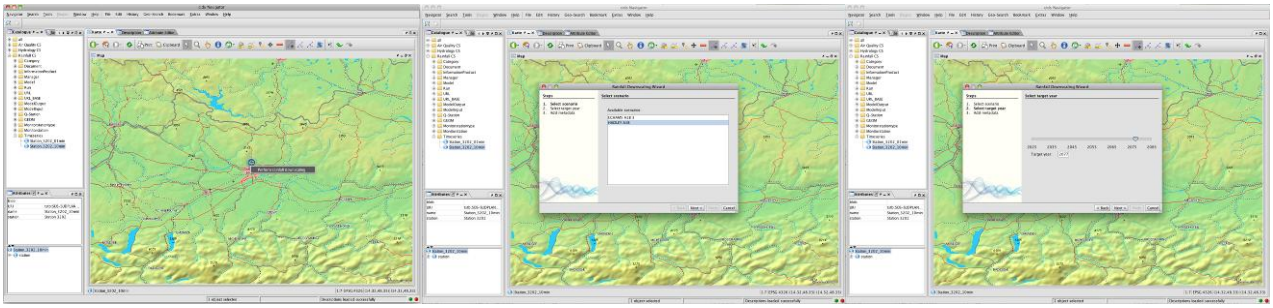

Figure 8: Using the SUDPLAN Common Services to downscale a selected RCM to a specific city using historic rainfall time series.

The user can simply drop the desired rainfall time series from the repository onto the map component. The downscaling is started by selecting the representation of the time series on the map. The user is guided through the process by a simple wizard where he can choose the climate scenario and the desired forecast period/year (Figure 8).

The historical rainfall data and selected preferences will automatically be uploaded to the Common Services and after the downscaling is finished the user is presented with the new (future) rainfall time series based on the chosen climate scenario which he can then compare to the original historical data (Figure 9).

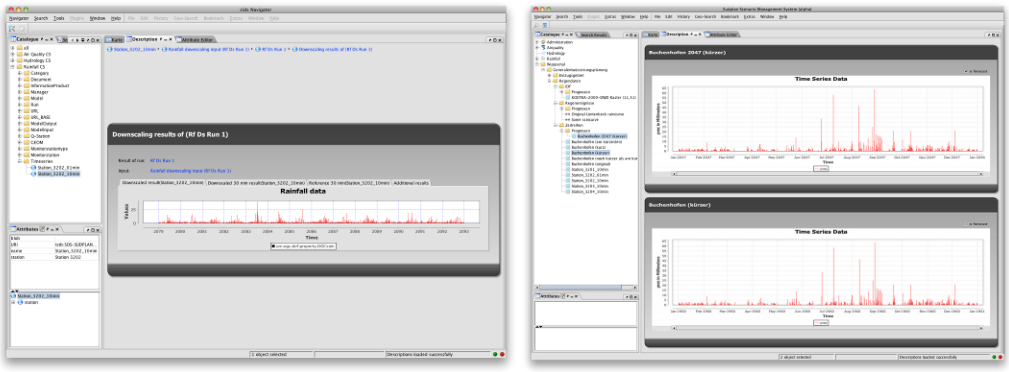

Figure 9: Rainfall downscaling result (left) and comparison of historical and future rainfall time series (right).

5.3 Running the local model

To run the local run-off model the user first selects the area of interest and a predefined configuration (GeoCPM input data, DEM, etc.). The user can inspect the data and if he wants to simulate a effects of a mitigation measure optionally manipulate the underlying DEM, e.g. raise predefined breaklines (road kerbs), etc. (Figure 10).

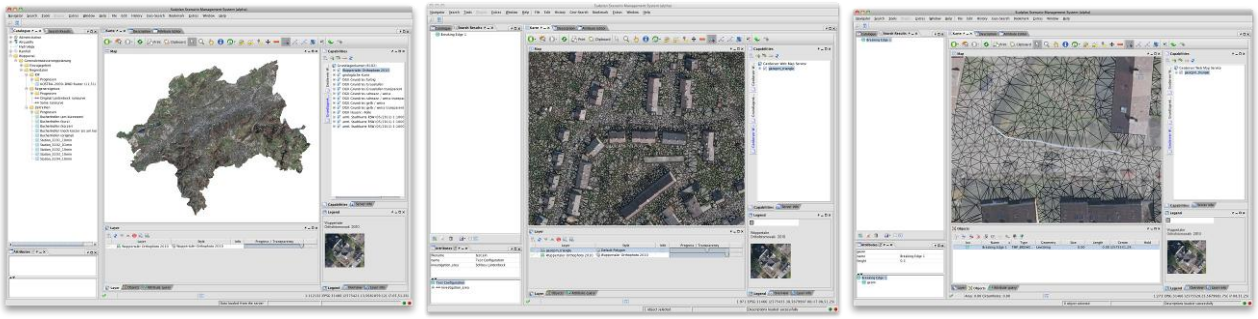

Figure 10: Selecting and manipulating the base data for the local model.

The external simulation is integrated in the SUDPLAN application through the provided API and can be started directly from within application. The user is provided with the estimated time to run the simulation and after finishing an overview of the simulation results is given (Figure 11). The simulation result is automatically added to the local repository and can be used for further inspection and visualisation.

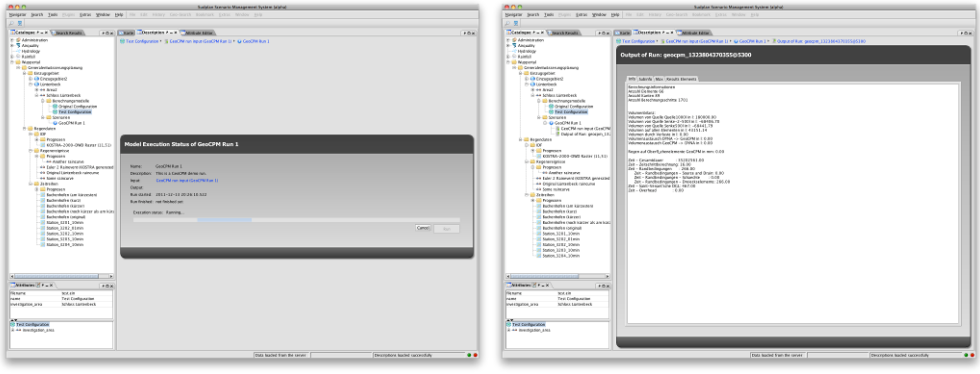

Figure 11: Running the external local model and result overview.

5.4 Visualise the results of the local model

The simulation results can be visualised either in the 2D map or with the 3D visualisation component. The results can be easily combined with additional existing data like building information, traffic data, etc. When using the 3D visualisation component the user is able to animate the model results inspect the water levels at certain important points of interest over time. In addition multivariate data can be shown with different information visualisation techniques to get a better understanding of the impact of the flooding event or the mitigation measures used for this simulation run.

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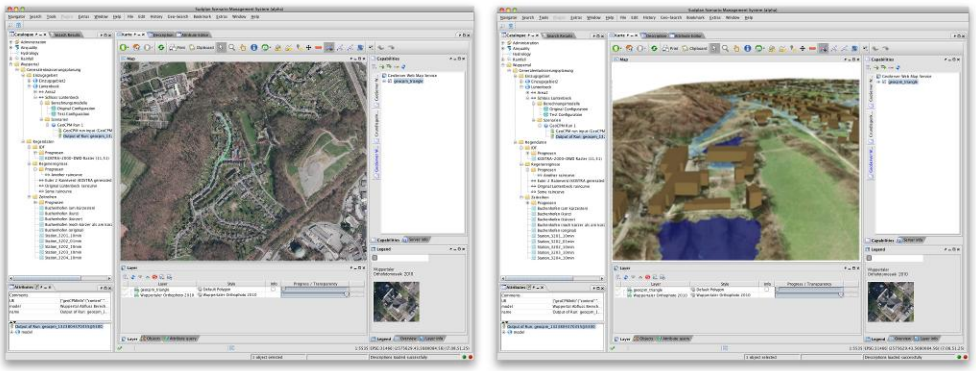

Figure 12: 2D and 3D visualisation of local model simulation results.

6 CONCLUSION

In this paper we gave an overview of the SUDPLAN system which is currently being developed within the EU FP7 project SUDPLAN and presented details about the Wuppertal pilot which is concerned with the mitigation of the impact of heavy storm water events considering future climate change.

We presented the objectives and use case for the City of Wuppertal and described the workflow from selecting a climate scenario, downscaling this scenario to the urban scale, running the local simulation model to visualizing the simulation results, which is all combined within the SUDPLAN application.

7 FUTURE WORK

The SUDPLAN project is now in the third year of development. After developing and integrating the basic building blocks and first pilot extensions we will now focus on specialised solutions for the different pilot cities and use cases. The project status and results can be followed on the project website (http://www.sudplan.eu).

8 ACKNOWLEDGEMENTS

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[5] ORCHESTRA – Open Architecture and Spatial Data Infrastructure for Risk Management, http://www.euorchestra.org

[6] SANY IP – European Integrated Project Sensors Anywhere, www.sany-ip.eu

[7] OSIRIS - Open architecture for Smart and Interoperable networks in Risk management based on In-situ Sensors, www.osiris-fp6.eu

[8] Service Support Environment, services.eoportal.org

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Deconstructing Smart Cities: An Intertextual Reading of Concepts and Practices for Integrated Urban and ICT Development

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1 ABSTRACT

Concepts of 'smart' or 'intelligent' cities currently enjoy great popularity. They offer frameworks for interpreting certain linkages between information and communication technology (ICT) and urban development, and put forward a particular agenda for action. In this, they claim a broad legitimacy for guiding stakeholders, drawing on findings from a number of strands of scientific inquiry. Furthermore, building on the everlasting albeit problematic promise of technology as a key to resolve pressing societal problems, they equally constitute an attractive reference for actors at all levels and across sectors. But despite their striking virulence in research, policy and practice, it remains rather open what the actual pursuit of a 'smart city' is, and therefore, which winners and losers we are to expect from realization.

Against this backdrop this paper puts forward an intertextual reading of recent contributions to the 'smart city' discourse, probing in particular the context conditions under which it has emerged, the conceptual orientations developed, and the implementation strategies derived. It appears that, while suffering from affinities to technological determinism and urban entrepreneurialism, 'smart cities' largely neglect the need to select and balance goals for integrated urban and ICT development, and to develop suitable approaches for actually doing so. Instead, by conflating the descriptive and the normative, 'smart cities' tend to substitute an orientation at societal ends by an orientation at selected means, thus supporting path optimization but structurally evading radical urban change. Hence, in order to become meaningful for enhancing sustainable and resilient local development, such concepts need to be embedded within a much wider cultural change perspective that should underpin especially the social, ecological and political dimensions of 'smart' urban development. In particular, they need to strengthen their focus on and engagement with the governance of integrated urban and ICT development.

2 INTRODUCTION: CONDITIONS FOR THE RISE OF SMART CITIES

Relationships between urban development and networked information and communication technologies (ICT) have increasingly gained attention in research, policy and practice since the early 1990s. As visionary writings on digital urban futures started to influence our cognitive maps (Mitchell 1996; 2000; Negroponte 1996), and notions of the "global city" (Sassen 2001) and the "network society"' (Castells 2000) have gradually developed into common places, this has triggered the emergence of a new field of activity, "populated by researchers and practitioners at the intersection of people, place and technology" (Foth 2009, xxix). The discussion in this field has thus revolved around diverse concepts and issues such as 'digital-', 'cyber-', 'wired-' or 'intelligent' cities and communities, local 'innovation systems' and their constitution, multiple 'e' applications (e-government, e-participation, e-mobility, e-learning, e-health, e-inclusion, etc.), increasingly including the use of pervasive computing and future internet technologies within urban areas. In this context, a mainstream appears to be concerned with shaping and deploying new technologies in cities for a range of sectoral and/or actor-specific objectives. But also more critical and empirical analyses of the socio-economic, spatial and cultural implications and interrelations of networked ICT and cities have been undertaken (Graham & Marvin 1996; 2001; Rutherford 2011). The boundaries of the object in question are therefore still rather loosely defined e.g. by conference titles referring to 'communities and technologies' or overview publications under the heading of 'urban informatics', including contributions from a wide range of (inter-) disciplinary perspectives and world regions (Ellison et al. 2007; Foth 2009).

More recently, however, a growing part of this debate about the co-evolution of urban areas and ICT appears to have centered around 'smart' or 'intelligent' cities – two concepts that are mostly used as synonyms. The very materialisation of this discourse prompts the question of what may have changed in the context conditions that shape the relationship between cities and ICT that would explain the emergence of this distinctive label? Not unexpectedly, there is no straightforward answer to this question. Rather, one has to account for a number of factors that have gradually converged towards each other, nourishing todays 'smart city' narrative and its virulence:

- Grand environmental challenges: Climate change and global resource scarcity have become dominant on policy agendas across all levels. However, key knowledge on the dynamics of these challenges and their complex interactions with socio-economic structural change has become available only during the past decade (Stern 2007), creating increasing pressures for action. The 2009 financial crisis has added to this picture, drawing attention to the vulnerabilities of the existing regime and in particular the role of cities in this (Harvey 2010);
- Urbanisation: With a growing share of urban population (e.g. in the EU from currently 75% to 85% by 2050, globally 81% by 2030) and the related increase and spatial differentiation of resource demands, environmental pressures and socio-economic inequalities, cities and urban regions are gaining further quantitative and qualitative importance when it comes to designing policy reponses to the above challenges;
- Technology convergence: ICT system components are subject to enhanced convergence and miniaturisation, facilitating the interconnection of data, soft- and hardware, as well as users. objects and environments in large-scale (mobile) networks, e.g. regarding the development of future internet and embedded systems concepts and applications (mobile broadband, cloud computing, internet of things, service-oriented architectures, Web2.0, etc.);
- Industrial convergence: As ICT components become increasingly integrated with other infrastructures and technologies (electricity grids, transport networks, building components, household applicances, etc.), major industrial branches are moving closer together. This "convergence of industrial value chains for smart urban infrastructure and applications" (EC 2011, 13) is therefore pushed by industry and governments alike to secure participation in emerging growth markets;
- Informatisation of society: Drawing on selected novel ICT solutions and their adaptation, social practices at individual, organisation (public and private) and inter-organisation level are changing, exploring new decentralised options for networked data and information collection, exchange, analysis and communication. Especially in urban contexts, new networked ICT usages are thus becoming self-evident parts of everyday practices in both professional and private milieus;

While actually none of these factors is entirely new or can be convincingly claimed to have triggered 'smart city' thinking all alone, together they have created a dynamic context within which this discourse has been able to unfold through continued reproduction across levels and sectors. Most importantly, it illustrates that the 'smart city' can hardly be claimed to represent a neutral frame for any urban ICT activities, or define merely a certain epistemological perspective in research. Rather, it clearly establishes a normative reference, since a 'smart city' should be implemented, and it demands the creation of policy addressing this need. In this sense, and before entering a detailed discussion of the concept and its current reiterations, a 'smart city' represents a positively valued, multi-objective policy strategy of integrated urban and ICT development, promising to tackle problems of economic competitiveness, social equity and environmental performance - somehow. Such a strategy attracts stakeholders for its ability to reduce complexity and provide capacity to act in situations characterised by wicked problems and uncertainty, claiming efficient (time and resource constraints) and effective intervention (extent of impacts). It is therefore also a proposition that is rather difficult to reject, thus paving the way for political majorities and implementation alliances.

In view of this rising discursive hegemony of smart cities, there is a growing need to reflect on this concept, its construction and underlying assumptions to enable transparency and new readings. What exactly is it that 'smart city' development aims to achieve, and in particular, how does it want to achieve this? Which actors and scales are involved in this agenda, and where will it lead us when implemented under real-life conditions? This paper therefore adopts a perspective of discursive deconstruction (cf. Derrida 1983; 1998; Hajer & Versteeg 2005), following intertextual relationships, in this case between science, policy and practice, in order to open up the 'smart city' label for a reinterpretation of its cultural, political, social and institutional bearings. Such relationships refer not only to text as a written expression, but also to context conditions and social practices that serve to attribute particular meanings. Discourse analysis can thus be usefully deployed here to help the identification of related effects of 'smart city' thinking and talking, such as a change of normative contents, constructing problems and solutions, supplying legitimacy and power, preparing consensus, coalitions and institutional arrangements, as well as affecting resource distribution.

To start with, section 3 will thus take a closer look at recent contributions on the topic from the scientific community to shed light on the conception of 'smart cities' and the strategies derived for their implementation. Against this backdrop, section 4 will acknowledge for the broader discursive construction of 'smart cities' in society, focusing on alignments and mutual influences between actors. Finally, this discussion will allow to draw some conclusions in section 5 on the need to question 'smart city' reiterations for the sake of transparency and accountability, and to pay increasing attention to the role of governance practices for shaping the multiple relationships between cities and ICT.

3 SCIENTIFIC CONCEPTIONS OF SMART CITIES

Reviewing scientific publications for the usage of 'smart city' notions quickly illustrates that so far very few have actually sought to theorise this concept or discuss its usage as such (Komninos 2002; 2006; Hollands 2008; Deakin 2011; Allwinkle & Cruickshank 2011). The current Wikipedia entry created as recently as in 2007 equally draws on these as central references (Wikipedia 2012). However, the vast majority of contributions referring to 'smart cities' today uses the concept only to discuss certain sectoral, technological or methodological aspects thereof, which does not contribute substantially to enhance the comprehension of the phenomenon in question. Nevertheless, such discursive 'free-riding' serves of course to indicate topicality and relevance of the respective research undertaken vis-a-vis a booming societal discourse (Figure 1). At the same time, it indicates that 'smart city' operates as an empty signifier in that conceptually almost any issue of ICT in an urban context may be framed by it, ranging e.g. from electricity grids and public lighting to spatial data infrastructures or social media.

Notwithstanding the large amount of work that has dealt with the broader issue of co-evolution between society, cities and ICT from a variety of perspectives (cf. Graham 2004; Foth 2009), the question here is whether a distinctive understanding of 'smart cities' as a scientific object and program can be recognised already. As we will see, this is increasingly the case, although some important indefinitions remain. The following two paragraphs will thus briefly trace those contributions that have sought to conceptualise 'smart cities', first asking for the research perspective constructed, and second for the approaches derived to implement such concepts in practice.

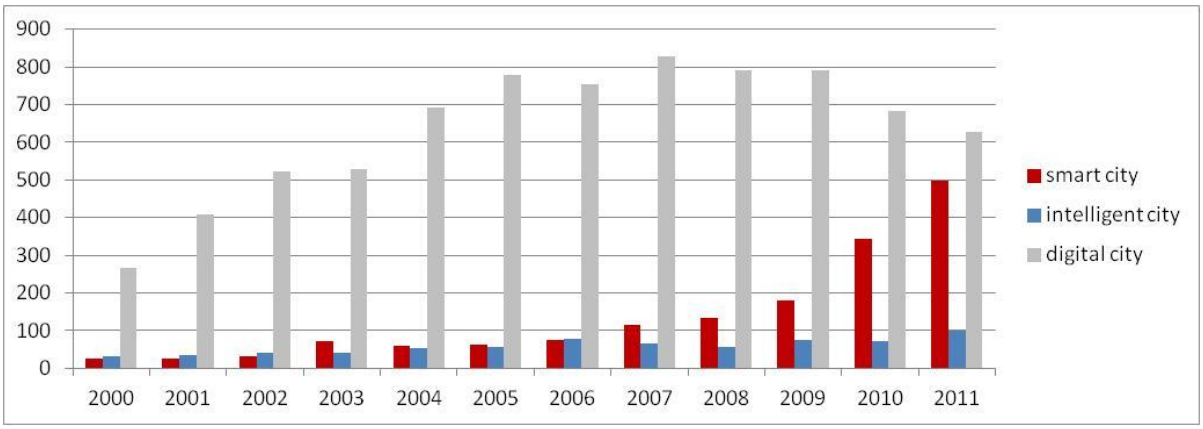

Figure 1: Rise of the „smart city" concept in scientific discourse - total search results (http://scholar.google.de - 2.3.2012)

3.1 Ontological and epistemological orientations

Considering the topics addressed and references used, it is the gradual convergence of two major strands of research and their core concepts that appears to characterize present 'smart city' thinking (Komninos 2006, 4). In the first place, evolving out of administrative and information system sciences, there is a broad concern with digital cities. These are conceived of as an open repository of diverse online applications linked to local government, although without necessarily addressing any relationships between them. This includes especially virtual city representations, e-government services, as well as interactive platforms and their combinations in support of various public policy goals, such as place marketing, social inclusion or environmental awareness (cf. Ishida & Isbister 2000). On this subject, the main research orientations are to identify and develop new internet applications for local governments, and to assess their efficiency and effectiveness in the light of the respective policy goals addressed. The digital city strand of research has therefore tended towards technological determinism, following the hypothesis that ICT will somehow impact

on social and cultural urban practices in cities, rather than vice versa, while also being highly optimistic about this impact. This perspective has increasingly been criticised for its disregard of the social construction processes that shape technology usage (Aurigi 2005, 200) - a criticism that has given rise to more qualitative approaches, analysing the interplay of ICT, developers, users and institutions in local settings (see contributions in: Tanabe et al. 2002; Koizumi & van den Besselaar 2005). Also mainstream digital city research now usually includes at least some form of a 'disclaimer' in terms of technological determinism, but its basic positive assumption that ICT usage will improve a city's performance in the policy areas addressed, which in turn requires the identification of barriers to implementation and measures to overcome them, has largely been maintained. At present, we find this perspective reified through future internet research, driven by new technologies seeking for (urban) problems to be solved (cf. Komninos et al. 2011; Pallot et al. 2011).

The second important research strand has been inspired by Lundvall's conception of innovation systems (Lundvall 1985; Lundvall & Johnson 1994), echoed especially in business studies, economics and economic geography. Here, the starting point is the identification of 'innovation' as the main trigger of economic growth under conditions of globalisation. Such innovation is characterised as a socially embedded and spatially structured learning process determined by the formation of knowledge networks between key actors - government agencies, knowledge organisations, businesses, funding bodies, intermediaries (Morgan 1997). These networks in turn are seen to depend on social and human capital, local institutional settings, as well as culture and ICT, reaching out from the local to the global scale (Cooke & Morgan 1993; Lundvall & Johnson 1994; Komninos 2009a). Research in this field has therefore been trying to identify, describe and model these networks and their conditioning factors in a systemic perspective in order to provide orientations for urban policy, with the ultimate aim to strengthen the competitive position of cities and regions (cf. Moulaert & Sekia 2003). Apparently, this perspective implies a normative selectivity in terms of both the goals addressed and the actors involved.

As illustrated especially through the work of Komninos (2002; 2006; 2008; 2009b), the idea of the 'smart city' emerges from linking the ontological and epistemological perspectives of the innovation system with those of the digital city. Hence, a 'smart city' is conceived of as a specific type of innovation system, namely one that is deeply rooted in urban spaces, their institutions and actor networks, while also fostering the use of novel web-based ICT applications to support the pertinent interaction processes, learning and creativity. As the digital city, its development is therefore principally open to any societal goals linked to it, but due to its focus on innovation systems, priority is given implicitly to competitiveness and economic growth. Furthermore, 'smart cities' coincide with both conceptual sources in identifying enhanced ICT adoption as a core instrument to achieve societal objectives, while largely neglecting related negative or rebound effects (e.g. social exclusion, overcompensation, ICT carbon footprint). Consequently, 'smart city' research is addressing especially the identification and analysis of the preconditions and factors that influence a successful implementation of this agenda in order to guide practical development. Alternative pathways that would not strongly focus on the exploitation of ICT are even discarded from the outset as an existential threat for cities and regions (Eger & Becker 2000, 2).

This basic orientation already formed the starting point of the influential "Smart Communities" program, initiated in 1997 by the International Center for Communication at San Diego University. It says to respond to the need "to help communities worldwide better understand the important role of technology, economic development and importantly, creativity and innovation to success and survival in the new global economy." (Smart Communities 2011). More recently, the same perspective has been presented as a "new planning paradigm" for urban-regional development and innovation management that "updates older arguments about telcoms in the city, cybercities and digital cities" (Komninos 2009b, 338), thus underlining the above normative assertion and promptly doing away with more critical approaches (here referring explicitly to Graham & Marvin 1996).

Some authors have also tried to provide more specific directions regarding the selection of policy domains a smart city should address. For instance, Giffinger et al. (2007) identify six characteristics - economy, people, governance, mobility, environment, living – in which a smart city should be "well performing in a forward-looking way" (ibid. 6), measured by a total of 73 indicators. These six characteristics are then used as a "solid background" by Caragliu et al. (2011) to analyse correlations between urban wealth and five other selected indicators, namely employment in culture and entertainment industry, multimodal accessibility, length of public transport network, e-government services and education levels. Although this selection

exposes major gaps regarding both the six domains referred to (e.g. environment, living) and key sustainability issues (e.g. inclusion, equity, quality of life), the positive correlations identified are then seen to "clearly define a policy agenda for smart cities" (ibid. 77). It is interesting to denote that although ICT does actually not play a prominent role in these two interpretations of 'smart cities' (only two of the indicators identified by Giffinger et al. (2007) relate to "ICT infrastructure availability", while Caragliu et al. (2011) consider just "transactional e-government services" in this respect), both references figure in the context of the technology-led 'smart city' debate. Here it appears that, technology aside, what remains of the 'smart city' seems to be an investment program for strengthening certain location factors or "capital stocks" (ibid. 77) that does clearly support urban competitiveness, but leaves entirely unclear whether or how urban sustainability is also supported. Rather, by establishing policy priorities and instruments, 'smart cities' seem to replace sustainability as a development goal and problem-solving concept, including its much more demanding requirements of balancing ecological, social and economic development, ensuring intra- and intergenerational equity, and fostering cultural and institutional change (cf. Majer 2007; Nielsen et al. 2010).

3.2 Strategies for implementation

Given the ontological and epistemological frame sketched above, 'smart city' conceptions also entail a particular understanding of how their implementation should be approached and enhanced in practice. While this question is hardly addressed as such, discussions mainly revolve around two complementary implementation settings in terms of the scale addressed and the type of actors involved, namely the triple-helix model and open innovation ecosystems. Drawing on empirical and analytical grounds, these two concepts are put forward in a prescriptive manner to guide 'smart city' development. Both types of implementation strategies display particular strengths for addressing certain aspects of integrated urban and ICT development, but they also raise questions concerning their legitimacy as specific modes of governance and their ensuing repercussions on urban planning and policy in general.

Shaping 'smart city' alliances: The triple-helix model

Following the engagement of innovation systems research with different modalities of knowledge production, the triple helix model focuses in particular on relations between universities, industry and government at an urban and regional scale (Shinn 2002). Its proponents maintain that the characteristics of the network formed by these three key actor groups is what conditions organised knowledge production, economic wealth creation as well as development control ("reflexive overlay") in urban regions (Leydesdorff & Deakin 2011, 56). The triple-helix is thus understood as a selection environment for knowledge creation and innovation, ushering in place-based strategies to exploit local creativity and social capital to achieve a "new urban vitality" i.e. growth (Lombardi et al. 2012, 16). Particular attention is therefore paid to the design of interactions between industry and university with a view to knowledge generation, between university and government regarding mutual learning, and between government and industry for creating market affine institutions (Lombardi et al. 2012, 8). In this, ICT is attributed a crucial importance mainly because it can configure and intensify such interactions e.g. through corresponding knowledge management and exchange platforms.

While the triple-helix model is formally conceived of as an analytical device to measure and compare the degree of 'smartness' cities have achieved, it equally aspires to outline a framework for action (Caragliu et al. 2011, 77). For instance, arguing strictly against "entrepreneurship-based" and "market-dependent" approaches, Leydesdorff and Deakin suggest that these should be "replaced with a learning organisation of policy makers, academic leaders and corporate strategists" (2011, 59). This particular alliance is stipulated to form a new kind of governance blueprint for steering 'smart' urban development, emphasising reflexive arrangements to generate and exploit intellectual capital. Yet, whether such elitist and corporatist coalitions do reflect the demanded "cultural reconstruction at the bottom" (ibid. 57) certainly depends on where that 'bottom' line is drawn. In practice, they are unlikely to be less biased by the respective motives and resources of the parties involved than the 'entrepreneurial city' or 'urban growth coalitions' criticized (cf. Hall & Hubbard 1996; Harding 1991). Hence, if informed by the triple-helix model, urban planning and policy making runs the risk of reifying the kind of neo-liberal distorsions it (hopefully) wants to avoid. And while the model implicitly assumes that by focusing on ICT-enhanced knowledge production, creativity and learning, cities could simply "grow smarter", doubts remain regarding its capacity to resolve fundamental

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goal conflicts in urban development, ensure representation and legitimacy, and thus direct urban innovations towards sustainability.

Designing service incubators: Open innovation ecosystems

While the triple-helix addresses the creation of an urban-regional governance framework and practices that enable smart growth, open innovation ecosystems focus on the concrete identification and design of new products, services or infrastructures at the scale of real-life settings. They draw on a variety of concepts and approaches developed in business and information system studies such as 'open innovation', 'lead-user involvement', 'crowdsourcing' or 'participatory design' (cf. von Hippel 1986; Asaro 2000; Chesbrough 2003). In addition to the interaction environment itself, such ecosystems also encompass the required technologies and infrastructures, partners providing specific expertises, as well as a supporting organization and methodologies for iterative co-creation and learning. They build on a partnership among businesses, government and academia, while also involving citizens and civil society stakeholders in as far as they represent certain end-user groups. Typically, the design process then runs through several loops of needs analysis, system design and evaluation, oriented at the overall principles of "openness" (include new users), "realism" (focus on real users in real-life situations) and "empowerment" (motivate and engage users) (Bergvall-Kareborn & Stahlbröst 2009). At present, already a large number of examples for such open innovation ecosystems can be found in cities around the globe, addressing a variety of domains and applications (e.g. e-government, health, mobility, energy-efficiency, tourism - cf. ENoLL 2012; LivingLabs Global 2012).

Regardless whether the approach as such actually succeeds in creating innovative services that are meaningful for those users involved, and in developing a business cases for durable operation, it is clear that the focus on particular needs or opportunities has to be rather narrow from the outset. Hence, open innovation ecosystems such as living labs (Folstad 2008) or 'communities of practice' (Deakin et al. 2011) are only able to deliver innovations for objectives selected beforehand on the basis of the partnership arranged – they do not perform such selection themselves. The very creation of a living lab depends on the initiative of interested stakeholders interacting in an urban-regional selection environment, thus shaping their configuration and orientation. Moreover, there are further filters in place that format such open innovation ecosystems. For instance, a strong technology push from industry currently favours the creation of urban living labs around future internet applications (Pallot et al. 2011). Also, regarding the users involved it appears to be difficult to avoid domination by technically mature and curious people who seek to actively influence societal developments (Bergvall-Kareborn & Stahlbröst 2009, 367). In addition, with a view to "realism" as a principle the focus on products or services and taking selected end-user needs as a starting point, more systemic innovations cannot be addressed as such. This implies that despite a strong emphasis on openness, user involvement and empowerment, open innovation ecosystems remain rather limited in their scope, remit and aspirations. Ironically enough, the lack of a coherent typology or evaluation framework for open innovation ecosystems currently impedes learning from the plethora of experiments performed worldwide. It is therefore difficult to empirically assess even basic relations between innovation subjects, actor constellations, methods and outcomes.

4 SMART CITY DISCOURSE FORMATION AND LABELLING PRACTICE

As discussed above, researchers from a wide range of disciplines have contributed to gradually shape a scientific conception of 'smart cities' over the past decade, including a distinctive raison d'être and particular modes of implementation. Yet, rather than providing a framework for critical analysis, the key motive for this has been to establish the evidence basis for a growth-oriented and technology-driven policy agenda. As Allwinckle and Cruickshank argue for the selection of papers they discuss (2011, 9), research now appears to "offer a language, a syntax, and a vocabulary by which to understand the emerging policy debate on smart cities." Apparently, this perspective omits precisely the crucial role that policy and practice themselves have played in the production and reproduction of 'smart city' concepts - which renders the suggested analytical devices rather short-sighted. To explore such relationships we thus need to acknowledge for the contributions of other societal actors more explicitly and in an intertextual perspective.

Regarding the role of industry, it is the large IT and telecom corporations that figure in a prominent position here. Already in 1995 the Intelligent Communities Forum (ICF) was set up by the World Teleport

Association (WTA), an organisation of satellite communication industries and businesses. As the organisation's name indicates, it is urban areas that were quickly identified to offer a crucial market development and growth potential for ICT products and services. Today the ICF forms a network also including about 90 local authorities. It conducts studies, disseminates results and grants an annual community award. Since 2006, a preselected group of 21 candidate authorities to this award is promoted under the label of "Smart21". The ICF posits that intelligent communities "are those which have [...] come to understand the enormous challenges of the Broadband Economy, and have taken conscious steps to create an economy capable of prospering in it." (ICF 2011). Correspondingly, broadband connectivity, knowledge workforce, innovation, digital inclusion and marketing are identified as the key factors for assessing progress on this path. Emphasis is put on collaboration "among government, businesses, universities and institutions", as well as on leadership and sustainability - although the latter refers essentially to durable service provision and business models (ICF 2011).

A qualiatively different message has then been launched by the Global e-Sustainability Initiative (GeSI), another influential network formed in 2001, bringing together the largest IT and telecom companies worldwide in partnership with NGOs as well as the UN Environment Program. GeSI declares to promote "products, services and access to ICT for the benefit of human development and sustainable development" (GeSI 2011). In 2008, GeSI commissioned the "Smart2020" study that has raised much interest. This study has attempted for the first time to quantify the global CO2 emission reduction potential of ICT usage, while also discussing the growth of ICTs own carbon footprint (The Climate Group 2008). The principal reduction potential was identified in the application domains of logistics, buildings, electricity grids, motor systems and dematerialisation. In particular, the study highlights the key role of urban areas since this is where the above domains converge, as well as the need for closer cooperations between industry and (local) government for implementing measures. Consequently, a "Smart2020" initiative was kicked off as a follow up on this study, promoting pilot and transfer projects in this field (The Climate Group 2012)

This specifically urban focus of ICT deployment linked to grand environmental challenges has increasingly been taken up by various major solution providers. For instance, Cisco Systems' "Connected Urban Development" initiative pursues "a future where the intelligent use of networking architectures can transform society not only by boosting productivity and spurring economic growth, but also by supporting environmental sustainability and enhancing the quality of life in urban environments" (Cisco 2012). Concretely, it addresses four application domains (work, mobility, energy and buildings) and is realised in partnership with cities from across multiple countries. In 2010, IBM launched its "Smarter Cities Challenge", offering a total of $50 million support for 100 cities worldwide, selected through a competition until 2013. The nominees need to cover a certain range of ICT applications in city management, infrastructure and human services (IBM 2012). Also Siemens has jumped the train, now promoting its products and services under the umbrella of "Sustainable Urban Development". The company has also published a "Green City Index" that ranks 30 European cities according to their performance in selected domains (CO2, energy, transport, buildings, water, waste and land use, air quality, environmental governance) (Siemens 2009).

While slightly differing in their scope, the core narrative of these industry-driven initiatives and networks seems clear: In order to maintain competitiveness and be able to respond to the grand environmental challenges, a turn towards networked urban ICT solutions is inevitable i.e. "cities must become smarter" (IBM 2012). Seeking to align with (local) government policy priorities in terms of energy efficiency and climate change mitigation, a supply-driven conception of smart cities thus emerges. It is promoted through global marketing campaigns, including instruments of city competition as well as tools for city self-assessment and benchmarking. But while considerable verbal pressure is put on urban decision makers to create 'smart' programs, a consistent conceptual frame for these is not suggested. Application domains vary simply depending on the respective company's product portfolio, and issues concerning the local process of 'smart' development are hardly addressed at all. The only constituent element necessary to drive implementation seems to be the kind of alliance demanded by the triple-helix model.

In Europe, this emphasis on urban ICT applications for both economic development and as a response to environmental challenges is equally what underpins recent government initiatives concerning smart cities. In particular the European Commission is leading the way in this matter, given the maturity of its initiatives and also due to English communication practice contributing to adjust terminology across member states. Two complementary EC initatives shall be highlighted here as they capture the prevailing ideas and objectives

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linked to 'smart cities' at this level. Since 2009, the EC supports a large number of 'smart city' pilot projects demonstrating future internet applications through its "ICT Policy Support Program" (EC 2012a). As cities are free to address the local policy domain and goals they choose, this funding strand is guided only by particular technologies (i.e. future internet – each call also addresses selected technologies e.g. RFID, mobile LTE) and a certain partnership and development model (open innovation ecosystems). In 2011, the EC has additionally launched a major "Smart Cities and Communities Initiative" through its 7th Research Framework Program, supporting R&D projects that address the use of ICT for energy efficiency and climate change mitigation (EC 2012b). Here, the core aims are derived from environmental policy goals, but the means to achieve them are predefined as large-scale urban ICT deployment in the energy, transport and building domains. Cities are thus required to form networks and partnerships with industry and research in order to be able to benefit from EC funding. This not only illustrates how EC policy increasingly points towards urban ICT deployment as a key solution to resolve environmental problems and foster competitiveness. It equally underlines that this turn towards the 'smart city' is accompanied by particular approaches for implementation at the local level, contributing both conceptually and resourcewise to underpin the alleged synergetic coalitions to govern urban change.

Ultimately, the decisive pull for the 'smart city' discourse to thrive had to come from cities themselves. In fact, the number of cities adopting policies that target 'smart' development has been growing fast, without necessarily referring to a shared understanding of this concept. In his review of practical examples from around the globe, Hollands (2008) underlines that at the core of the 'smart city' label used by local authorities lies a focus on networked infrastructures and ICT in particular as an instrument for urban development and for improving the economic, social and cultural condition of cities in a global marketplace. Furthermore, he identifies four distinctive features of such policies 1) Market-led development, granting businesses, research organisations and technology providers a prominent place in the design of new governance arrangements; 2) High-tech and creative industries, following concepts of the 'learning region' and 'creative city' (Florida 1995; 2003; Landry 2000); 3) Learning, education and social capital, to enable the local workforce to be part of the 'knowledge economy', and to develop e-government applications for local communities to "learn how to learn" (Coe et al. 2001, 13); and 4) Social and environmental sustainability, maintaining that ICT can make important contributions to address issues of social inclusion, ressource consumption and emission reduction. Considering the recent wave of EC-funded smart city projects in Europe, an update of this spectrum may well reflect a shift in emphasis here from creativity and learning towards global environmental challenges, thus echoing the more recent initiatives from ICT industries.

Most importantly, while the above seems to depict a certain spectrum of objectives and approaches, Hollands emphasises that "not all the elements mentioned here have equal weighting in the labelling process" (2008, 310). He criticises that, behind the self-congratulatory rethoric of cities claiming to be or become 'smart', there is an underlying agenda that matters when it comes to implementation: In the absence of a widely recognised definition of what it means to become a 'smart city' and without any effective mechanisms to balance community, government and business goals, 'smart city' policies in practice thus tend to foster a particular kind of urban entrepreneurialism, seeking to strengthen hard and soft location factors (Hollands 2008, 304). In this context, what falls especially short of consideration are not only the wider implications of ICT for social, cultural and political development in cities e.g. regarding participation, transparency, social inclusion or spatial segregation. Also in environmental terms the almost exclusive focus on selected grand challenges deflects from a range of urban environmental issues that escape the logic of energy and carbon reduction actions, partly or entirely, such as ecosystem service provision, environmental risk management, climate change adaptation or biodiversity maintenance.

5 CONCLUSIONS: DECONSTRUCTING SMART CITIES

This paper has presented an intertextual reading of current contributions to a broad societal discourse referring to the development of 'smart cities'. The starting point has been the recognition of a number of driving factors and pressures that contribute to defining a distinctive issue called 'smart city', placing it high on the agenda of research, policy and practice. This includes especially the imminent grand environmental challenges, pointing towards cities and urban areas as a key to address them; the convergence between information and communication technologies and between major industry branches, enabling increasingly

mobile and networked ICT while also opening up new growth markets for multinational corporations; and finally the diffusion and adoption of ICT applications in urban society, linked to a widening range of social practices. This context has provided a fertile ground on which the current discourse around 'smart cities' has been able to grow dynamically - and with a good prospect for further expansion in the years to come.

To initiate a fruitful deconstruction of this dominant discourse, the focus has been twofold: On the one hand, scientific conceptions of 'smart cities' and related research agendas have been reviewed in order to capture the various genuine knowledge sources upon which 'smart city' claims are built and justified. On the other hand, the propositions and initiatives devised by key industry players, the European Commission and cities have been discussed with a view to the respective motives linked to 'smart cities' and the mechanisms in place for practical realisation, affecting resource availability, partnerships and institutional arrangements.

By juxtaposing the above components it appeared that at the surface, the narrative of the 'smart city' is addressing the broad deployment of advanced ICT applications potentially affecting a wide array of urban sustainability issues. It evokes a picture of urban areas and activities highly networked through infrastructures and devices to enable more efficient operations and informed decision making in key domains – energy, mobility, buildings, governance – while enhancing the attractiveness and competitiveness of the location. It is this everlasting promise of technology as a key to resolve pressing societal problems that constitutes the ultimate vision of the 'smart city'. And it is this vision that results to be sufficiently attractive and convincing for public and private actors across scales, capable of mediating between their interests.

Nevertheless, even though the 'smart city' operates as a floating signifier that paves the way for broad implementation coalitions, it may not necessarily be an empty one. Looking at its trajectory in scientific work, industry initiatives and policy design, there is an underlying agenda which results to be be far more narrow but at the same time well equipped with the means required for enhanced realisation: 'Smart cities' have to respond by priority to the imperatives of economic competitiveness and global environmental change. To achieve the related policy goals, they must turn to ICT deployment as a key policy instrument, valued exclusively for its expected positive contribution. Further, to foster implementation 'smart cities' are required to push for veritable innovation systems through triple-helix alliances that select application fields and enable implementation, using open innovation ecosystems for creating new products and services.

While necessarily simplifying, this synthesis illustrates that the current 'smart city' discourse may in fact imply a less visible but ultimately heavy burden for cities, their stakeholders and citizens. At a time where urban areas are facing complex uncertainties and struggle to become more sustainable and resilient, it promotes a rather particular and uniform development pathway that in fact tends to marginalise complementary objectives, alternative approaches, as well as likely negative effects. It equally raises doubts whether or how the supply-driven logic promoting specific application fields and technology solutions can be overcome, which represents a major risk of creating lock-in situations and preventing more systemic and radical urban change. Furthermore, with a view to the specific design of the related governance structures and practices, 'smart cities' inherently suffer from a limited capacity to deal with contradictory goals and broader sustainability issues. As a result, they equally lack a proper legitimacy that could firmly root them in the wider context of urban development and its challenges.

This immediately raises the question of how cities could possibly escape such formatting of their activities? Strategies are needed that allow to leave the trodden path of 'smart city' development in order to effectively balance objectives in terms of local and global sustainability, and create novel justifications for integrated urban and ICT development practices. To start with, this requires placing the different options and implications of urban ICT usage next to other policies and measures. It implies to open up 'smart city' development to citizen and stakeholder deliberation, developing a shared understanding of problems and risks and contributing to the co-creation of local visions. It demands to conceive of this as an integral part of a much broader governance system designed for instigating urban change. Such a collective deconstruction of 'smart cities' seems necessary in order to respond to place-specific conditions and requirements, considering e.g. different world regions, contexts of growth or shrinkage, or diverging sustainability levels, and therefore to equilibrate the 'smart city' agenda in terms of actor coalitions and policies devised. In particular, to transcend current mainstream thinking also requires to acknowledge for diverging interpretations of 'smart cities' more explicitly. Faint signs of these have started to emerge already in dispersed arenas, focusing e.g. on social and institutional conditions for learning and innovation processes in

cities (Campbell 2012), on "green" technologies for improved environmental performance (Ercoskun 2011), or on urban ecosystem services and sufficiency (Lim & Liu 2010). Another good example is the Californian "Smart Communities Network", which displays a rather different notion of city 'smartness', essentially providing examples, guidance and tools for practitioners to develop local urban sustainability projects (NCAT 2012). Seemingly, this suggests a very different definition of a 'smart city' that may in fact help to recalibrate ongoing efforts in this direction: A 'smart' city is a city that knows how to become sustainable and resilient – which will most probably imply, but not depend on, the usage of advanced ICT.

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🏆 *reviewed paper*

Der Pfalzfinder – mobiler Service im regionalen Tourismus

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1 ABSTRACT

Wollten Mitte der 1990er Jahre Tourismusverwaltungen noch eine Präsenz im Internet, so steigt heute die Nachfrage nach mobilen Dienstleistungsangeboten. Die mobile Information ist wichtig für eine zeitgemäße Vermarktung von Tourismusdestinationen, denn Touristiker müssen ihre Gäste auch per Smartphone und mobilem Internet über ihre Angebote informieren.

Doch welche Instrumente sind hier die richtigen, wie können bereits existierende Informationen mobil verfügbar gemacht werden und wie können effektive mobile Dienstleistungsangebote mit regionalem Charakter geschaffen werden? Gerade regionale Tourismusinstitutionen haben es oft schwer mit dem Sprung in das mobile Internet. Wie ein regionales, mobiles Informationssystem für Touristen auf- und ausgebaut werden kann, zeigt das Projekt Pfalzfinder im Landkreis Germersheim: Durch die Verknüpfung mit der vom Südpfalz-Tourismus e.V. eingeführten Datenbank Deskline 3.0 sind alle regionalen Akteure wie Direktvermarkter, Gastronomen, Hoteliers sowie Sehenswürdigkeiten in den mobilen Service des Pfalzfinders eingebunden. Per QR-Code können Touristen diese Informationen direkt vor Ort auf ihr Handy laden. Für die Verwaltung der Standorte wurde darüber hinaus ein Point-of-Interest-Management-System entwickelt, das von der Einpflege von Texten, Bildern und Videos bis zur automatischen Generierung einer Hinweistafel inklusive QR-Code alle notwendigen Aufgaben für die Erzeugung neuer Informationsstandorte übernimmt. Somit kann der Ausbau des Systems von verschiedenen Akteuren vor Ort vorgenommen werden und ist nicht an eine zentrale Verwaltung gebunden. Ziel des Pfalzfinders ist es, ein mobiles Serviceangebot zu schaffen und damit touristische Destinationen und lokale Akteure in einer der aktuellen und zukünftigen technischen Entwicklung angepassten Art und Weise zu bewerben. Insbesondere aufgrund der Verknüpfung zu einer bestehenden und ständig aktualisierten Datenbank ist das System mit nur wenig Aufwand auf andere Regionen und Städte übertragbar.

2 MOBILE ANWENDUNGEN IM TOURISMUS

2.1 Anforderungen an mobile Anwendungen im Tourimus

Eine berechtigte Frage bei der Entwicklung eines (regionalen) mobilen Tourismus-Informationssystems ist seine Daseinsberechtigung, denn das mobile Internet bietet auch ohne die Entwicklung von weiteren Plattformen oder Anwendungen Möglichkeiten, Informationen in Abhängigkeit des eigenen Standortes zu ermitteln. Es existiert bereits eine Vielzahl an Informationsdiensten, die im Sinne der Touristeninformation genutzt werden können. Alleine die mobile Plattform der Online-Enzyklopädie Wikipedia, Google Maps bzw. Google Places oder die Anwendung Qype stellen dem Suchenden eine Vielzahl touristisch relevanter Informationen in Abhängigkeit seines Standortes zur Verfügung. Doch gerade in der Menge der Informationen liegt das Problem, denn für den Touristen als Endnutzer ist (zunächst) nicht der volle Umfang an Informationen relevant. Je nach Ausrichtung des Tourismus im jeweiligen Zielgebiet und den damit verbundenen touristischen Zielgruppen ergeben sich spezifische Anforderungen an Informationstiefe und die Art der Darstellung von Informationen. Doch nicht nur die touristische Zielgruppe bestimmt die Anforderungen an ein mobiles Informationssystem, ebenso sind Bedürfnisse der lokalen Akteure und Dienstleister zu berücksichtigen, die ja letztlich von der mobilen Vermarktung ihres Angebotes profitieren sollen und damit positive Effekte im Hinblick auf regionale Wertschöpfung und Steigerung des Bekanntheitsgrades von Region und Angeboten erzielen sollen.

Die Schwierigkeit liegt hier insbesondere in der Bereitstellung von spezifisch lokalen Informationen, die sich auch im „stationären“ Web nicht ohne aufwendige Internetrecherche erreichen lassen, beziehungsweise nur dann auffindbar sind, wenn der Internetuser mittels gezielten Suchbegriffen hiernach sucht. Gerade aber die spezifisch lokalen Informationen können für den Touristen vor Ort von besonderem Mehrwert sein –

beispielsweise das kleine Spezialitätengeschäft um die Ecke oder die alte Kunstschmiede in 500 Metern Entfernung. Diesen kleinen regionalen Akteuren fällt es oft schwer, sich im mobilen Web so zu positionieren, dass eine standortbezogene Suchanfrage Informationen über ihren Betrieb oder ihre Produkte bereitstellt. Fragt somit der Nutzer vor Ort Informationen mittels den beschriebenen Anwendungen wie „Google Places“ oder ähnliches ab, gehen für ihn zum Großteil die Informationen mit Mehrwert verloren. Weiterer Nachteil dieser Informationsrecherche ist das mögliche Informationsüberangebot – es werden zu viele Informationen oder Point-of-Interests (POIs) im näheren Umkreis angezeigt, die den Touristen vor Ort überfordern. Neben der Vielzahl und der Unübersichtlichkeit der POIs ist keineswegs die Qualität der Standortinformation gesichert. In den POIs lassen sich Informationen hinterlegen, die dem Touristen vor Ort gegebenenfalls keinen Vorteil bringen, oder völlig falsch sein können. Beispielsweise ist jeder Inhaber eines YouTube-Accounts in der Lage Videos zu verorten – genau diese Videos können dem Touristen dann vor Ort über die Standortinformation mittels GPS-Signal angezeigt werden – auch wenn das Video keinen touristisch relevanten Inhalt besitzt. Stattdessen muss gewährleistet sein, dass die bereitgestellten Informationen über eine hohe Qualität verfügen, eine dauerhafte Aktualität aufweisen und alle Belange und Besonderheiten der jeweiligen Tourismusregion berücksichtigen. Diese Vorgaben werden nur gewährleistet, indem Akteure und Touristiker aus der Region gleichermaßen für die Informationsinhalte und deren Bereitstellung verantwortlich sind.

2.2 Native App vs. Mobile Webseite

Mobile Informationssysteme sind technisch zu Unterscheiden zwischen einer nativen Application (App) und einer eigenen mobil optimierten Internetseite. Native Applikationen sind Programme, die für jedes Smartphone-Betriebssystem zu entwickeln sind, mobile Webseiten funktionieren dagegen unabhängig vom jeweiligen Betriebssystem .

Werden derzeit mobile Informationssysteme oft mit der Entwicklung einer nativen App gleichgesetzt, so gilt es doch die Vor- und Nachteile einer nativen App mit Alternativlösungen wie beispielsweise eben einer Web-App oder mobilen Internetseite abzuwägen. War es bisher nur möglich mit Hilfe nativer Apps einen Zugriff auf Funktionen wie beispielsweise den GPS-Empfänger des Smartphones zu erhalten, ist dies nun dank html5 auch bei web-basierten Anwendungen der Fall [WÜRSTL 2012]. Die Vorteile liegen auf der Hand: Müssen native Apps in verschiedenen Versionen auf die unterschiedlichen Betriebssysteme der sich auf dem Markt befindlichen Smartphones angepasst werden, so kann mit einer einzigen browserbasierten Web-App nahezu der volle Funktionsumfang unabhängig vom verwendeten Betriebssystem genutzt werden. Somit ist die Entwicklung eines mobilen Informationssystems für eine breite Nutzergruppe auf Basis einer mobilen Webseite wesentlich schneller und kostengünstiger zu realisieren – und damit auch für kleinere Tourismusregionen finanzierbar. Allerdings gibt es derzeit auch bei Web-Apps Grenzen, insbesondere im Hinblick auf innovative Techniken: Augmented Reality Anwendungen, die mit Hilfe der GPS Daten, des digitalen Kompass und des Gyrosensors arbeiten, sind derzeit nur über native Apps zu realisieren [HEISE 2011]. Es gilt demnach bei der Konzeption eines mobilen Informationssystems klar zu definieren, welche Anforderungen auf Basis der touristischen Zielgruppe, den Bedürfnissen der lokalen Akteure und den touristischen Leitbildern einer Region erfüllt werden müssen.

Denn oftmals können mittels einer Web-App alle im Rahmen eines regionalen mobilen Informationssystem erforderlichen Informationen zur Verfügung gestellt werden – von textlichen Standortinformationen über Audioguides bis hin zu Videos. Ferner können auch Karten und Routen die Zielfindung des Anwenders vor Ort deutlich erleichtern. Verfügt das Smartphone über eine Navigationsfunktion kann der Nutzer auch mit der Web-App mittels Echtzeitnavigation zu dem vorgesehenen Ziel gelotst werden. Dementsprechend kann anhand einer Web-App eine breite Zielgruppe mit den wesentlichen Informationen vor Ort erreicht werden – unabhängig vom verwendeten Betriebssystem des Smartphones. Der Nutzer ist somit in der Lage mit dem Informationssystem zu interagieren, ohne sich vorher eine gesonderte App installieren zu müssen. Sofern das System, wie im hier vorgestellten Pfalzfinder mittels QR-Codes den Standort des Nutzers ermittelt, ist lediglich ein Barcode-Reader und ein Internetzugang des Mobiltelefons erforderlich. Diese Voraussetzungen erfüllt heutzutage fast jedes Mobiltelefon. Weiterer entscheidender Vorteil einer Web-App in Kombination mit QR-Codes ist, dass der Nutzer nicht zwingend im Vorfeld seiner Reise über die Verfügbarkeit des Informationssystems informiert werden muss. Dank der Hinweisschilder in der Region mit entsprechendem QR-Code erfolgt der Hinweis auf das System direkt vor Ort – der Nutzer kann das System somit sofort

nutzen. Eine vorgeschaltete Marketingkampagne ist demnach nicht zwingend notwendig. Im Gegensatz hierzu, muss der Nutzer einer nativen App im Vorfeld Kenntnis über eben dessen Existenz haben und sie sich auf dem eigenen Smartphone installieren [vgl. BREMMER 2011]. In den Appstores von Apple oder Android finden sich bereits jeweils über 26.000 verschiedene Apps mit dem Schwerpunkt Reisen und Tourismus – bei dieser Vielzahl ist eine App einer kleineren Tourismusregion kaum wahrnehmbar.

Doch letztlich entscheidet der Endnutzer über den Erfolg oder Misserfolg eines mobilen Informationssystems, dabei ist es nahezu unerheblich, ob eine native App oder eine Web-App verwendet wurde. Viel wichtiger ist der Mehrwert, den ein mobiles Informationssystem dem Nutzer bietet. Ein Mehrwert ist insbesondere dann gegeben, wenn das (regionale) mobile Informationssystem spezifische Informationen über touristische Destinationen zur Verfügung stellt, die sonst nur durch mehrfache Filterung von Suchabfragen in verschiedenen (mobilen) Informationsportalen zu finden sind und die Darstellung dieser spezifischen Information in einer zielgruppengerechten und anschaulichen Art und Weise vorgenommen wird (z.B. in Form von Infotainmentvideos).

3 DER PFALZFINDER

Mit dem Pfalzfinder wurde im Landkreis Germersheim durch den Südpfalz-Tourismus e.V. in Zusammenarbeit mit Mar.Vis ein mobiles Informationssystem konzipiert, dass speziell auf die touristischen Rahmenbedingungen des Landkreises ausgerichtet ist und die Bedürfnisse der lokalen Akteure ebenso berücksichtigt wie die der touristischen Endnutzer. Derzeit befindet sich das System in der Umsetzung und soll Ende April 2012 offiziell gestartet werden.

3.1 Funktionsprinzip

Das System des Pfalzfinders basiert auf drei wesentlichen Elementen: Einer mobilen Webseite, einem Hinweisschild mit Quick-Response-Code (QR-Code) und einem internetfähigen Kamerahandy auf Seite des Nutzers. Um die Darstellung der mobilen Webseite optimal auf die Displaygröße der vom Nutzer verwendeten Endgeräte anzupassen, werden entsprechende „Browserweichen“ implementiert. Diese gewährleisten, dass die Benutzeroberfläche auf nahezu jedem Mobiltelefon, egal ob Smartphone oder „normales“ Handy, in optimaler Weise dargestellt wird und kaum ein Unterschied zu einer nativen App erkennbar ist.

Nach Abfotografieren und automatischem Entschlüsseln des QR-Codes auf den Hinweisschildern wird der Nutzer auf eine mobile Webseite geleitet. Diese enthält fünf anwählbare Buttons:

- Standortinformation

Hier erhält der Nutzer textliche Informationen zu seinem aktuellen Standort. Im folgenden Untermenü kann sich der Nutzer den Standort auf einer Karte (GoogleMaps) anzeigen lassen. Optional besteht die Möglichkeit im Untermenü einen mobilen Infotainment-Film oder einen Audioguide über den Standort abzurufen.

- Direktvermarkter

Die Direktvermarkter stellen einen wichtigen Vertriebszweig für landwirtschaftliche Produkte im Landkreis dar, zusätzlich handelt es sich aufgrund von vielfältig angebotenen Veranstaltungen um eine wichtige touristische Attraktivität im Landkreis Gemersheim – entsprechend wurden die Direktvermarkter als eigener Menüpunkt in das Informationssystem aufgenommen. Unter diesem Menüpunkt erhält der Nutzer eine Liste der Direktvermarkter in einem definierten Umkreis und nach Entfernung sortiert. Klickt der Nutzer einen Anbieter der Liste an, erhält er weiterführende Informationen über den ausgewählten Direktvermarkter wie zum Beispiel Name, Adresse, Kontaktdaten, Sortiment oder aktuelle Informationen und Veranstaltungen. Bei Click auf den Button „In Karte anzeigen“ gelangt der Nutzer auf eine Kartendarstellung, auf der der Standort des Direktvermarkters und der eigene aktuelle Standort angezeigt wird. Durch die Navigationsfunktion und Routenplanung von GoogleMaps kann der Nutzer die Echtzeitnavigation zum ausgewählten Direktvermarkter starten.

- Gastronomie

Analog zum Menüpunkt „Direktvermarkter“ erhält der Nutzer hier eine Liste von Gastronomiebetrieben, ebenfalls nach Entfernung sortiert. Auch bei diesem Menüpunkt besteht die Möglichkeit weitere

Informationen zu erhalten (Name, Angebot etc.) und sich direkt zu dem jeweiligen Betrieb navigieren zu lassen.

- Sehenswürdigkeiten

Der Menüpunkt Sehenswürdigkeiten stellt ebenfalls textliche Informationen über die nächste Sehenswürdigkeit im definierten Umkreis des Nutzers zur Verfügung – ebenso die Navigationsfunktion. Unter der Rubrik „Sehenswürdigkeit“ bietet es sich insbesondere an, multimediale Inhalte wie Audioguides, Videos oder 3D-Modelle als zusätzliche Information bereit zu stellen.

- Unterkünfte

Neben der Information zum Anbieter und der Navigationsfunktion zu der Unterkunft, besteht hier eine direkte Buchungsmöglichkeit des Hotels oder des Gasthofes über die Verknüpfung mit dem Buchungsmodul von Deskline 3.0 (siehe 3.2).

Abbildung 1: Benutzeroberfläche des Pfalzfinders mit den anwählbaren Buttons

3.2 Datengrundlage und Informationsquellen des Pfalzfinders

Dem Pfalzfinder liegt als Datengrundlage die von der Rheinland-Pfalz Tourimus GmbH verwendete Datenbank und Buchungsplattform Deskline 3.0 der Feratel AG (http://www.feratel.de/) zu Grunde. Über eine Datenbankschnittstelle greift der Pfalzfinder auf das System zu und ruft darüber die Informationen zu verschiedenen Destinationen in der Umgebung ab, beispielsweise Hotels und Gastronomie. Ein großer Vorteil dieser Datenbankverknüpfung ist die Gewährleistung der geforderten Informationsqualität des Pfalzfinders, denn die Datenbank Deskline 3.0 wird seitens des Südpfalz-Tourismus e.V regelmäßig aktualisiert.

3.3 Backend: Das Point-of-Interest-Management-System

Für den Ausbau des Systems und zur Ergänzung weiterer Standorte (QR-Schilder) wurde zu dem Informationssystem ein Online-Managementsystem entwickelt. Diese Plattform ermöglicht den lokalen Akteuren (Vertreter des Südpfalz Tourismus e.V.) den Pfalzfinder eigenständig und ohne spezielle Programmierkenntnisse zu erweitern. Die Plattform ist mit einem Log-In-Filter versehen, somit haben nur berechtigte Personen die Möglichkeit, weitere Standorte in das System zu integrieren. Dies ermöglicht ein zentrales Management des mobilen Informationssystems sowie den zielgerichteten Ausbau und sichert gleichzeitig die Qualität der Inhalte, da nur touristisch verantwortliche Personen neue Standorte in das System einpflegen können. Zudem besitzt das POI-Management System eine eigene Datenbank, die regelmäßig mit den Datensätzen aus Deskline abgeglichen wird. Der Vorteil in der Erstellung einer eigenen Datenverwaltung innerhalb des POI-Management-Systems (POI-MS) liegt in der schnelleren Bereitstellung

der Daten im mobilen Frontend: Relevante Datensätze müssen nicht durch separate Abfragen an Deskline 3.0 vom Server der Pfalztouristik übernommen werden, sondern können nach regelmäßigem Abgleich direkt vom Hosting-Server des Pfalzfinders übernommen werden. Somit werden letztlich die Informationen schneller auf das Mobiltelefon des Endnutzers geladen. Die Aktualisierung der POI-Datenbank bzw. der Abgleich zwischen der POI-Datenbank und Deskline 3.0 erfolgt automatisiert alle 24 Stunden.

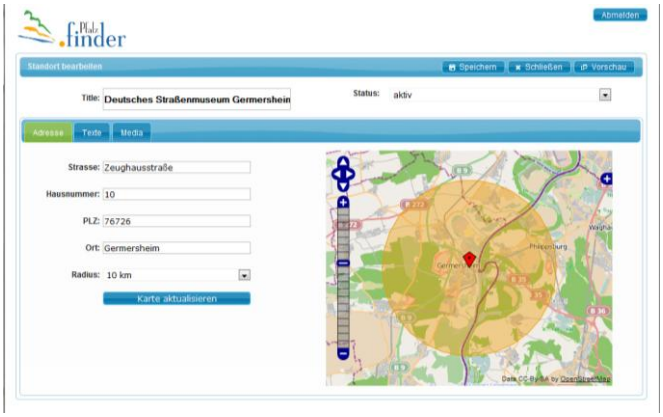

Abbildung 2: Das Point-of-Interest-Management-System des Pfalzfinders

3.4 Funktionsweise des Point-of-Interest-Management-Systems

Schritt 1: Log-In-Filter

Das POI-MS entspricht in seiner Funktion einer regulären Webseite, die mit einem Log-In-Filter versehen ist. Der POI-Manager muss sich hier per Benutzername und Passwort anmelden, um einen neuen Standort im System hinzuzufügen. Das System lässt sich auch um eine Benutzerverwaltung ergänzen, wodurch mehrere POI-Manager gleichzeitig im System arbeiten könnten und jeder neue Standort wäre einem definierten Benutzer zuzuordnen – im Sinne der Qualitätssicherung der bereitgestellten Informationen.

Schritt 2: Eingabe eines neuen Standortes

Soll der Pfalzfinder nun um einen weiteren Standort ergänzt werden, kann mit Hilfe eines Kartenmoduls (oder der Eingabe von Koordinaten) der neue Standort im System festgelegt werden. Gleichzeitig lässt sich der Radius festgelegen, in dem nach touristischen Destinationen gesucht werden kann. Dies ermöglicht z.B. die Eingabe eines geringen Radius bei Standorten in Städten und Dörfern mit vielen Destinationen im direkten Umfeld, sowie die Eingabe eines großen Radius bei Standorten „im freien Feld“. Dies gewährleistet die präzise Darstellung von Destinationen ohne ein Überangebot an Informationen zu schaffen.

Schritt 3: Eingabe von Informationen über den Standort

Hier können Informationen über den aktuellen Standort des Nutzers (=Standort des Hinweisschildes) eingegeben werden. Der Umfang der textlichen Information wurde durch die Festlegung einer maximalen Zeichenanzahl begrenzt, sie kann jedoch durch Hyperlinks erweitert werden. Dies gewährleistet eine kompakte Erstinformation und bei Bedarf die Abfrage weiterer Informationen. Die Eingabematrix der Standortinformation bietet ferner die Möglichkeit, Bilder und Videos zu integrieren. Die Eingabematrix für Videos bietet neben der Upload-Funktion von Dateien in verschiedenen Formaten (.mpg, .3gp) auch die Verknüpfung von YouTube-Videos per Eingabe der jeweiligen Video-ID. Der Nutzer kann somit selbst entscheiden, ob er ein Video nur ansehen oder auch downloaden möchte.

Schritt 4: Vorschau und Kontrolle

Die neu eingegebenen Information sowie der gewählte Standort und gewählte Umkreis werden in einem Vorschaufenster angezeigt. Der POI-Manager kann hier noch einmal alle relevanten Daten auf Richtigkeit überprüfen und ggf. Änderungen vornehmen. Beim Click auf den nächsten Schritt (Schildauswahl) wird aus den Daten automatisch eine URL und der passende QR-Code generiert.

Schritt 5: Auswahl des QR-Hinweisschildes

Der POI-Manager kann nun aus einer Auswahl definierter Schildgrößen wählen, die die notwendige Flexibilität für unterschiedliche Standorte bietet.

Schritt 6: Mobile Vorschau, QR-Linkcheck & Druckdatei

Im letzten Schritt kontrolliert der POI-Manager die Darstellung des Hinweisschildes und die Darstellung der Standortinformation. Dabei erfolgt die Darstellung der Standortinformation in gleicher Weise, wie auch der Endnutzer sie auf seinem Mobiltelefon sehen wird. Parallel dazu kann die druckfertige PDF-Datei des Hinweisschildes heruntergeladen werden.

4 UMSETZUNG DES PFALZFINDERS IN DER PRAXIS

4.1 Standorte der Beschilderung

Die Umsetzung des Pfalzfinders im Sinne der Positionierung von Hinweisschildern befindet sich derzeit in Vorbereitung, ein offizieller Start des Systems ist für Ende April 2012 geplant. Zu Beginn werden Schilder entlang des Rheinradweges aufgestellt, im Laufe des Jahres sollen weitere Radwege mit Hinweisschildern ausgestattet werden.

Zur Gewährleistung des vollen Funktionsumfangs des Informationssystems müssen die Standorte der Hinweisschilder verschiedene Voraussetzungen und Kriterien erfüllen:

- Mobilfunknetzabdeckung:

Vor Ort muss eine gesicherte Mobilfunknetzabdeckung, von allen vier in Deutschland vertretenden Mobilfunkanbieter vorhanden sein. Idealerweise ist der Mobilfunkstandard UMTS verfügbar, der eine schnelle Datenübertragung ermöglicht. Für Standorte, an denen kein UMTS-Netz zur Verfügung steht, sollte mindestens das GPRS-Netz mit dem Datenbeschleuniger EDGE bereitstehen – die Übertragungsraten sind zwar bereits deutlich langsamer als im UMTS-Netz, reichen allerdings noch aus um rein textliche Informationen zu übertragen. An solchen Standorten sollte allerdings auf die Bereitstellung von Videodateien aufgrund von langen Ladezeiten verzichtet werden

- Frequentierung:

Eine hohe Frequentierung an Touristen und Freizeitsuchenden ist entscheidend für die Effizienz des Pfalzfinders. Hierbei sollen nicht nur Rad-, sondern auch Wander- und „Autotouristen“ die Möglichkeit haben, das System zu nutzen. Daher bieten sich Standorte wie Rastplätze, Aussichtspunkte, Kreuzungspunkte verschiedener Rad- oder Wanderwege und bestehende Informationspunkte für die Aufstellung der Hinweistafeln an.

- Aufenthaltsqualität

Die Standorte der einzelnen Stationen des Pfalzfinders müssen über eine gewisse Aufenthaltsqualität verfügen. Schließlich sollte sich der Nutzer an dem jeweiligen Ort wohl fühlen, um sich mit den bereitgestellten Inhalten informieren zu können.

- Beschilderung

Die Schilder mit den QR-Codes müssen so aufgestellt werden, dass sie deutlich erkennbar und ohne Probleme zugänglich sind. Entsprechend bietet es sich an, bereits bestehende Hinweisschilder und Informationstafeln um die QR-Code-Hinweistafeln zu ergänzen. Des weiteren ist zu gewährleisten das die Schilder auffällig platziert werden.

- Infrastrukturelle Anbindungen

Die Standorte des Pfalzfinders sollten so ausgewählt werden, dass sie über eine Anbindung an die umliegenden Orte, Direktvermarkter und Sehenswürdigkeiten verfügen.

4.2 Ausbaustufen und Erweiterungen

In der ersten Ausbaustufe des Pfalzfinders erstrecken sich die einzelnen Stationen entlang des gesamten Rheinradweges. Insbesondere wurde dabei auf eine gesicherte Mobilfunknetzabdeckung geachtet. Allerdings stellt sich das Problem, dass nicht an allen Stationen eine gesicherte UMTS-Netzabdeckung vorhanden ist. Längerfristig gesehen kann diese Problematik aufgrund des Netzausbaus mit dem neuen Mobilfunkstandard LTE (Long-Term-Evolution), der auch im ländlichen Raum sehr schnelle Datenübertragungsraten gewährleisten soll, vernachlässigt werden. Dann können auch die Stationen an denen nur ein EDGE-Mobilfunknetz verfügbar um multimediale Inhalte erweitert werden.

Für die flächendeckende Verfügbarkeit des Pfalzfinders sollen im weiteren Projektverlauf weitere touristisch attraktive Standorte, die ebenfalls über eine ausgesprochen hohe Frequentierung verfügen, mit QR-Code-Schildern ausgestattet werden (z.B. Freizeitparks, Schwimmbäder, historische Bauten in den Ortschaften). Letztendlich sollen alle Sehenswürdigkeiten und touristische Destinationen im gesamten Landkreis Germersheim mit dem System ausgestattet werden. Der Ausbau des Systems wird insbesondere durch das Point-of-Interest-Management-System garantiert und kann zügig erfolgen. Hier können ausgewählte, lokal engagierte Akteure sowie die Mitglieder des Südpfalz-Tourismus e.V. schnell und einfach neue Standorte generieren und garantieren dabei gleichzeitig als touristische Fachleute die Qualität der Inhalte sowie den idealen Standort. Gleichzeitig ist mit der automatischen Schildergenerierung ein kostengünstiger Ausbau des Pfalzfinders zu einem flächendeckenden mobilen Informationssystem gewährleistet – es fallen lediglich die Druckkosten für die QR-Code-Schilder an.

Durch das Point-of-Interest-Management-System und der Web-App bietet das System Pfalzfinder generell umfassende Möglichkeiten zur Erweiterung. Neben der problemlosen Erstellung von neuen Standorten und der leichten Erweiterung der Standortinformationen mit multimedialen Inhalten wie Infotainmentvideos, bietet der neue Webstandard html5 in Zukunft noch weitaus mehr Möglichkeit des Einbindens neuer Anwendungen, denn es ist zu erwarten, dass die in 2.2. angesprochenen Defizite hinsichtlich des Zugriffs auf einige Funktionen des Smartphones überwunden werden. Dann ließen sich auch beispielsweise Augmented Reality (AR) Anwendungen realisieren, ohne dass eine gesonderte native App programmiert werden muss. Mittels AR können dem Nutzer zusätzliche und besonders interessante Standortinformationen bereit gestellt werden – beispielsweise lassen sich nicht mehr existente Bauwerke als 3D-Modell in das Live-Bild der Smartphone-Kamera einblenden

5 ZUSAMMENFASSUNG

Das Beispiel des Projektes Pfalzfinder zeigt, wie eine verhältnismäßig kleine Tourismusregion ein mobiles Informationssystem realisieren kann, das exakt auf die Bedürfnisse der touristischen Zielgruppe und der lokalen Akteure abgestimmt ist. Die technische Umsetzung mit Hilfe einer mobilen Webseite, eines angeschlossenen POI-Management-Systems und der Schnittstelle zu Deskline 3.0 gewährleistet die Erreichbarkeit einer möglichst großen Gruppe an Endnutzern, die flexible Erweiterung durch die lokalen Akteure und die dauerhafte Aktualität und Qualität der angebotenen Informationen. Somit profitieren nicht nur Touristen vor Ort von einen Informationen mit Mehrwert, sondern auch die regionalen Akteure, die nun mit dem Pfalzfinder eine effektive Möglichkeit besitzen, ihre Angebot zu vermarkten. Insbesondere die landwirtschaftlichen Direktvermarkter dürften hiervon profitieren, da Touristen nun auf die oft abgelegenen Höfe hingewiesen werden und durch die Navigationsmodule des Pfalzfinders diese leichter erreichen können.

Allerdings stellt der Pfalzfinder in seiner derzeitigen Ausrichtung nur eine spezifische Lösung für den Landkreis Germersheim dar. Es gilt demnach bei der Konzeption von (regionalen) mobilen Informationssystemen explizit auf die Bedürfnisse der lokalen Akteure und der definierten Zielgruppen zu achten. Nur wenn die Kategorisierung der Inhalte und die Ausgestaltung von Informationen auf Basis einer fundierten Analyse der Region und des Angebotes erfolgen, kann ein regionales mobiles Informationssystem Erfolg haben.

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Der Weg zum Smart Citizen – soziotechnologische Anforderungen an die Stadt der Zukunft

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1 ABSTRACT

Die Bereitstellung von Infrastruktur und sozialen Dienstleistungen sowie die Gewährleistung einer hohen Lebensqualität für eine wachsende und immer stärker diversifizierte Stadtbevölkerung stellen vor dem Hintergrund der Umweltbelastungen und des steigenden Ressourcenverbrauchs eine der größten Herausforderungen für Städte dar. In Hinblick auf die ökologische, ökonomische und soziale Stadt der Zukunft wird dem Konzept der Smart Cities deshalb großes Potential zugeschrieben. In diesem Zusammenhang werden häufig neue Technologien, besonders im Bereich IKT, Energie und Mobilität entwickelt und eingesetzt, wobei jedoch gesellschaftliche und nutzerorientierte Ansprüche zu wenig beachtet werden. Das führt zu dem Problem, dass diese neuen Technologien nicht angenommen werden oder nicht die gewünschten Erfolge erzielen. Voraussetzungen, um die technologischen Entwicklungen zu etablieren, sind einerseits die interdisziplinäre Zusammenarbeit von Politik, Wirtschaft und Wissenschaft, um eine gemeinsame Vision, Vorgaben und regulative Grundlagen zu schaffen, ein hohes Bildungsniveau (Human- und Sozialkapital) sowie die Berücksichtigung der Diversität der Stadtbevölkerung. Andererseits ist vor allem die Einbindung der Stadtbevölkerung in Entscheidungsprozesse sowie die Etablierung von Technologien, die Bewusstseinsbildung und Partizipation in der Bevölkerung erhöhen, ausschlaggebend.

Um herauszufinden, wie diese gesellschaftlichen Ansprüche in Hinblick auf eine nachhaltige Stadtentwicklung umgesetzt werden können, wurden 20 Experteninterviews mit Stakeholdern aus verschiedenen Bereichen geführt, um den bisherigen Einsatz von Technologien durch die Bevölkerung sowie die Bereitschaft der Gesellschaft zur Nutzung dieser Systeme zu erheben. Dabei zeichneten sich Forderungen nach einem Smart Citizen, einem mündigen, selbstbestimmten und für Umweltbelange sensibilisierten Bürger ab, der gewillt ist, aktiv am Stadtgeschehen teilzunehmen und nachhaltig zu handeln. Aufbauend auf den gewonnenen Erkenntnissen wurde ein dreistufiger Prozess (Problemorientierte Bewusstseinsbildung, Akzeptanz der technologischen Erneuerungen, langfristige Umsetzung einer nachhaltigen Stadtentwicklung) abgeleitet, der den Weg der Bürger in Richtung dieses Smart Citizen beschreibt.

2 EINLEITUNG

Seit 2008 lebt mehr als die Hälfte der Weltbevölkerung (3,3 Milliarden Menschen) in Städten bzw. Megastädten und die Tendenz ist steigend, 2030 werden es rund 5 Milliarden Menschen (80% der Weltbevölkerung) sein. Diese Entwicklung führt zu einer Veränderung der städtischen Strukturen, die neue Herausforderungen entstehen lässt. Mit dem rasanten Bevölkerungswachstum gehen Probleme wie Umweltbelastungen, Armut, Überalterung der Bevölkerung, Segregation, wirtschaftliche, soziale, politische und ethnische Ungleichheiten, Wohnraummangel, steigender Ressourcenverbrauch oder Schwierigkeiten in der Bereitstellung von Infrastruktur, sozialen Dienstleistungen und der Daseinsvorsorgen einher (UNFPA 2007). Um vor dem Hintergrund des steigenden Ressourcenverbrauchs und der Umweltbelastungen eine hohe Lebensqualität für eine immer stärke diversifizierte Stadtgesellschaft zu gewährleisten, wird dem Konzept der Smart Cities, das den Ansatz einer ökologisch, ökonomisch und soziale gerechten Stadt vertritt, großes Potential zugeschrieben. Während in Caragliu et al. (2009, S. 6) neben technologischen Entwicklungen Investitionen in Human- und Sozialkapital, nachhaltiges wirtschaftliches Wachstum, hohe Lebensqualität, schonender Umgang mit Ressourcen und partizipative Governance gefordert werden, beschäftigen sich sehr viele „Smart Cities“ Projekte ausschließlich mit der Entwicklung und Umsetzung neuer Technologien in den Bereichen Energie, Mobilität und moderner Informations- und Kommunikationssysteme (IKT). Gesellschaftliche und nutzerorientierte Ansprüche werden dabei zu wenig beachtet. Dies führt zum Problem, dass diese neuen Technologien nicht angenommen werden bzw. nicht die gewünschten Erfolge erzielen.

Um Lösungsansätze entwickeln zu können, die gesellschaftliche und technologische Ansprüche in Hinblick auf eine nachhaltige Stadtentwicklung vereinen und eine ökologisch, ökonomisch und sozial verträgliche Stadt der Zukunft ermöglichen, wurden 20 Experteninterviews mit Stakeholdern aus den Bereichen Stadtplanung und –verwaltung, Energie, Mobilität, Gebäude- und Infrastrukturmanagement geführt. Ziel der

Erhebung war es festzustellen, auf welche Weise Technologien eingesetzt werden können, wie die Bereitschaft der Gesellschaft zur Nutzung dieser Systeme forciert werden kann und welche Voraussetzungen und Rahmenbedingungen dafür gegeben sein müssen. Der Rest dieses Papers ist folgendermaßen strukturiert. In Abschnitt 3 werden technische und gesellschaftliche Voraussetzungen sowie Rahmenbedingungen für nachhaltige Städte der Zukunft beschrieben. Darauf und auf den Ergebnissen der Experteninterviews aufbauend, wird im Abschnitt 4 auf den Prozess zum Smart Citizen, den intelligenten und informierten Bürger, der bereit ist Verantwortung für seine Stadt zu übernehmen, eingegangen.

3 SOZIOTECHNOLOGISCHE VORAUSSETZUNGEN UND RAHMENBEDINGUNGEN

Um eine ökologisch, ökonomisch und sozial nachhaltige Stadtentwicklung unter Einbindung der Stadtgesellschaft gewährleisten zu können, müssen sowohl technologische Voraussetzungen wie auch gesellschaftliche und regulative Rahmenbedingungen gegeben sein.

Abbildung 1: Tagcloud – Handlungsfelder für eine nachhaltige Stadt der Zukunft. Datenquelle: Experteninterviews

Expertinnen und Experten sehen den Handlungsbedarf von Städten der Zukunft vor allem in den Bereichen Energie, Mobilität, Wirtschaft und Bildung. Die Maßnahmen in diesen Bereichen zielen darauf ab, die Klimaziele (Kyoto-Ziele) zu erreichen, einer hohen Lebensqualität inklusive lebenswerter öffentlicher Räume sowie eine transparente und effektive Stadtsteuerung und Verwaltung mit Partizipationsmöglichkeiten zu gewährleisten (vgl. Abbildung 1). Die Handlungsfelder sind daher sehr unterschiedlich und erstrecken sich von Infrastruktur und Daseinsvorsorge (Energie, Mobilität, Ver- und Entsorgung) über Wirtschaft und Forschung, Bildung und Kultur sowie Governance bis hin zum Bereich der Umwelt und Ressourcenschonung.

3.1 Technische Voraussetzungen

Die technische Voraussetzung für intelligente und nachhaltige Städte der Zukunft besteht laut Expertenmeinung vor allem in der Systemintegration über IKT-Systeme und der Vernetzung der unterschiedlichen Bereiche wie z.B. in der Vernetzung von Daten aus den Bereichen Energie, Verkehr, Ver- und Entsorgung für Stadt- und Raumplanung und zu Verbesserung der Lebensqualität der Bewohnerinnen und Bewohner. Basistechnologien sind eine flächendeckende Abdeckung mit Bereitbandkommunikation, intelligente Verteilungsnetze für die Energieversorgung und –verteilung, moderne Sensornetze, die über Machine-to-Machine-Kommunikation Vorteile in den Bereichen Energie, Logistik, Verkehrstechnik und Verwaltung mit sich bringen sowie eine City Data Cloud als hocheffiziente IT-Struktur, die staatliche und unternehmerische Informationen und Daten einer Stadt integriert (Schieferdecker et al. 2011, S. 15-16).

Aufgrund des steigenden Energiebedarfs, vor allem an Strom, müssen neue technologische Möglichkeiten gefunden werden, diesen Bedarf umweltverträglich zu decken. Technische Entwicklungen in den Bereichen der Gebäudeintegration von Energieerzeugungstechnologien, Technologien zur kaskadischen Ressourcennutzung (Abwärmenutzung aus Industrieprozessen, Abwasserkanälen, Biogaserzugung aus Kläranlagen oder biogenen Abfällen, Wiederverwerung von städtischen Ressourcen wie z.B.Bauschutt) sowie zur Energie- und Stoffspeicherung stellen Lösungsansätze dar. Performanceindikatoren sowie eine

Abschätzung der Technikfolgen zählen zusätzlich zu den notwendigen Schritten, um über technologische Ansätze ökonomisch, ökologisch und sozial gerechte Städte zu ermöglichen (Saringer-Bory et al. 2011).

Weitere Forderungen im Zusammenhang mit Smart Cities beziehen sich auf eine integriete Raum-, Verkehrs- und Energieplanung. Auf technologischer Seite gibt es hierfür auch schon Ansätze wie LIVE! Singapore, ein Plattform die das Leben in der Stadt in Echtzeit wiederspigeln soll und zum Ziel hat, Entscheidungsträgern neue Perspektiven zu eröffnen und Bürgerinnen und Bürgern neue Services zu bieten. Das innovative an dieser Plattform ist die Einbindung der Bewohnerinnen und Bewohner der Stadt, die über Smartphones oder das Mobilfunknetz als wichtige Informationsliferanten ins System eingegliedert werden (Kloeckel et al. 2011). Für die Stadtbevölkerung sind Technologien zur Kommunikation und ganz besonders für die Informationsbeschaffung (Energieverbrauch, Verkehrsinformation, Partizipationsmöglichkeiten, etc.) von Bedeutung. Dazu müssen jedoch Methoden zur Datenauswertung und Interpretation entwickelt werden, die das Verständnis der urbanen Komplexität für die Bevölkerung sowie für die Entscheidungsträger erleichtern.

Für einen Großteil der befragten Expertinnen und Experten ist die Frage nach nachhaltigen, zukunftsfähigen Städten keine technologische. Ihrer Meinung nach werden Technologien im Zusammenhang mit Smart Cities oft überschätzt, da die meisten Technologien bereits vorhanden sind und nur noch besser vernetzt und ausgebaut werden müssten. Demnach ist nachhaltige Stadtentwicklung keine rein technologische Problemstellung sondern vielmehr eine gesellschaftliche bzw. eine der Technikakzeptanz. Viele Technologien werden und wurden schon entwickelt, werden jedoch nicht angenommen oder erzielen nicht die gewünschten Erfolge. Dies ist darauf zurückzuführen, dass einerseits zu wenig Bewusstseins zur Verhaltensänderung bei der Bevölkerung sowie wie bei den Akteuren seitens der Stadt vorhanden ist und dass andererseits bei der Entwicklung der technologischen Lösungen zu wenig auf die nutzerorientierten und gesellschaftlichen Ansprüche eingegangen wird.

3.2 Gesellschaftliche Voraussetzungen

Nachhaltige Städte der Zukunft setzen vor allem gesellschaftliche Veränderungsprozesse voraus. Das Ziel dieser Prozesse sind Smart Citizens, intelligente und informierter Bürger, die breit sind in einer Kultur der Beteiligung und Partizipation, (ökologische) Verantwortung zu übernehmen und die Stadt nach ihren Bedürfnissen nachhaltig zu gestalten.

Um eine zukunftsfähige Stadtgesellschaft zu erreichen, sind einerseits Veränderungsprozesse und Bewusstseinsbildung bei den Entscheidungsträgern und andererseits bei der Bevölkerung selbst notwendig. So ist eine interdisziplinäre Zusammenarbeit von Politik, Wirtschaft und Wissenschaft von besonderer Bedeutung, um gemeinsame Visionen, Ziele und Vorgaben sowie regulative Grundlagen für die Stadt der Zukunft entwickeln zu können. Zudem muss der gesellschaftliche Rahmen, der sich durch eine immer diversifiziertere Gesellschaft und einer Pluralität der Lebensstile auszeichnet, beachtet werden. Die Basisvoraussetzungen für eine zukunftsfähige Stadtgesellschaft sind eine gerechte Wohlstandsverteilung, die Gewährleistung der Daseinsvorsorge, ein ausgezeichnetes Bildungssystem, welches „lebenslanges Lernen“ ermöglicht sowie die Einbindung der Bevölkerung in Partizipationsprozesse.

Um Bewusstseinsbildung zu schaffen und einen Wertewandel in der gesamten Gesellschaft zu ermöglichen ist laut Expertinnen und Experten besonders auf die unterschiedlichen Lebensstile der Stadtbewohnerinnen und Stadtbewohner sowie auf die Förderung der sogenannten Urban Diverstity zu achten. In der Soziologie wird „Lebensstil“ als „der regelmäßig wiederkehrende Gesamtzusammenhang der Verhaltensweisen, Interaktionen, Meinungen, Wissensbestände und bewertenden Einstellungen eines Menschen“ (Hradil 2005, S.46) bezeichnet, der nach Pierre Bourdieu (1987) von der klassenspezifischen sozialen Lage (Beruf, Einkommen, Bildung, Arbeitsplatz, Wohngegend, Freizeit) abhängig ist und bestimmte Verhaltensweisen (Kultur, Nahrung, Selbstdarstellung, Denk- und Handlungsmuster) mit sich bringt (Christmann 1999). Werden nun Maßnahmen zur Bewusstseinsbildung und Verhaltensänderung gesetzt oder geplant, muss auf die unterschiedlichen Lebensstile der Menschen geachtet werden, um einen möglichst großen Teil der Stadtgesellschaft erreichen zu können. Besonders wichtig dabei ist die Aufbereitung von Informationen, welche unbedingt auf die Bedürfnisse der Bevölkerung abgestimmt werden müssen, um keine Gruppen auszuschließen.

Urban Diversity wurde bereits in den 1960er Jahren von der Stadt- und Architekturkritikerin Jane Jakobs als Grundlage für Lebensqualität, Wirtschaftswachstum und die Attraktivität von Städten bezeichnet. In ihren

Werken fordert sie eine vielfältige, gewachsene städtische Struktur, mit Funktionsdurchmischung und hoher Dichte, die lebendigen Nachbarschaften in kleinteiligen, ungeplanten Quartieren ermöglicht (Jacobs 1961). In dieselbe Richtung gehen auch die Forderungen der Expertinnen und Experten, so wird unter dem Schlagwort „Stadt der kurzen Wege“ eine intelligente Stadtplanung mit hohen Dichten, Funktionsdurchmischung und ein lebendiger öffentlicher Raum gefordert. Dies hat die Erhöhung der Effektivität des öffentlichen Verkehrs, eine Verkehrsreduktion, Einsparungen im Energiebereich sowie ganz besonders die Erhöhung der Lebensqualität durch „Grätzelbildung“, Gemeinschaft und Kommunikation innerhalb des Stadtviertels zum Ziel. Die dadurch entstehende Identifikation mit der eigenen Wohnumgebung fördert wiederum die Bereitschaft, Eigenverantwortung für den eigenen Lebensraum bzw. die eigene Stadt zu übernehmen und aktiv zu werden.

Dies führt zu einer weiteren, äußerst wichtigen gesellschaftlichen Voraussetzung: der Einbindung der Stadtbevölkerung in Entscheidungsprozesse. Erfolgreiche Bürgerpartizipation kann jedoch nur dann stattfinden, wenn eine sogenannte „Kultur der Partizipation“ vorhanden ist, was wiederum vor allem eine gut gebildete, informierte und eigenverantwortliche Bevölkerung bedingt. Die Stadtgesellschaft muss sich mit ihrem Lebensraum identifizieren, die Probleme der Stadt erkennen und offen und flexible genug sein, um Veränderungen und Neues zuzulassen. Andererseits muss auch seitens der Entscheidungsträger Vertrauen in das Urteilsvermögen der Bevölkerung gegeben sein, d. h. Probleme, Anliegen, Verbesserungsvorschläge müssen ernst genommen und Projekte, die unter Einbindung der Bevölkerung geplant wurden, umgesetzt werden.

3.3 Soziotechnologische Voraussetzungen

In der Literatur wird der Begriff „soziotechnologisch“ bzw. „soziotechnisch“ immer im Zusammenhang mit dem Begriffen „System“ oder „Prozess“ verwendet. Er geht auf den soziotechnischen Gestaltungsansatz des englischen Tavistock Institutes, das sich mit sozialwissenschaftlicher Forschung und Arbeitsorganisation befasste, zurück. Demnach zielt ein soziotechnischer Prozess auf eine gemeinsame Optimierung sozialer und technischer Systeme ab (Maucher et al. 2002) und kann als Bindeglied zwischen Mensch, Technik und Organisation verstanden werden (Sylvester 2008). Die Stadt kann als soziales System gesehen werden, bei dem starke Verflechtungen mit Technologien zu erkennen sind. Eine optimale Verbesserung des Systems, d.h. die Entwicklung zu einer ökologisch, ökonomisch und sozial nachhaltigen Stadt, kann daher nur erfolgen, wenn soziale bzw. gesellschaftlich und technologische Veränderungen aufeinander abgestimmt passieren.

Besonders in den Bereichen der Bürgerpartizipation und Bürgerinformation aber auch im Verkehrssystem (Ticketing, Routenplanung,…), in der Bildung, im Energiebereiche, etc. kommen in der Stadt immer häufiger neue Technologien zum Einsatz. Viel zu oft werden diese Technologien entwickelt und eingesetzt, ohne die gesellschaftlichen und nutzerorientierten Ansprüche zu beachten. Das führt zu dem Problem, dass diese nicht angenommen werden oder nicht die gewünschten Erfolge erzielen. In diesem Zusammenhang ist die Technikakzeptanz innerhalb der Bevölkerung von besonderer Bedeutung. Unter Technikakzeptanz wird die „grundsätzliche Aufgeschlossenheit gegenüber technsichen Innovationen“ verstanden, die „einerseits Voraussetzung für einen sachlich-aufgeklärten Meinungsbildungsprozess und andererseits wesentlicher Bestandteil […] wirtschaftlicher Modernisierung und Wettbewerbsfähigkeit eines Standorts ist“ (Kornwachs et al. 2011, S. 7). Mehrere Gründe führen dazu, dass neue technologische Lösungen nicht akzeptiert werden: Diese sind einerseits die Angst, die Kontrolle über die eigene Lebenswelt zu verlieren sowie die Furcht vor realen oder vermuteten Umweltproblemen, negativen Gesundheitsauswirkungen oder Eingriffe in die Privatsphäre. (Kornwachs et al. 2011). Andererseits schrecken Personen vor neuen Technologien zurück, wenn diese sehr kompliziert sind/erscheinen bzw. die potentiellen Nutzerinnen und Nutzer mit diesen nicht vertraut sind. Zudem sind fehlende Transparenz (Datenschutz, Schutz der Privatsphäre) oder unzureichendes Verständnis für den Nutzen der Technologien Gründe dafür, dass es zu einer Ablehnung kommt.

4 DER WEG ZUM SMART CITIZEN

Aufbauend auf den oben dargestellten Erkenntnissen zu technologischen, gesellschaftlichen und soziotechnischen Voraussetzungen für eine Smart City zeichnet sich ein dreistufiger Prozess zur Förderung der Akzeptanz und aktiven Umsetzung nachhaltiger Maßnahmen in der städtischen Bevölkerung ab (vgl. Abbildung 2). Im folgenden Kapitel soll näher auf die einzelnen Stufen (problemorientierte

Bewusstseinsbildung, Akzeptanz der technologischen Erneuerungen, langfristige Umsetzung einer nachhaltigen Stadtentwicklung) eingegangen werden.

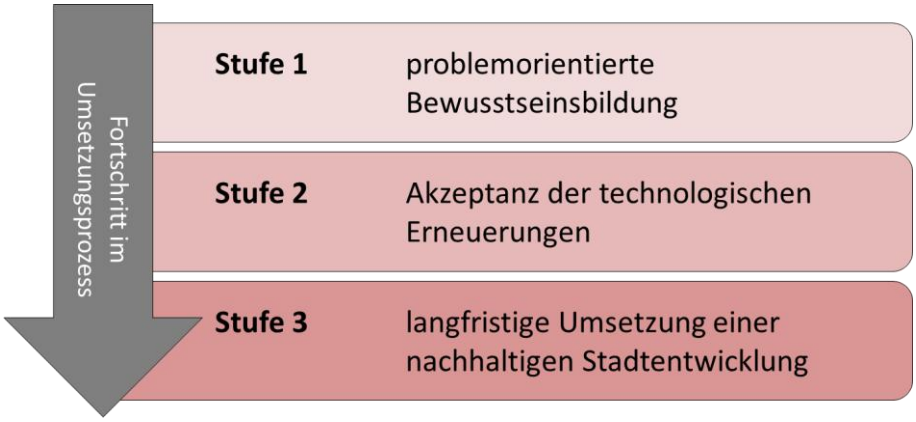

Abbildung 2: Übersicht über die Prozessstufen

Dabei ist es von Bedeutung, negative Assoziationen der Bürger, die durch Veränderungen in ihrem direkten Lebensumfeld hervorgerufen werden, zu vermeiden und stattdessen positive Anreize für nachhaltige Verhaltensweisen zu schaffen. Nur so kann sichergestellt werden, dass (technische) Neuerungen einerseits angenommen und in den Lebensalltag integriert werden und andererseits zu einer bewussten Teilnahme der Bürger bei der Umsetzung nachhaltiger Strategien motivieren.

4.1 Problemorientierte Bewusstseinsbildung

Der erste und wesentlichste Schritt, der von einem Großteil der Expertinnen und Experten aller Bereiche identifiziert wurde, ist jener der problemorientierten Bewusstseinsbildung in Hinblick auf Themen der Nachhaltigkeit (vgl. Abbildung 3).

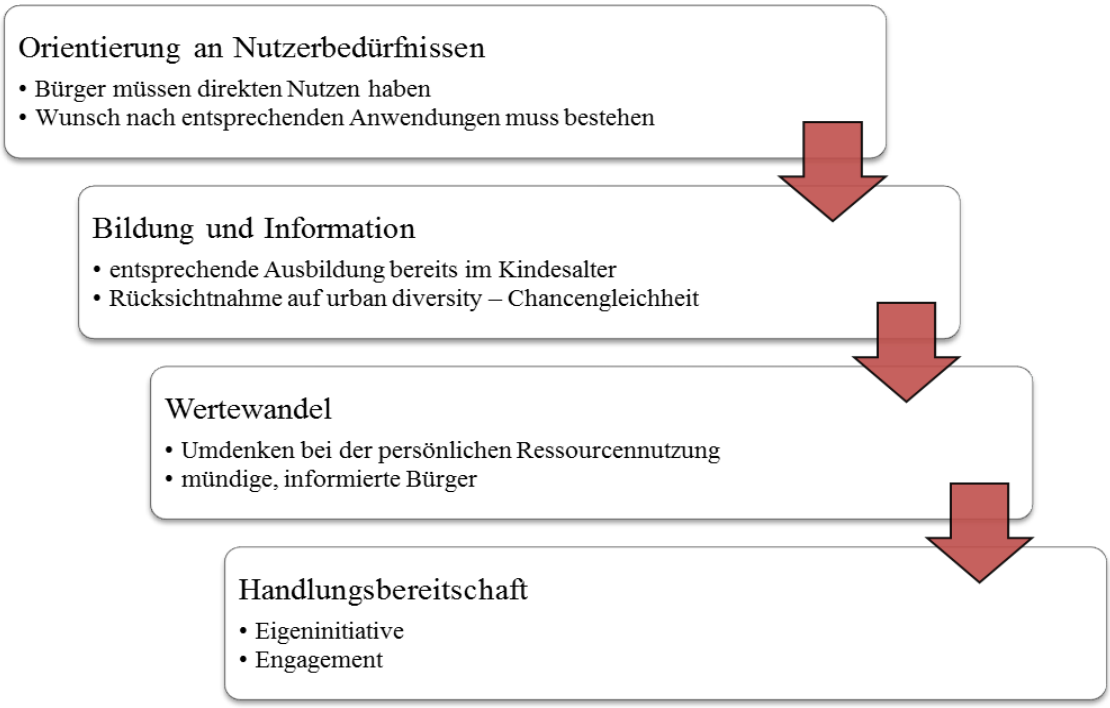

Abbildung 3: Stufe 1 – Bewusstseinsbildung

So wird vermehrt darauf hingewiesen, dass der Einsatz der Smart City-Technologien den Bürgerinnen und Bürgern einen direkten Nutzen bringen muss, der den Wunsch nach entsprechenden Anwendungen fördert. Um diesen Bewusstseinswandel in der Bevölkerung herbeiführen zu können, ist es nach Ansicht der Experten nicht zielführend, technologische Entwicklungen am technisch Machbaren zu orientieren, sondern auf tatsächliche Nutzerbedürfnisse einzugehen.

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Ebenso muss auf Seiten der Bürger ein Verständnis für städtische Problematiken geschaffen werden, welches dazu führt, dass ein selbst initiiertes Umdenken in Hinblick auf das eigene Verhalten stattfindet. Von Experten aus dem Forschungssektor geht hierbei beispielsweise die Forderung nach einer zielgruppenspezifischen Bildung und Information in Bereichen wie Energieverbrauch oder Mobilitätsnutzung aus. Als Beispiel wurde hier etwa ein öffentlich zugängliches Informationssystem genannt, welche die Feinstaubbelastung, den ökologischen Fußabdruck des Einzelnen in Bezug auf das jeweilige Mobilitätsverhalten sowie andere ökologische Parameter darstellt. Ziel dieser Maßnahme soll es beispielsweise sein, die Bürgerinnen und Bürger zu einem Umdenken bei der Verkehrsmittelwahl zu motivieren.

Dabei herrscht bei den Befragten Einigkeit darüber, dass eine solche Verhaltensänderung vor allem einen individuell wahrnehmbaren Nutzen für die Bürger haben muss. Um dies zu gewährleisten, bedarf es einer Orientierung der Bewusstseinsbildungsmaßnahmen an den unterschiedlichen Zielgruppen und Lebensstilen der Menschen. So muss nach Ansicht von städtischen Interessensvertretern eine nachhaltigkeitsorientierte (Aus)Bildung bereits im Kindesalter ansetzen, um bereits jungen Bevölkerungsschichten entsprechende Vorbilder im Umgang mit natürlichen Ressourcen zu liefern. In diesem Sinne äußerten die befragten Expertinnen und Experten auch den Wunsch nach Investitionen in das Bildungssystem sowie in eine gezielte Lehrer- und Pädagogenausbildung; auch der Begriff des „lebenslangen Lernens“ wurde mit diesem Bildungsprozess in Zusammenhang gebracht. Zudem wurde die Einbeziehung und Chancengleichheit weniger privilegierter Gesellschaftsschichten in den bzw. im Bewusstseinsbildungsprozess gefordert. Wie von Nachhaltigkeitsforschern und Raumplanern unterstrichen, ist somit ein neuer Bildungsansatz notwendig, der durch gezielte Informationen zu städtischen Problembereichen verantwortungsbewusste und „mündige Bürger“ hervorbringt und das Potential besitzt, die Eigeninitiative und das Engagement der Bevölkerung zu steigern.

4.2 Akzeptanz der technologischen Erneuerungen

Existiert bereits ein Problembewusstsein für Themen der städtischen Nachhaltigkeit, bedarf es auch einer möglichst flächendeckenden Akzeptanz der Bevölkerung für die neuen Technologien, welche in Smart Cities eingesetzt werden (vgl. Abbildung 4).

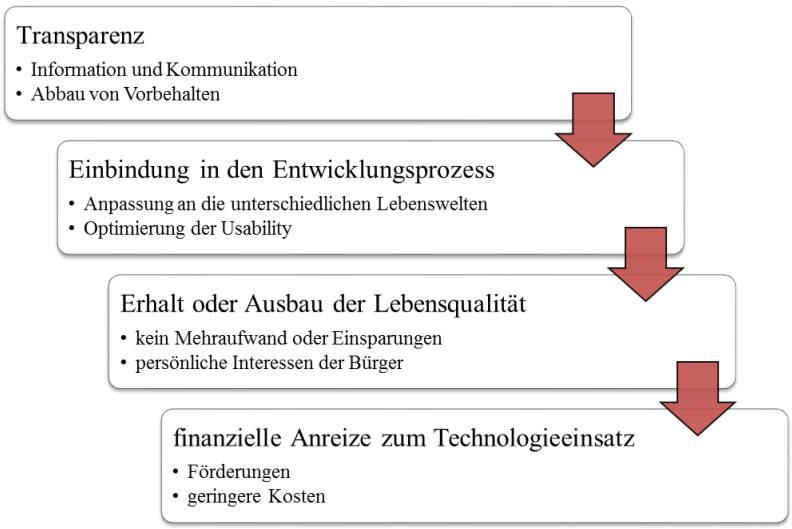

Abbildung 4: Stufe 2 – Akzeptanz technologischer Erneuerungen

Auch hierbei stellen Information und Kommunikation wesentliche Kriterien dar, weil die dadurch entstehende Transparenz Expertinnen und Experten zufolge die Vorbehalte gegenüber neuer Technologien eindämmt. Diese Transparenz sollte sich dabei sowohl auf geplante (auch weniger „populäre“) Maßnahmen als auch auf die Entscheidungsprozesse, die zur Etablierung der Maßnahmen führen, beziehen. Die Konsequenzen der Erneuerungen für das eigene Leben bzw. den eigenen Alltag sollten daher von den Anbietern sowie Akteuren aus Politik, Wirtschaft und Gesellschaft möglichst verständlich kommuniziert werden. Neue Technologien müssen als Hilfsmittel zum besseren Verständnis komplexer Systeme verstanden werden und die entsprechende Nutzerfreundlichkeit aufweisen. Wie schon bei der Bewusstseinsbildung ist auch hier eine Anpassung an die unterschiedlichen Lebenswelten potentieller

Nutzerinnen und Nutzer notwendig, um auch weniger technikaffinen Bevölkerungsschichten die Handhabung zu ermöglichen. Besonderer Stellenwert kommt in diesem Zusammenhang der Usability, der Nutzerfreundlichkeit zu. Als möglicher Ansatzpunkt zur Optimierung der Usability wurde hier von einigen Interviewpartnern eine Einbindung der unterschiedlichen Akteure in den Entwicklungsprozess der zu nutzenden Technologien vorgeschlagen. Ebenso muss für die Nutzer Datenschutz und Sicherheit in der Anwendung gewährt werden.

Zudem darf nachhaltiges Verhalten für die Bürger nicht mit einem Mehraufwand oder Einsparungen im persönlichen Bereich verbunden sein, was zu einer Assoziation des Lebensstilwandels mit Einschränkungen des persönlichen Komforts und der Lebensqualität führt. In diesem Zusammenhang wurde von mehreren Experten unterstrichen, dass eine ökologisch, ökonomisch und sozial nachhaltige Stadt der Zukunft die Lebensqualität aller Bewohner erhöht, jedoch auch enormes Konfliktpotential mit sich bringt. So sind für gewisse Personengruppen durchaus unpopuläre Maßnahmen wie die Forcierung des Umweltverbundes auf Kosten des motorisierten Individualverkehrs, etc. notwendig. Als Lösungsansatz wurde hier jedoch auf eine zielgruppenorientierte Bewusstseinsbildung (vgl. 4.1) verwiesen. Im Allgemeinen müssen die öffentlichen Interessen von Entscheidungsträgern in Hinblick auf urbane Entwicklungen mit den persönlichen Interessen der Bürger vereinbar sein. Dies kann etwa durch den Einsatz gezielter Anreize und Förderungen geschehen, mit denen der Einsatz nachhaltiger Technologien (z.B. Photovoltaik- oder Solarzellen) „belohnt“ wird. Wie von einigen Befragten festgehalten, lässt sich Akzeptanz in vielen Fällen auch über den Preis bzw. Kosten erreichen, wenn die entsprechenden Technologien einen finanziellen Vorteil in der Anwendung nach sich ziehen.

4.3 Langfristige Umsetzung einer nachhaltigen Stadtentwicklung

Eine letzte Stufe stellt der Umsetzungsprozess dar, der nicht nur durch wirtschaftliche, wissenschaftliche und politische Stakeholder, sondern auch durch die Bürgerinnen und Bürger als Nutzer der Technologien getragen wird (vgl. Abbildung 5).

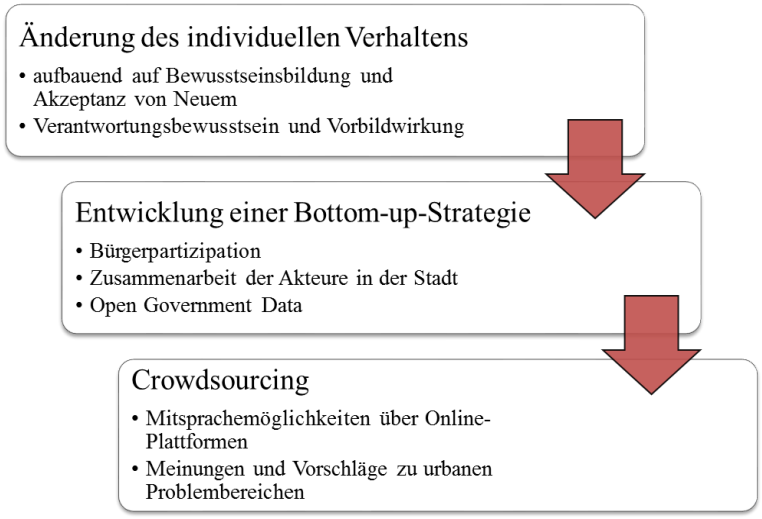

Abbildung 5: Stufe 3 – Langfristige Umsetzung von Maßnahmen

Dabei zeigt sich die Bedeutung der ersten zwei Stufen deutlich, da ein entsprechendes Bewusstsein für eine nachhaltige Stadtentwicklung und die Akzeptanz der damit verbundenen Veränderungen im persönlichen Umfeld wesentlich für eine sinnvolle Nutzung der zur Verfügung stehenden Technologien sind. Konkret bedeutet dies, dass eine Bereitschaft zur Verhaltensänderung vorhanden sein muss, um Maßnahmen zur Reduktion des Stromverbrauchs oder des CO2-Ausstoßes aktiv einzusetzen, auch wenn diese Maßnahmen vielleicht im Widerspruch zu bisherigen Verhaltensmustern stehen. Wie von einem der befragten Experten erwähnt, sieht das Konzept des „Smart Citizen“ vor, dass „jeder bei sich selbst beginnt“, sich also seiner Verantwortung für die Umwelt bewusst ist und eine Vorbildwirkung auf andere hat.

Wie bereits im vorigen Punkt ausgeführt, sehen Expertinnen und Experten aber auch die aktive Einbindung der Bevölkerung als wesentlichen Aspekt an, der die Bürgerinnen und Bürger über ihre Rolle als Anwender städtischer Technologien hinaus auch als Feedback- und Input-Lieferanten in Erscheinung treten lässt. Ein Stichwort, welches die befragten Experten in diesem Zusammenhang besonders häufig nannten, war jenes

der Bürgerbeteiligung, die es den Bürgern ermöglicht, selbst Ideen einzubringen. In vielen Fällen wurde diese Form der Einbeziehung als entscheidender Aspekt der Demokratieentwicklung genannt, der wesentlich zur Schaffung „intelligenter Bürger“ beitragen soll. Vor allem in Hinblick auf den permanenten Umbruch, dem Smart Cities unterliegen, wurde von Seiten der Politik und der Planer eine bottom-up-Strategie gefordert, die den Bürgern eine aktivere und verantwortungsvolle Rolle zugesteht und eine Zusammenarbeit der Akteure in der Stadt untereinander sowie mit der Stadtgesellschaft möglich macht. Um dies zu gewährleisten, tritt wieder die bereits im vorigen Schritt erwähnte Informationstransparenz in den Vordergrund, da eine qualifizierte Teilnahme an partizipatorischen Entscheidungsprozessen einen integrativen Blick auf die Problemstellung erfordern. Ein solches Informationsangebot steht den Bürgern beispielsweise in Form von Open Government Data online zur Verfügung. Wie vermehrt festgehalten wurde, muss sich die Bevölkerung selbst eine Meinung bilden können, Teil einer „flexiblen und offenen Gesellschaft“ mit einem hohen Maß an „Empowerment“ werden zu können.

Neben der klassischen Partizipation spielt aber auch „crowdsourcing“ eine wesentliche Rolle, welches die Mitsprachemöglichkeiten der Bürgerinnen und Bürger auf eine neue Ebene verlegt. Auf diese Weise steht für Interessierte die Option offen, über Online-Plattformen Meinungen und Vorschläge zu urbanen Problembereichen auszutauschen und die sonst meist nur auf einen Teil des Planungsprozesses eingeschränkte Beteiligung auf den gesamten städtischen Raum auszudehnen. Auch kann Feedback so schneller an die zuständigen Abteilungen weiter geleitet werden. Für die Akteure in der Stadtverwaltung bedeutet das jedoch, dass Meinungen und Vorschläge nicht nur gesammelt werden, sondern auch einer genauen Studie unterzogen werden müssen, um qualifizierte Beiträge direkt einbeziehen zu können. Nur so kann gewährleistet werden, dass engagierte Bürger, die ihre Ideen öffentlich kundtun, auch weiterhin zur Teilnahme motiviert werden können.

5 FAZIT

Wie anhand der Aussagen der befragten Expertinnen und Experten festgestellt werden konnte, bedarf der Entwicklungsprozess einer Stadt zur Smart City vor allem einer engagierten Bürgerschaft, die dazu bereit ist, sich auf neue Entwicklungen einzulassen und diese auch anzuwenden. Bewusstseinsbildung muss somit einerseits dem Abbau von Vorbehalten gegen neue Techniken und andererseits der Entwicklung eines Bewusstseins für nachhaltiges Verhalten dienen. Nur so kann in weiterer Folge eine Akzeptanz für urbane Entwicklungen, die sich außerhalb altbewährter Bahnen bewegen, in der Bevölkerung erreicht werden (vgl. Abbildung 6).

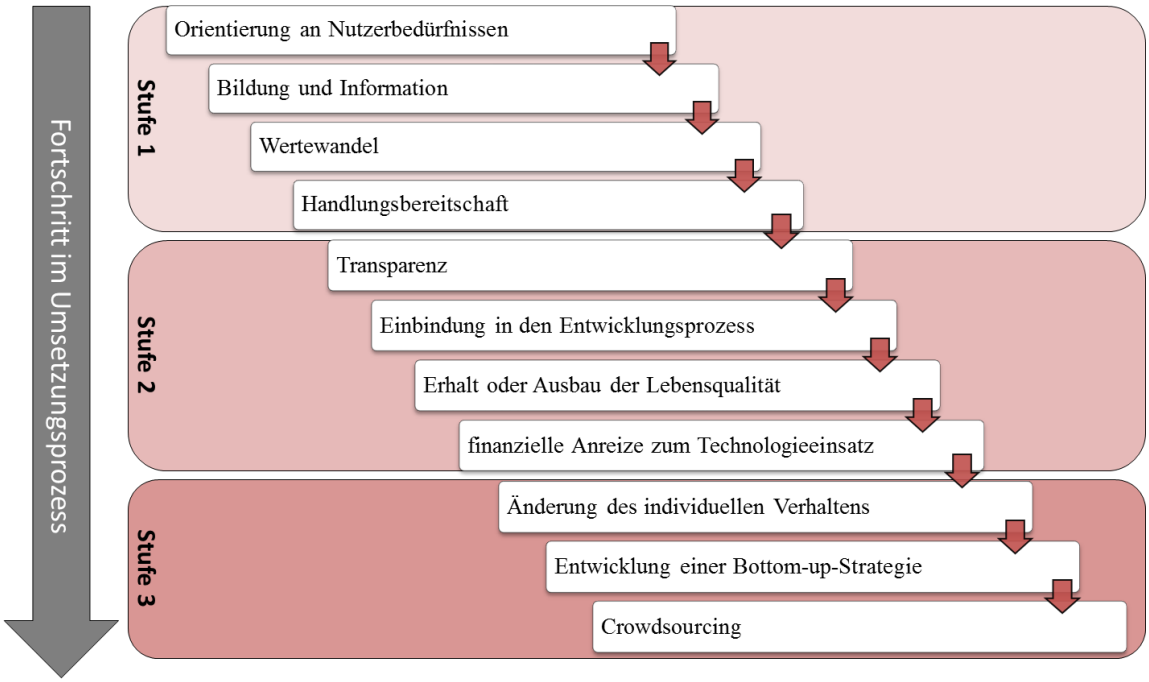

Abbildung 6: Zusammenfassung der Prozessstufen

Um dies zu erreichen, ist es für politische und wirtschaftliche Entscheidungsträger sowie für Technologieunternehmen notwendig, sich an den Nutzerbedürfnisse der Bürgerinnen und Bürger zu

orientieren und Entscheidungsprozesse sowie Informationsquellen transparent zu gestalten. Einige der Expertinnen und Experten sprachen sogar die Forderung nach einer aktiven Einbindung der Bevölkerung bei der Entwicklung von Maßnahmen und dem Einsatz partizipativer Ansätze aus. Hierbei ist es die Rolle der Verwaltung, die einzelnen Bevölkerungsschichten zielgerichtet (über den Einsatz verschiedener Methoden und Medien) zur Teilnahme zu motivieren und ihre Ideen auch aktiv aufzugreifen, um die Bereitschaft zur Meinungsäußerung durch konkrete Umsetzungsmaßnahmen zu stärken. Erste Ansätze in diese Richtung bieten in Wien beispielsweise die Mitte März 2012 eingerichteten Partizipationsportale „Wiener Charta" sowie „Wir sind mehr", die den Bürgern einen öffentlichen Austausch über stadtrelevante Themen erlauben. Längerfristig ist bei Projekten dieser Art jedoch zu bedenken, dass auch Bevölkerungsschichten, die vom privaten Technologieeinsatz ausgeschlossen sind, Zugang zu Informations- und Kommunikationsmedien haben müssen, um der Verwaltung ein sozial ausgewogenes Interessensbild der Gesellschaft zu liefern. Auch spielt hierbei die Wahl geeigneter Selektionsschemata für die Auswahl von Ideen eine wesentliche Rolle, da nicht alle Bürger durch eine einzige Lösung zufrieden gestellt werden können.

Zusammenfassend lässt sich somit festhalten, dass es für die Entscheidungsträger im Smart City-Entwicklungsprozess wesentlich ist, eine bottom-up-Strategie einzusetzen, die es den Bürgern ermöglicht, an der Strategiefindung mitzuwirken und dadurch ein Bewusstsein für eine nachhaltige Lebensweise und die dafür notwenigen Änderungen im eigenen Verhalten aufzubauen. Dabei ist es jedoch wesentlich, auch weniger priviligierte Bevölkerungsschichten durch die Bereitstellung ensprechender Informationstechnologien am Partizipationsprozess teilhaben zu lassen. Unter diesen Voraussetzungen kann es auch langfristig zu einem Umdenken in der Gesellschaft kommen, so dass diese dem von Expertinnen und Experten vielfach heraufbeschworenen Begriff des „Smart Citizen" auch gerecht werden kann.

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Development and Application of Urban Micro-Climate Management System for Creating Low-Carbon and Green City

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1 ABSTRACT

The Republic of Korea has established a diversity of strategies to cope with the climate change through a new policy paradigm called 'low-carbon green growth' since the past 2008, and it is being realized. This new paradigm suggested a far-reaching developmental guideline of low-carbon and green city creation, and for its concrete realization appeared the very Urban Renaissance Project.

This study is the result drawn through this Project, and its ultimate purpose is to develop a system that can compare & analyze the degree of micro-climate change consequent upon diverse planning elements in a project target site. Actually, it's true the elements belonging to micro-climate are really diverse. However, this study carried out its research by confining the micro-climate to wind and temperature for the sake of realizable possibility and concreteness. As a case target site for system evaluation, this study set the Urban Renaissance Zone in Gwangju Metropolitan City of central district of Korea. The developmental contents of the system and system evaluation results are summed up as follows:

First, this study designed the urban micro-climate management system so that macro-scale analysis module and micro-scale analysis module can be interlocked on the basis of the 3-dimensional virtual machine, through which it's possible to analyze cold wind formation & its flow at a wide area level and also to analyze the wind flows at a microscopic level.

Second, this study designed the system composition by dividing it roughly into data sector, analysis sector and expression sector for making it possible for its users to handle with ease.

Third, this study dealt with system management process. In all planning process, this study preferentially conducted the analysis of cold wind formation and wind flows at a wide area level, on the basis of which this study conducted the analysis of wind flows at a microscopic level, and then finally drew the optimum alternative for creating low-carbon and green city.

Fourth, this study drew the results of Pilot Study for evaluating the urban micro-climate system. First, there increased the wind by 0.6 m/s, and decreased the temperature by 0.4 °C through the creation of Traditional Theme Street. In case of Streamlet Street, there increased the wind 0.12 m/s, and decreased the temperature by 0.3 °C. In addition, in case of Central Square, there increased the wind by 0.26 m/s, and decreased the temperature by 1.0 °C. Additionally, through the creation of Waterfront Park, there appeared the greatest increase in the wind by 0.99 m/s while the temperature was found to decrease the most by 0.7 °C, showing that green space combined with waterfront creation was the most effective in improving micro-climate.

Through the results mentioned above, this study was able to understand the potential for the stability & applicability of the Urban Micro-Climate Management System. Nevertheless, this research thinks that should the reliability in the drawn result value and speed for drawing the analysis value back up, it could be a system with higher practical use, and additionally, if the practical function like the analysis of greenhouse gas emissions should be added, the effective value of this system would be more augmented.

2 INTRODUCTION

The microclimatic environmental change has recently caused the problems, such as wind flow impediment and heat island phenomenon due to the high-rise/high-density centered urban development, and this has been recognized as the reason that impedes the residential environment in the surrounding areas, as well as the developing areas themselves. Therefore, the environment factors (securing wind road and enhancement of heat island) have been truly proposed as the planning considerations in the legislation system related to the urban plan, in recent. However, it is true that it is never enough to evaluate and reflect these urban microclimate environmental factors by linkage with the actual planning process. Especially, as the effects by

the change of urban microclimate should be sufficiently reviewed and considered in the planned/comprehensive manner prior to implemetation of urban development project, the effective enhancement can be expected due to its nature. Because of this, it can be said that the sufficient effects can be seen only if the relevant factors of the urban microclimate should be predicted/evaluated and controlled in advance in the systematic/comprehensive manner when establishing all types of the urban regeneration projects.

Therefore, this study has an ultimate purpose of developing the technologies that can be generally operated in the process of applying this to each type of urban regeneration project by building the system that can control and manage the relevant problems related to urban microclimate due to urban regeneration projects perfectly and comprehensively, and is intended to contribute to building the low-carbon and green city with creating the pleasant urban environment as the environmental factors related to the urban microclimate are sufficiently reflected on the plan through this.

3 URBAN MICRO-CLIMATE MANAGEMENT SYSTEM (UMCMS)

3.1 System Concept and GUI

System Concept

The urban microclimate management system is a system to expand the liquidity of wind by predicting/analyzing the wind environment and the heat environment in priority among various urban microclimate factors and to focus on evaluating and designating the planning technique and the related factors necessary for this that can lower the strength of the heat island. This system has been interlocked with Macro-Model for wind flow analysis in the macroscopic level, Micro-Model for wind flow analysis in the microscopic level, and Thermal-Analysis Model for heat environment analysis in the microscopic level, based on the 3-dimensional virtual machine, and has been drawn up to allow various thermal maps to be drawn up through this.

The flow of system for the microclimate analysis is shown as following. Firstly, the analysises in the regional level, such as cold wind forming analysis, cold wind flow analysis, and cold wind velocity analysis, have been conducted, based on the land cover and the geographical data. Next, the wind analysis is conducted, here with needs of building structures, building materials and meteological data. Based on these data, analysis of wind flow and pollutants distribution within the specific object site is to be conducted. Finally, the system has been comprised of the system that can propose the plan for building the optimal green city through linkage with the wind environment by conducting the heat environment analysis. However, the heat environment analyzing function has been in the status of showing only possibility of realizing the function, as a testing phase, and in the status with substantially little reliability on the results.

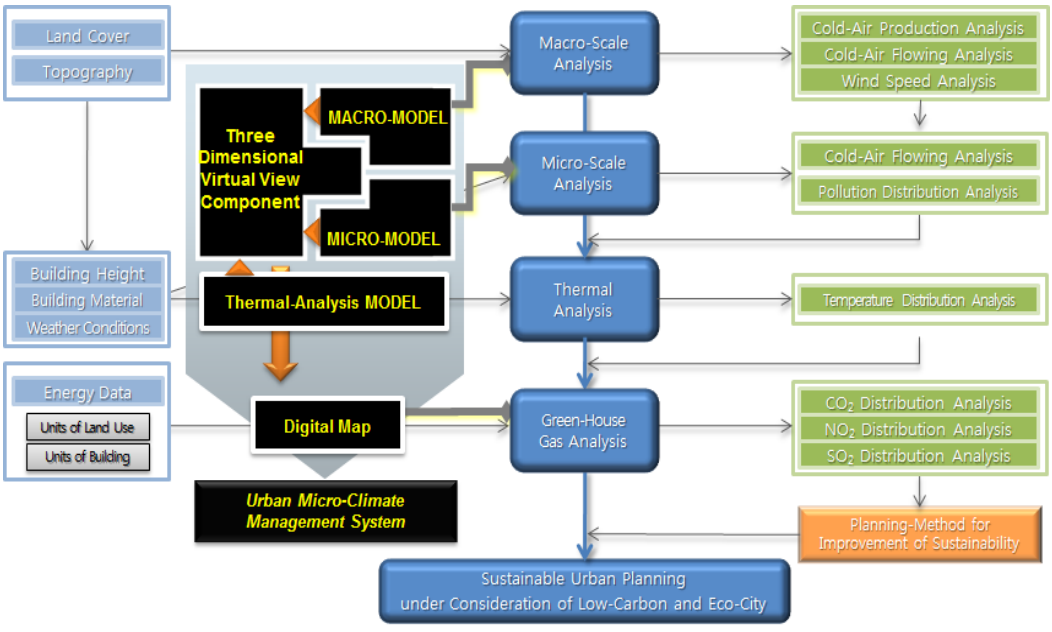

Fig. 1: System Concept and Workflow

System GUI

The most important matter in the urban microclimate management system is that the convenience should be provided to the users by top priority when utilizing the system. Therefore, the urban microclimate management system has a merit that it has been designed to enable all the functions to be implemented in the single platform with removing the difficulties that various models should be utilized in turn according to the necessary functions.

The main screen has been intuitively and simply comprised of Menus, Layer Control Window, and Map Display Window to improve convenience and identification. The menu for improving convenience of the system has been simply comprised of File, Data, Analysis and Display.

File Menu has been consisted of Submenu, such as Open and Save, which is the menu that all the programs have in common, generally. Data menu is largely divided into creation and extraction of data, and submenu below this has been consisted to create and extract the topography, image, land cover, and building data.

In Analysis Menu, the submenu has been composed to analyze wind environment, heat environment, and green house gasses emissions. In other words, we have comprised a submenu for separate analysis of cold wind flow and pollution sources below the wind environment menu, a submenu for analysis of temperature distribution below the heat environment menu, and sub/submenu for analysis of green house gasses emissions. We have divided the analyzed results into sectors of land status, wind environment, thermal environment, and status of green houses emission, as expressing parts, and consisted of the sub/submenu to draw up the specific thematic map related to each below it.

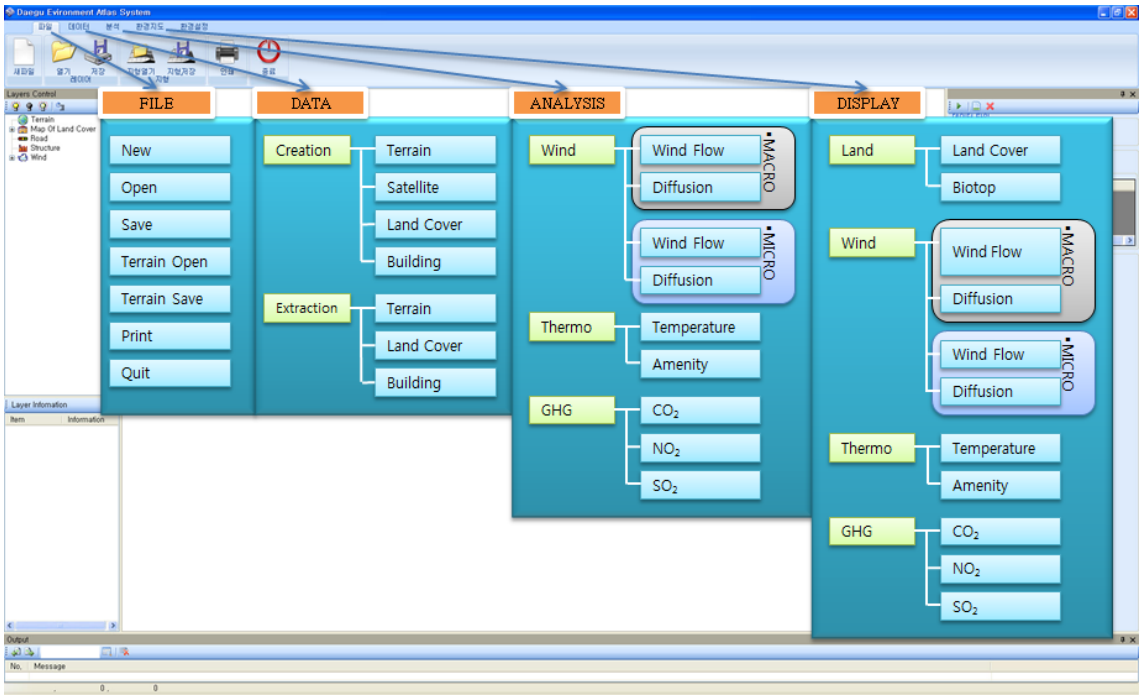

Fig. 2: System GUI

3.2 System Workflow

As aforementioned, the analyzing process of the system is substantially important to operate the microclimate system efficiently and draw the optimal result through this. Therefore, we intend to mention the specific details related to this in this chapter.

Cold-Wind Flow Analysis (Macro Scale)

As a first process for analysis of the microclimate, this means the process of analyzing the occurring areas and flows of the cold or fresh wind in the regional level. The cold wind blows to downtown ordinarily with forming in the mountain areas in the vicinity of downtown at night. As this cold wind has a crucial role in solving various environmental problems that the existing city has, the analysis of creation and flow should be conducted by top priority. Along with this, the results of analysis are utilized as the basic data for analysis of the optimal wind flow in the microscopic level that will be conducted in the next phase.

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To analyze the creation and flow analysis of the cold wind in the regional level, the data related to topography on the object site, land cover and buildings, and the analysis of where the cold wind creates and flows in, is conducted based on this.

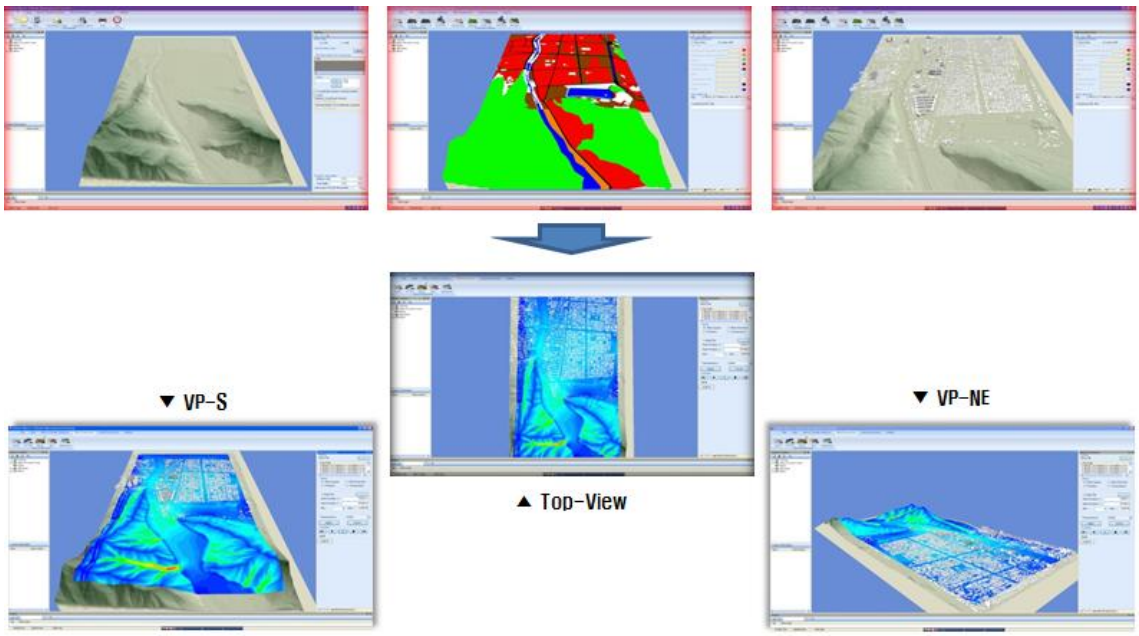

Fig. 3: Cold-Wind Flow Analysis (Macro-Scale)

Wind Flow Analysis (Micro Scale)

This is a phase of conducting an analysis of wind flow in the microscopic level, as the second process of the urban microclimate management system. To analyze the wind flow in the microscopic level, the data that are previously built in the macroscopic level can be utilized as they are. However, a step to set the main wind direction as the initial input values considering the cold wind flow results that have been drawn in the macroscopic level and the specific scope that is intended to be analyzed are necessary in addition.

We can draw the results of wind flow analysis in the microscopic level through this process, and can observe and assess the specific wind flow within the complex as shown in below picture.

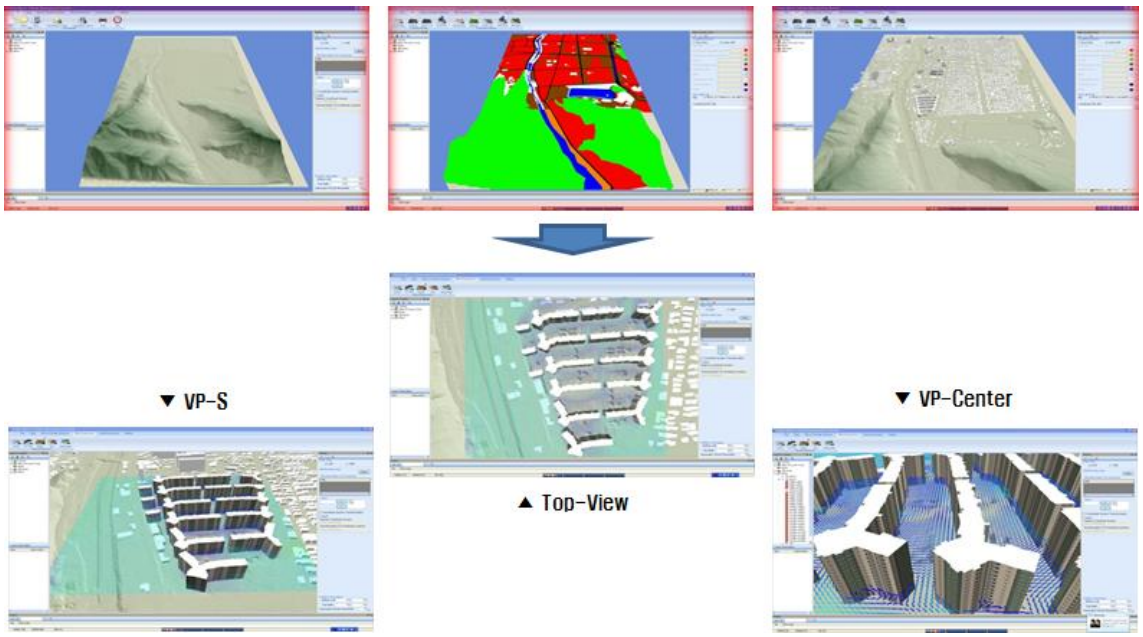

Fig. 4: Wind Flow Analysis (Micro-Scale)

Thermal Environment Analysis (Micro Scale)

Next is the thermal environment analysis phase. The analysis in this study is a phase of testing the possibility of further expansion of the system functions as aforementioned, and we intend to mean that we have checked

the linking possibility with other modules up to now and mention that the analysis results still have a low reliability in advance.

For the thermal environment analysis, the data built in the microscopic level can be utilized as they are, and we can add the data related to the building materials more here. We can conduct the thermal environment analysis in the microscopic level through this. The results are shown as the below figure, and we can estimate and assess the change of the thermal environment according to the array of complex and type and materials of buildings.

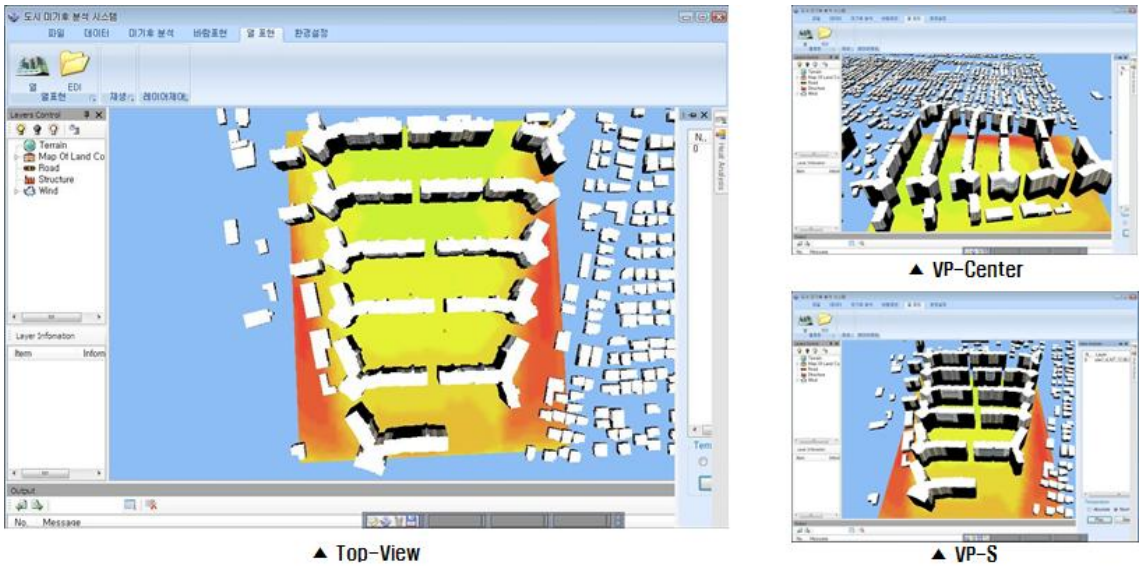

Fig. 5: Thermal Environment Analysis (Micro-Scale)

4 PILOT STUDY WITH UMCMS

In this chapter, we deal with the contents related to the Pilot Study to see the possibility of utilizing the previously developed microclimate management system, and intend to explain with focusing on the general status, planning details, and the results of the Pilot Study for the exampled site.

4.1 Outline of Study Area

Location

The exampled site is a regeneration project district within Gwangju Metropolitan City when has played a central role in the southwest areas, as one of 6 metropolitan cities in Korea. The details are shown in the below table, and this site is a place where the city regeneration project has been propelled after being designated as the demonstration project for residential environment enhancement from Ministry of Land, Transport And Marine Affairs with the reason of the quality declination of the residential areas due to the enhancement of the current decrepit buildings and the poor infrastructures.

Articles	Details
Location	Whole Area of No.202-27, Yangnim-Dong, Namgu, Gwangju Metropolitan City
Area	128,873m^2
Population	2,420 People
Household	1,133 Houses

Table 1: Summary of Study Area

Fig. 6: Location Map of Study Area

Climates Status

As to the detail climates in the exampled areas, the average temperature is 14.6 ℃ for one year in the object site and the vicinity of it, and the main wind is indicated as blown from north-northwest and south. As to the wind velocity, the blown wind in 0.5 m/s to 2.0 m/s velocity has taken up the largest portion by 54.3% of total.

Articles	Details
Average Temperature	14.6℃
Relative Humidity	68%
Main Wind Direction	NNS, S
Frequency of Wind Velocity	0.5-2.0 m/s: 54.3%
Frequency of Non Windy Condition	11.34%

Table 2: Climates Status of Study Area

4.2 Urban Regeneration Planning of Study Area

Purpose of Planning

The exampled site is a typical urban residence, in which is located in Nam-gu of Gwangju Metropolitan City, with the lining of decrepit buildings in current. Because of this, it is a district where a variety of programs have been propelled to promote the urban regeneration as the downtown of Gwangju Metropolitan City has been depressed. Also, the qualitative enhancement of the residence environment has been required as all the infrastructures necessary for the residential life have been substantially appalled. Besides, as there are many facilities that have substantial values historically in the object site and the vicinity of it, the necessity of their preservation has been also suggested. Therefore, it is a ultimate purpose of the urban generation project for this exampled site to improve the qualitative enhancement of residential environment by enhancement of the appalled infrastructure and improvement of decrepit buildings, and further to promote the urban regeneration through the linkage with the facilities that have historical and cultural values.

Details of Plan

Various specific plans for the exampled site have been established and propelled to achieve the purpose of the plan. If the details of the plan related to this study among them are put together, they are shown as followings.

Traditional Theme Street: The planning factor for utilizing the natural materials in the existing asphalt-centered street and realizing the traditional street by planting the street trees in the surroundings.

Streamlet-Street: The planning factor for providing the water-friendly space by building water-friendly space in the existing dreary street, especially, a small stream in the middle or at the edge of street.

Central Square (Community Center): The planning factor for restoring the center point and symbolism for local communities by using the environment-friendly or natural coating materials.

Traditional Parking Lot: The planning factor for restoring the traditionality by installing the traditional fence with using the pavement materials with permeability in the existing concrete-centered parking lots.

Waterfront Park: The planning factor for providing space where the residents can have an easy access and enjoy the rest as improving the space around the existing river.

Pocket Park: The planning factor for providing various resting space for residents within the object site.

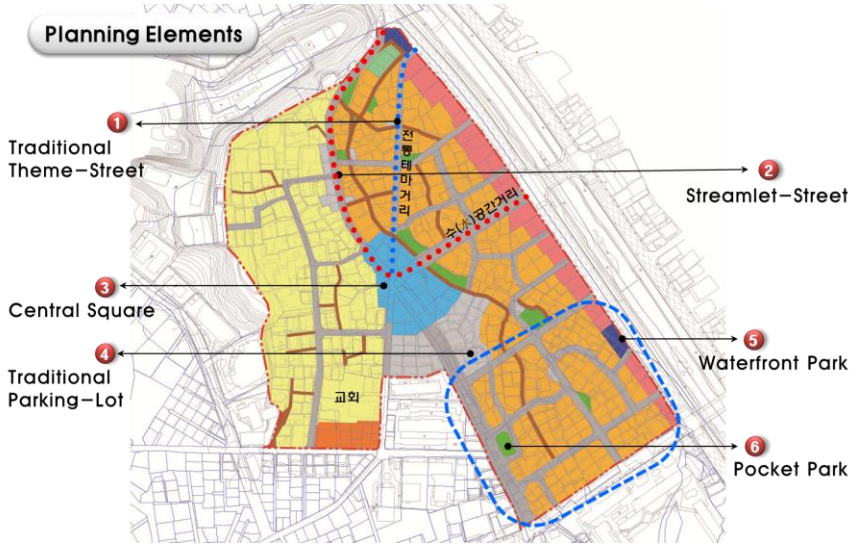

Fig. 7: Planning Details of Urban Regeneration Project for Study Area

4.3 Evaluation of Micro-Climate according to Urban Regeneration Planning

In this chapter, we intend to introduce the results of analyzing and assessing the degree of urban microclimate change according to the major planning factors related to the urban microclimate among various planning details of the urban regeneration project for the exampled site.

Planning Element 1: Traditional Theme-Street

The traditional theme street has a feature that the Korea beauty has been added by using stones, which is a natural material, not an artificial material for the materials for existing road pavement, and building the street trees and flower garden around it. It is a specialized street planned with 230m in total length and 10m in width(Fig. 9).

Seen the results of analyzing the degree of the urban microclimate change due to building this traditional theme-street, the wind velocity has increased as the wind velocity prior to the plan was indicated as 0.87 m/s of daily mean temperature, and the one after planning was indicated as 1.47 m/s of daily mean temperature. The temperature has been analyzed as reduced by 0.4 ℃ in average, as it is 26.8 ℃ of daily mean temperature prior to building the traditional theme-street, and 26.4 ℃ of daily mean temperature after building it. These velocity improvement and temperature falling effect can be said as the result that gives an awareness of importance of the road pavement materials and road width when improving the urban microclimate.

	Average Wind-Speed(m/s)	Average Temperature(℃)
Before	0.87	26.8
After	1.47	26.4

Table 3: Effect of Enhancing Urban Microclimate According to Building Traditional Theme-Street

Planning Element 2: Streamlet-Street

The streamlet-street is a planning factor that has been built to provide the more pleasant water front space to residents who live within the exampled site. The street has been planned with 250m in length and 6m in width along with Korean traditional floor pattern considering the traditional style(Fig. 10)

Seen the degree of urban microclimate change according to building the streamlet-street, the wind velocity has been indicated as increased by 0.25 m/s in daily average, and the temperature change as reduced by 0.3 ℃ in daily average.

	Average Wind-Speed(m/s)	Average Temperature(℃)
Before	1.13	26.6
After	1.25	26.3

Table 4: Effect of Enhancing Microclimate According To Builing Streamlet-Street

Fig. 8: Example of Traditional Theme Street

Fig. 9: Example of Streamlet-Street

Planning Element 3: Central Square

The central square established to play a central point role in the community of residents and to impose the symbolism within the exampled site, is due to be built as 5,950 m2 in total areas and is planned to equip with fountains, resting spaces, playgrounds and community centers as detail facilities(Fig. 11).

Seen the effect of improving the urban microclimate through these central squares, the velocity has been indicated as increased by 0.26 m/s in daily average, and the temperature as reduced by 1.0 ℃. Especially, when comparing the temperature change with other planning factors, it has shown the relatively high reduction effect. This can be concluded as the areas where the natural coating materials have taken up are relatively larger. Eventually, it is judged that the natural coating materials should be positively introduced to improve the temperature.

	Average Wind-Speed(m/s)	Average Temperature(℃)
Before	1.20	26.8
After	1.46	25.8

Table 5: Effect of Enhancing Microclimate According To Builing Central Square

Planning Element 4: Traditional Parking-Lot

This is a traditional parking lot planned to restoring traditionality by using the traditional fence and the floor pattern along with using the pavement materials with permeability in the existing concrete-centered parking lot(Fig. 11). The degree of urban microclimate change according to this is shown as followings. 6,070m2 of the total areas have been planned by being divided into 3 places within the exampled site. However, to conduct the specific and accurate analysis, we have conducted the analysis by selecting one traditional parking lot located in the center within the exampled site that has taken up 2,960m2 areas. Firstly, the wind

velocity has indicated the improvement effect by 0.18 m/s, showing 1.22 m/s after applying the plan to the previous 1.04 m/s, and the temperature has indicated the temperature falling effect by 0.3 ℃, showing 26.3 ℃ after applying the plan to the previous 1.04 m/s.

	Average Wind-Speed(m/s)	Average Temperature(℃)
Before	1.04	26.6
After	1.22	25.3

Table 6: Effect of Enhancing Microclimate According To Builing Traditional Parking-Lot

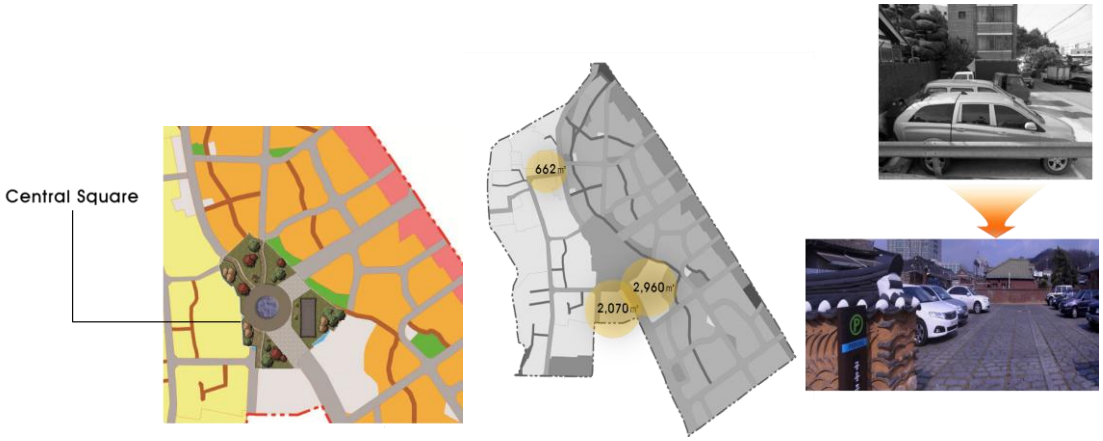

Fig. 10: Example of Central Square (Left) / Allocation and Example of Traditional Parking-Lot (Right)

Planning Element 5: Waterfront Park

The waterfront park planned to provide an easy access and space for enjoying rests to residents is a substantially important planning factor to residents when improving the spaces around the existing stream located in the east side of the exampled site. Therefore, it can be expected that the expecting effect for the degree of urban microclimate change is substantially huge in general, according to building the water front park. The analysis result according to this has also shown the degree of enhancement relatively better than other planning factors. Seen the result, the wind velocity has shown the enhancement effect by 0.99 m/s in daily average and the temperature has shown the one by 0.7 ℃. In other words, it can be judged that the results are showing the biggest enhancement effect in wind velocity and the second biggest effect next to the central square in temperature.

	Average Wind-Speed(m/s)	Average Temperature(℃)
Before	0.36	26.9
After	1.35	25.2

Table 7: Effect of Enhancing Urban Microclimate According to Building Waterfront Park

Planning Element 6: Pocket Park

The result of the degree of the urban microclimate change according to the pocket park planned to provide various resting spaces to residents within the exampled site is shown as followings.

Firstly, the wind velocity has shown the enhancement effect by 0.77 m/s, changing from 0.34 m/s to 1.11 m/s, and the temperature has shown the same enhancement effect as the waterfront park, changing 27.0 ℃ to 26.3 ℃. They can also be the result of empasizing the importance of the natural coating materials or nature-friendly structures more and more.

	Average Wind-Speed(m/s)	Average Temperature(℃)
Before	0.34	27.0
After	1.11	26.3

Table 8: Effect of Enhancing Urban Microclimate According to Building Pocket Park

If summarizing by putting together the degree of urban microclimate change according to various planning factors within the exampled site as above, it is shown as followings.

The common features of the planning factors, such as traditional theme-street, streamlet-street, central square, traditional parking-lot, waterfront park, and pocket park, is to replace and use the artificial coating materials actively to natural coating materials and to recommend the proper density. With the result of analyzing the urban microclimate within the exampled site utilizing the microclimate management system through these common features, it has been assessed that the average wind velocity has shown as increased by 0.2 m/s in daily average, changing from 0.82 m/s before the project to 1.12 m/s after the project, the average temperature has the temperature reducing effect by 0.57 °C, changing from 26.78 °C before the project to 26.21 °C after the project.

5 CONCLUSION

The construction of the low carbon and green city is a strategy established by the urban development policy due to the policy paradigm of low carbon and green growth in Korea, and one of the projects suggested to realize this specifically is a very urban regeneration project. However, it is the current status that there is lack of quantative assessment tools for the enhancement effect according to the urban regeneration projects, especially the assessment tools for urban microclimate. Therefore, we have developed the tools for assessing the urban microclimate comprehensive, and further percussed a possibility of utilizing the assessment tools by designating the actual exampled site.

With the result of it, it has been shown that there are enhancement effects in urban microclimate, such as wind and temperature, according to various planning factors, and that utilization of natural coating materials rather than artificial materials and securement of the waterfront have substantial effects on enhancement of the urban microclimate. It has been also assessed that the quantative results shown through utilizing the system have shown the enhancement effect by about 0.2 m/s in daily average for wind and the temperature falling effect by 0.57 °C in daily average for temperature.

We could acknowledge the possibility of stability and utilizability of the urban microclimate management system through these case studies. However, it is suggested that this system can have a higher utilizabilty if immediacy for drawing the analyzed values and reliability for the drawn result values can be backed up. Beside of this, if the practical functions, such as the emission analysis of green house gasses, are added more, the effective values of the system is expected to be expanded more and more.

6 ACKNOWLEDGEMENT

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DGNB Zertifizierungssystem: Neubau gemischte Stadtquartiere

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1 ABSTRACT

Unser ökologischer Fußabdruck übersteigt die Fähigkeit der Erde zur Regeneration derzeit um rund 30 %. Wenn unsere Ansprüche an den Planeten weiter mit der gleichen Geschwindigkeit zunehmen, bräuchten wir im Jahr 2030 den Gegenwert von zwei Planeten, um unseren Lebensstil aufrechtzuerhalten. (vgl. WWF 2008) Städte könnten bei der Diskussion um eine nachhaltige Entwicklung eine Schlüsselrolle einnehmen, denn sie bieten beispielsweise die Möglichkeit Energie-, Abfall und Verkehrssysteme effizienter zu nutzen und somit den Energiebedarf pro Person zu senken.

Es zwängt sich die Frage auf, nach welchen Prinzipien Städte und Stadtquartiere entwickelt werden müssen, welche den Bewohnern eine hohe Aufenthaltsqualität bieten, gleichzeitig jedoch energieeffizient und ressourcenschonend sind?

Mit dieser Fragestellung wurde im Frühjahr 2009 bei der Deutschen Gesellschaft für Nachhaltiges Bauen (DGNB) eine Arbeitsgruppe gegründet, welche das Ziel verfolgte ein Zertifizierungssystem für nachhaltige Stadtquartiere zu entwickeln. Die Marktversion des Systems soll nun im Juni 2012 auf der Messe CONSENSE in Stuttgart präsentiert werden.

Entsprechend der DGNB Grundsätze bildet das Stadtquartiersprofil eine sinnvolle Ergänzung zu den Gebäudeprofilen, indem insbesondere der Bereich zwischen den Gebäuden und der Quartiersstandort bewertet wird.

Abb. 1: DGNB Logo

Auch in diesem System wird den Themen Ökobilanz und Lebenszykluskosten besondere Beachtung geschenkt. Zusätzlich werden neue stadtquartiersspezifische Themen, wie beispielsweise die Veränderung des Stadtteilklimas, Artenvielfalt und Vernetzung, die Qualität der Verkehrssysteme, Regenwassermanagement oder auch übergeordnete Konzepte für den Umgang mit Energie, Wasser und Abfall in die Betrachtung mit einbezogen. Die Gebäude selbst müssen für eine Quartierszertifizierung nicht zertifiziert sein und werden nur mit Basiswerten in der Bewertung berücksichtigt.

Da sich die Entwicklung von Stadtquartieren über einen langen Zeitraum erstreckt, wird neben dem Vorzertifikat (Phase 1) auf Ebene des städtebaulichen Entwurfs, ein weiteres Zertifikat für die Planung (Phase 2) eingeführt, für welches mindestens Baurecht vorliegen muß und die Ausführungsqualitäten vertraglich gesichert sind. Den Abschluß bildet das Zertifikat für das zumindest 75 % fertig gestellte Quartier (Phase 3). Das Vorzertifikat ist dabei 3 Jahre, das Zertifikat für die Planung ist 5 Jahre und das Zertifikat für das Quartier ist unbegrenzt gültig.

Zusammen gefasst bietet das vorliegende System vielfältige Möglichkeiten. Es unterstützt Kommunen und private Entwickler, schon im Planungsprozess, Optimierungspotentiale zu erkennen und zu beheben und schafft Transparenz bei den zukünftigen Nutzern des Quartiers. Nicht zuletzt beugen attraktive und lebenswerte Stadtquartiere soziale „Schieflagen“ vor und halten dieses über lange Zeiträume hinweg stabil und damit nachhaltig.

2 EINLEITUNG

Unser ökologischer Fußabdruck übersteigt die Fähigkeit der Erde zur Regeneration derzeit um rund 30 %. Wenn unsere Ansprüche an den Planeten weiter mit der gleichen Geschwindigkeit zunehmen, bräuchten wir im Jahr 2030 den Gegenwert von zwei Planeten, um unseren Lebensstil aufrechtzuerhalten. (vgl. WWF

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2008) Städte könnten bei der Diskussion um eine nachhaltige Entwicklung eine Schlüsselrolle einnehmen, denn sie bieten beispielsweise die Möglichkeit Energie-, Abfall und Verkehrssysteme effizienter zu nutzen und somit den Energiebedarf pro Person zu senken. Nicht zuletzt lebt mehr als die Hälfte der Weltbevölkerung in Städten. Dieser Anteil soll nach Prognosen der UN (vgl. UN 2009) bis zum Jahr 2050 sogar auf 70 % ansteigen.

Jedoch ist die Einsparung von Energie und Ressourcen nur ein Aspekt unter vielen. So unterstützt die Dichte von Städten beispielsweise auch die soziale Interaktion der Bewohner untereinander und ermöglicht es den Kommunen eine Vielzahl sozialer und kultureller Angebote zur Verfügung zu stellen, welche in weniger dicht besiedelten Gebieten schlichtweg an der Finanzierung scheitern würden.

Neben diesen positiven Aspekten können, insbesondere in Städten, auch Vielzahl von Problemen auftreten, welche sich im besonderen Maße in den rasant wachsenden Metropolen der dritten Welt zeigen. So haben beispielsweise eine Vielzahl der Stadtbewohner mit Lärm und Smog zu kämpfen oder verfügen nicht über ein ausreichendes Angebot an privaten und öffentlichen Freiflächen.

Es zwängt sich die Frage auf, nach welchen Prinzipien Städte und Stadtquartiere entwickelt werden müssen, welche den Bewohnern eine hohe Aufenthaltsqualität bieten, gleichzeitig jedoch energieeffizient und ressourcenschonend sind?

Mit dieser Fragestellung wurde im Frühjahr 2009 bei der DGNB eine Arbeitsgruppe gegründet, welche das Ziel verfolgte ein Zertifizierungssystem für nachhaltige Stadtquartiere zu entwickeln. 2010 wurden die erarbeiteten Kriterien erstmalig an realen Projekten getestet und auf der CONSENSE 2010 präsentiert. Die Erkenntnisse aus dieser ersten Evaluation wurden in die Kriterien eingearbeitet und mit einem unabhängigen Expertengremium diskutiert. Im Januar 2011 ist die Pilotphase mit 13 angemeldeten Projekten gestartet, welche im Oktober 2011, im Rahmen der ExpoReal in München, die ersten (Vor-) Zertifikate für Stadtquartiere erhalten haben. Aufgrund der großen Nachfrage an dem System und um weitere Erkenntnisse und Daten von den Projekten zu generieren, wurde die Pilotphase verlängert. Im Juni 2012 sollen die überarbeiteten Kriterien auf der Messe CONSENSE 2012 vorgestellt werden.

Folgende Projekte haben an der DGNB Pilotphase „Neubau gemischte Stadtquartiere“ teilgenommen:

Vorzertifikat: Planung (Phase 1)

- Aarau (CH), Torfeld Süd (4,43 ha)
- Babenhausen, Kaserne (56,75 ha)
- Bedburg, Bedburger Höfe (20 ha)
- Esch-sur-Alzette (LU), Belval (112 ha)
- Esslingen, Weststadt (9,8 ha)
- Köln, Waidmarkt (1,4 ha)
- Luxemburg, Ban de Gasperich (77,8 ha)
- Offenbach, Hafen (27,9 ha)
- •Stuttgart, Milaneo (4,8 ha)

Zertifikat: Erschließung (Phase 2)

- Düsseldorf, Le Quartier Central (28 ha)
- Frankfurt, Europa-Viertel West (67 ha)

Zertifikat: Quartier (Phase 3)

- Berlin, Dom Aquarée (2,5 ha)
- Berlin, Potsdamer Platz (13 ha)

3 STAND DER FORSCHUNG

Die Themen Audit, Benchmarking, Ranking, Rating, Screeing und Zertifizierung erfassen, nicht zuletzt in Zeiten knapper öffentlicher Kassen und der Forderung nach einer quantifizierten Wirkungsmessung, immer mehr gesellschaftliche Bereiche und haben etwas verspätet auch das Bauwesen erfasst (vgl. DV 2010, S. 6-

13). Die verspätete Entwicklung von Zertifizierungssystemen hat insbesondere in Deutschland damit zu tun, dass es ohnehin schon hohe gesetzlich verankerte Baustandards gibt. „Dennoch zeigen alleine die Entwicklungen der 1990er Jahre im Osten Deutschlands, aber auch laufende Vorhaben in allen Teilen Deutschlands, dass die gesetzlichen Vorgaben eine zukünftige Entwicklung nicht immer hinreichend gewährleisten können und Raum für Fehlentwicklungen lassen." (DV 2010, S. 37)

Auf Ebene der Gebäude gibt es derzeit weltweit eine Vielzahl an Zertifizierungssystemen mit unterschiedlichen Schwerpunkten (vgl. Ebert 2010), von welchen, gemessen an der Anzahl der zertifizierten Gebäude, in Europa die Systeme BREEAM, LEED, HQE und DGNB am häufigsten verwendeten werden (vgl. RICS 2011).

Auf Stadtquartiersebene ist die Anzahl an unterschiedlichen Zertifizierungssystemen derzeit noch überschaubar. Die vorhandenen Systeme, wie beispielsweise das Zertifizierungssystem LEED for Neighborhood Development (LEED-ND) oder BREEAM Communities, kommen hauptsächlich aus dem angloamerikanischen Raum (vgl. DV 2010, S. 8) in den deutschen Markt. Jedoch befinden sich auch in anderen Teilen der Welt Zertifizierungssysteme für Stadtquartiere in der Entwicklung, wie das aus Abu Dhabi stammende PEARL COMMUNITY Rating System zeigt.

Allen vorhanden Systemen gemein ist, dass diese in spezifischen kulturellen, klimatischen und rechtlichen Kontexten entwickelt wurden und nicht ohne weiteres auf deutsche bzw. europäische Verhältnisse übertragbar sind. So kommt auch die Kommission für Zertifizierung in der Stadtentwicklung zu der Feststellung das die „Anwendung von unter anderen rechtlichen und fachlichen Voraussetzungen entwickelten Zertifizierungssysteme für Neubauvorhaben […] in Deutschland nicht sinnvoll ist." (DV 2010, S. 10)

4 SYSTEM

4.1 Abgrenzung

Entsprechend der DGNB Grundsätze bildet das Stadtquartiersprofil eine sinnvolle Ergänzung zu den Gebäudeprofilen, indem hierbei insbesondere der Bereich zwischen den Gebäuden und der Quartiersstandort betrachtet wird. Diese Faktoren beeinflussen maßgeblich die Qualität eines Stadtquartiers und definieren den Rahmen für eine nachhaltige Entwicklung der Gebäude. Ebenso werden übergeordnete Konzepte beispielsweise für den Umgang mit Energie, Wasser und Abfall betrachtet. Die Gebäude selbst müssen für eine Quartierszertifizierung nicht zertifiziert sein und werden nur mit Basiswerten in der Bewertung berücksichtigt.

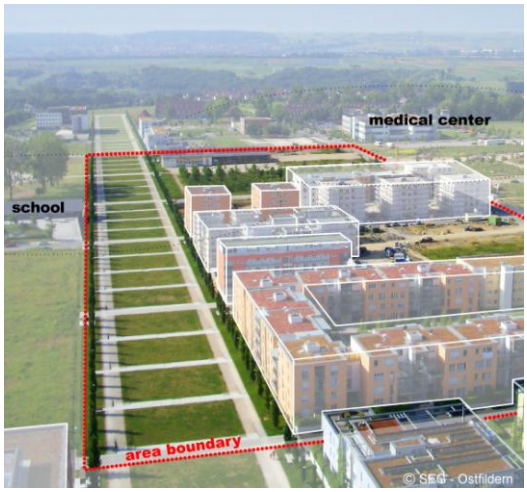

Abb. 2: Betrachtungsbereich des DGNB Nutzungsprofils „Neubau gemischte Stadtquartiere" (exemplarisch)

4.2 Bewertungsstufen

Da sich die Entwicklung von Stadtquartieren über einen langen Zeitraum erstreckt, in welchen oft auch die Eigentümer wechseln, wird neben dem Vorzertifikat (Phase 1) auf Ebene des städtebaulichen Entwurfs, ein weiteres Zertifikat für die Planung (Phase 2) eingeführt, für welches mindestens Baurecht vorliegen muß und die Ausführungsqualitäten vertraglich gesichert sind. Den Abschluß bildet das Zertifikat für das zumindest

75 % fertig gestellte Quartier (Phase 3). Das Vorzertifikat ist dabei 3 Jahre, das Zertifikat für die Planung ist 5 Jahre und das Zertifikat für das Quartier ist unbegrenzt gültig. (siehe Abbildung 3)

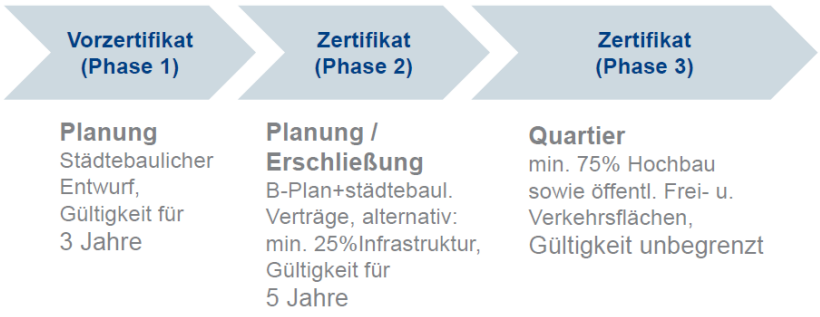

Abb. 3: Bewertungsstufen des Stadtquartiersprofils

4.3 Mindestanforderungen (Pilotphase)

In der Pilotphase wurden bewusst nur wenige Mindestanforderungen definiert, welche die Projekte zu erfüllen hatten. So konnte das System an einer großen Bandbreite unterschiedlichster Quartiere getestet und Rückschlüsse für die Überarbeitung gezogen werden. Die Mindestanforderungen bei der Pilotphase an ein Quartier war, das dieses mindestens ein Hektar groß ist, über öffentlich zugängliche Räume verfügt und einen Wohnanteil von mehr als 15 % und weniger als 85 % aufweist. Zusätzlich war eine Anforderung, dass alle Eigentümer des Gebietes mit der Zertifizierung einverstanden sind.

4.4 Gewichtung

Die Gewichtung der Hauptkriteriengruppen (siehe Abbildung 4) ist gleich der Systematik der DGNB Gebäudeprofile und beruht auf einem Gleichgewicht der ökologischen, ökonomischen und soziokulturellen und funktionalen Qualität. Einziger Unterschied bei dem Stadtquartiersprofil ist, dass die bei den DGNB Gebäudeprofilen separat ausgewiesene Standortqualität, in die Kriterien integriert ist. Die Lage hat somit wesentlichen Einfluss auf die Gesamtbewertung des Stadtquartiers.

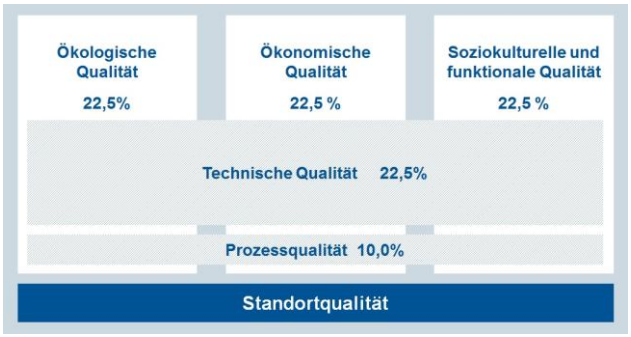

Abb. 4: Gewichtung der Hauptkriteriengruppen

4.5 Ziele und Kriterien

Die übergeordneten Ziele des DGNB Nutzungsprofils für Stadtquartiere sind die Umwelt und natürlichen Ressourcen zu schonen, den Komfort und das Wohlbefinden der Nutzer des Quartiers zu stärken sowie die anfallenden Kosten über den gesamten Lebenszyklus zu minimieren.

Hierfür wurde ein stadtquartiersspezifischer Kriterienkatalog entwickelt, welcher sich an den Grundzügen der DGNB Systematik orientiert, jedoch inhaltlich komplett neu erarbeitet ist. So wird auch in diesem System den Themen Ökobilanz und Lebenszykluskosten besondere Beachtung geschenkt. Zusätzlich werden neue Kriterien, wie beispielsweise die Veränderung des Stadtteilklimas, Artenvielfalt und Vernetzung, die Qualität der Verkehrssysteme oder auch das Regenwassermanagement in die Betrachtung mit einbezogen. Abbildung 5 zeigt, den Kriterienkatalog welcher in der Pilotphase verwendet wurde sowie die Gewichtung der einzelnen Kriterien innerhalb der Hauptkriteriengruppen.

Hauptkriteriengruppe	Kriteriengruppe	Nr.	Kriterium	Gewichtung
Ökologische Qualität (22,5%)	Wirkungen auf die globale und lokale Umwelt	ENV1.1	Ökobilanz	3
		ENV1.2	Gewässer- und Bodenschutz	2
		ENV1.3	Veränderung des Stadtteilklimas	3
		ENV1.4	Artenvielfalt und Vernetzung	2
		ENV1.5	Berücksichtigung von möglichen Umwelteinwirkungen	2
	Ressourceninanspruchnahme und Abfallaufkommen	ENV2.1	Flächeninanspruchnahme	3
		ENV2.2	Gesamtprimärenergiebedarf und Anteil erneuerbarer Primärenergie	3
		ENV2.3	Energieeffiziente Bebauungsstruktur	2
		ENV2.4	Ressourcenschonende Infrastruktur, Erdmassenmanagement	2
		ENV2.5	Lokale Nahrungsmittelproduktion	1
		ENV2.6	Wasserkreislaufsysteme	2
Ökonomische Qualität (22,5%)	Lebenszykluskosten	ECO1.1	Lebenszykluskosten	3
		ECO1.2	Fiskalische Wirkungen auf die Kommune	2
	Wertentwicklung	ECO2.1	Wertstabilität	1
		ECO2.2	Flächeneffizienz	3
Soziokulturelle und funktionale Qualität (22,5%)	Soziale Qualitäten	SOC1.1	Soziale und funktionale Vielfalt	2
		SOC1.2	Soziale und erwerbswirtschaftliche Infrastruktur	2
	Gesundheit, Behaglichkeit und Nutzerzufriedenheit	SOC2.1	Objektive / Subjektive Sicherheit	2
		SOC2.2	Aufenthaltsqualität in öffentlichen Räumen	2
		SOC2.3	Lärm- und Schallschutz	2
	Funktionalität	SOC3.1	Freiflächenangebot	3
		SOC3.2	Barrierefreiheit	2
		SOC3.3	Nutzungsflexibilität und Bebauungsstruktur	2
	Gestalterische Qualität	SOC4.1	Städtebauliche Einbindung	3
		SOC4.2	Städtebauliche Gestaltung	2
		SOC4.3	Nutzung von Bestand	2
		SOC4.4	Kunst im öffentlichen Raum	1
Technische Qualität (22,5%)	Technische Infrastruktur	TEC1.1	Effiziente IT und Kommunikations-Infrastruktur	1
		TEC1.2	Energietechnik	2
		TEC1.3	Effiziente Abfallwirtschaft	2
		TEC1.4	Regenwassermanagement	3
	Technische Qualität	TEC2.1	Demontage-, Trenn- und Recyclingfreundlichkeit der Infrastruktur	1
		TEC2.2	Instandhaltung, Pflege, Reinigung	2
	Verkehr / Mobilität	TEC3.1	Qualität der Verkehrssysteme	3
		TEC3.2	Qualität der MIV-Infrastruktur	1
		TEC3.3	Qualität der ÖPNV-Infrastruktur	1
		TEC3.4	Qualität der Radverkehr -Infrastruktur	1
		TEC3.5	Qualität der Fussgänger-Infrastruktur	1
Prozessqualität (10%)	Partizipation	PRO1.1	Partizipation	3
	Qualität der Planung	PRO2.1	Verfahren zur Konzeptfindung	2
		PRO2.2	Integrale Planung	3
		PRO2.3	Kommunale Mitwirkung	2
	Qualität der Abwicklung und Bauausführung	PRO3.1	Steuerung	2
		PRO3.2	Baustelle, Bauprozess	2
		PRO3.3	Vermarktung	2
		PRO3.4	Qualitätssicherung und Monitoring	2

Tab. 1: Kriterienübersicht des DGNB Nutzungsprofils „Neubau gemischte Stadtquartiere“, Stand Januar 2012

4.6 Bewertung innerhalb der Kriterien

Die Kriterien selbst setzen sich meist aus mehreren Indikatoren zusammen. So wird beispielsweise in dem Kriterium „Freiflächenangebot“ zum einen die private und öffentliche Freifläche pro Brutto-Grundfläche, jedoch auch die fußläufige Erreichbarkeit der einzelnen Freiflächen bewertet. Hierfür wurde wenn möglich für jeden Indikator ein Grenz-, Referenz- und Zielwert definiert. Der Grenzwert muss von jedem Projekt erfüllt werden um zertifiziert werden zu können. Der Referenzwert ist gleich zu setzen mit dem gesetzlichen Standard für den jeweiligen Indikator und der Zielwert ist gleich einem anerkannten Richtwert bzw. Best-Practice Beispiel aus der Praxis. Somit werden auch in dem DGNB Stadtquartiersprofil keine einzelnen Maßnahmen, sondern nur das Gesamtergebnis bewertet und den Planern die notwendige Freiheit für innovative Quartierskonzepte eingeräumt.

	Punkte
Zielwert (Richtwert bzw. Best-practice Beispiel)	100
Referenzwert (gesetzl. Standard)	50
Grenzwert (Mindestanforderung)	10

Tab. 2: Bewertung innerhalb der Kriterien

4.7 Erfüllungsgrade und Auszeichnungen

Entsprechend der für jedes Kriterium vergebenen Punkte und der jeweiligen Gewichtung, errechnet sich der Gesamterfüllungsgrad für das Quartier sowie für jedes der fünf Hauptkriteriengruppen. Dieser zeigt, ob und in welchem Ausmaß die vorgegebenen Anforderungen erfüllt sind. Ab einem Gesamterfüllungsgrad von 50 % erhält das Quartier das DGNB Zertifikat in Bronze. Ab einem Erfüllungsgrad von 65 % wird das DGNB Zertifikat in Silber vergeben. Für ein DGNB Zertifikat in Gold muss ein Gesamterfüllungsgrad von 80 % erreicht werden (siehe Abbildung 5).

Um einer ausgewogenen Verteilung der Punkte gerecht zu werden, gibt es zusätzlich den Mindesterfüllungsgrad bei allen fünf Hauptkriteriengruppen. Wenn ein Projekt beispielsweise die Auszeichnung in Gold erreichen möchte, muß es in allen fünf Hauptkriteriengruppen einen Erfüllungsgrad von mindestens 65 % erreichen. Somit könnte ein Quartier welches aus ökonomischen Gesichtspunkten eine sehr hohe Qualität aufweist, jedoch im soziokulturellen und funktionalen Bereich unter 65 % liegt keine Auszeichnung in Gold erhalten.

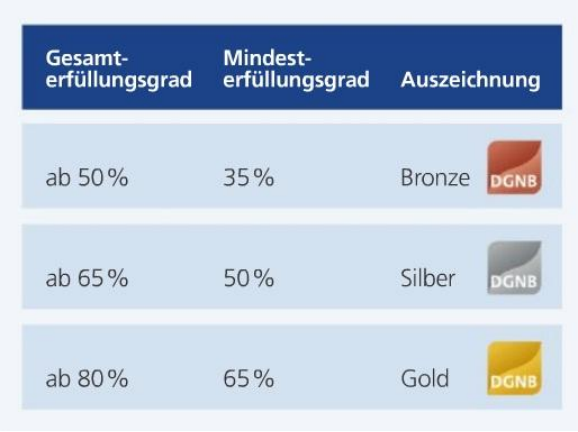

Abb. 5: Erfüllungsgrade und Auszeichnungen

4.8 Kosten der Zertifizierung

Bei den Kosten einer Zertifizierung muß zwischen direkten und indirekten Kosten unterschieden werden. Unter die direkten Kosten fallen die Zertifizierungsgebühren, welche an die DGNB zu entrichten sind und u. a. für die anonyme Prüfung der durch den Auditor eingereichten Unterlagen verwendet werden, sowie das Honorar für den von der DGNB ausgebildten Auditor, für die Zusammentragung der für die Zertifizierung notwendigen Unterlagen. Die Zertifizierungsgebühren hängen von der Größe und der Zertifizierungsstufe des Projektes ab und variierten in der Pilotphase von 3.000 bis 25.000 Euro für DGNB Mitglieder. Bei den

Honorarkosten für den Auditor können keine generellen Aussagen getroffen werden. Diese hängen stark von dem vereinbarten Leistungsbild sowie der Komplexität und bisherigen Dokumentation des Projekt ab.

Des Weiteren können die definierten Qualitätsziele auch indirekte Auswirkungen auf die Planungs- und Baukosten haben. So wird beispielsweise die Verwendung von Straßenleuchten mit LED-Technologie die Baukosten erhöhen, sich jedoch langfristig über geringere Nutzungskosten und eingesparte Emissionen postiv auswirken. Diese Betrachtung über den gesamten Lebenszyklus wird in de DGNB Nutzungsprofilen besondere Beachtung geschenkt.

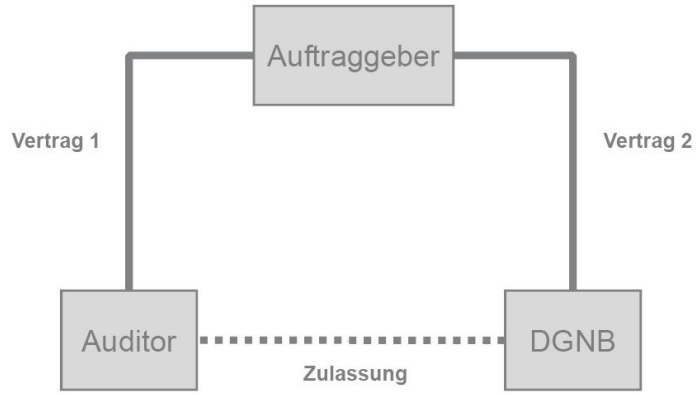

Abb. 6: Verhältnis Auftraggeber/Auditor/DGNB

5 RESULTATE

5.1 Erreichte Zertifizierungen

Auf Basis des Gesamterfüllungsgrads erreichten 6 von 13 der bisher ausgewerteten Projekten die DGNB Auszeichnung in Gold. Weitere 7 Projekte erreichten die Auszeichnung in Silber. Die Auszeichnung in Bronze wurde unter den ersten Projekten noch nicht vergeben. Die bisherigen Erfahrungen bei der DGNB haben jedoch gezeigt, dass die Projekte, welche sich an einer Pilotphase beteiligen und den damit verbunden höheren Aufwand nicht scheuen, ohnehin meist sehr ambitioniert sind und damit auch sehr gute Ergebnisse erzielen.

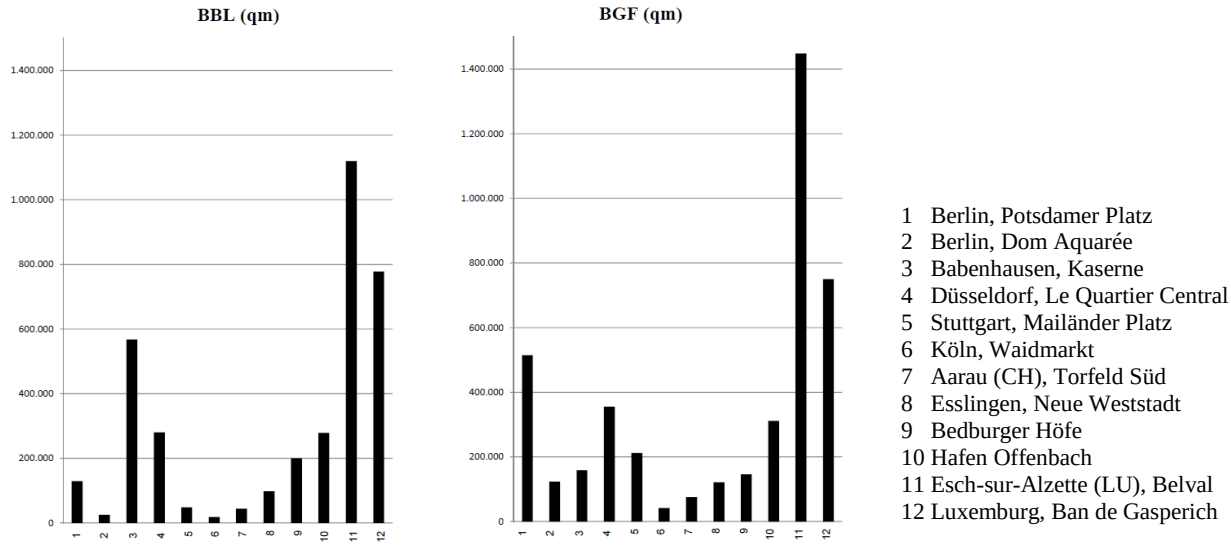

Abb. 7: Flächenvergleich der Pilotprojekte

5.2 Flächenvergleich der Pilotprojekte

Die Größe der Pilotprojekte variiert enorm (siehe Abbildung 7). Das kleinste Projekt „Waidmarkt“ in Köln, mit 1,4 Hektar Bruttobauland (BBL), steht im Kontrast zu dem größten Projekt „Belval“ in Esch-sur-Alzette (Luxemburg) mit einer Größe von 112 Hektar (BBL). Ähnliches gilt für die Brutto-Grundfläche (BGF) der

Projekte. Auch hier erreicht das Projekt in Esch-sur-Alzette mit einer Fläche von 1.448.661 qm den höchsten Wert und das Projekt in Köln mit 42.150 qm den niedrigsten Wert.

6 ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNG

6.1 Kriterienkatalog als Kommunikations- und Steuerungsinstrument

Nachhaltige Stadtplanung stellt die an der Planung beteiligten Personen vor eine komplexe Herausforderung, welche die interdisziplinäre Zusammenarbeit aller erfordert. Es gilt mit Bürgern und Verwaltung gemeinsame Ziele zu definieren, daraus konkrete Projekte abzuleiten und die Wirksamkeit dieser in regelmäßigen Abständen zu evaluieren. Zertifizierungs- und Bewertungssysteme bieten eine Möglichkeit diesen Prozess zielführend zu unterstützen. So kommt auch die Kommission „Zertifizierung in der Stadtentwicklung“ zu dem Ergebnis, dass Zertifizierung als prozessuales Verfahren implementiert werden sollte (vgl. DV 2010, S. 34). Auf Ebene des Quartiers eröffnet der vorliegende Kriterienkatalog somit die Möglichkeit die Auswirkungen verschiedener Planungsvarianten auf die Nachhaltigkeit eines Quartiers zu bewerten, ggf. zu optimieren und transparent zu kommunizieren. Ebenso stellt der Kriterenkatalog eine Möglichkeit dar, diesen als Planungsleitfaden in jeder Phase eine Quartiersentwicklung zu verwenden (vgl. Koch, Neumann, 2011)

6.2 Größe der Projekte

Rückblickend muss festgestellt werden, dass die Kriterien zwar von allen Projekten angewendet werden konnten, jedoch der damit verbundene Bearbeitungsaufwand sehr unterschiedlich war. Dies war zum einen dem Projekt selbst (Komplexität, Zertifizierungsstufe, etc.) sowie der bisherigen Dokumentation, jedoch auch der Größe des Projektes, geschuldet. Zukünftig soll der Zusammenhang zwischen Projektgröße und Bearbeitungsaufwand auf ein Mindestmaß reduziert werden. Ebenso gilt es, im Hinblick auf die Internationalisierung des Systems, eine Maximalgröße zu definieren bis zu welcher das Projekt als Stadtquartier zertifiziert werden kann und ab wann andere Bewertungsverfahren angewendet werden müssen.

6.3 Kosten-Nutzen-Zertifizierung

Die direkten und indirekten Kosten einer Zertifizierung wurden im Punkt 4.8 ausführlich dargestellt. Erste Untersuchungen auf Ebene der Gebäude zeigen jedoch das beispielsweise die Herstellungskosten bei zertifizierten Gebäuden nicht zwangsläufig höher sein müssen als jene bei nicht zertifizierten Gebäuden (vgl. Rotermund 2011). Gleiches kann auf Stadtquartiere übertragen werden.

Den eventuellen Mehrkosten gegenüber steht der enorme Nutzen, welchen eine Zertifizierung mit sich bringen kann. Eine Zertifizierung ist primär eine transparente und unabhängige Qualitätsauszeichnung, welche es dem späteren Nutzer ermöglicht die Qualität eines Quartiers objektiv beurteilen zu können. Mit einer höheren Qualität einhergehend ist das höhere Wohlbefinden und Produktivität der Nutzer des Quartiers sowie die Erhöhung der Marktchancen bei Verkauf und Vermietung. Nach einer Studie von Roland Berger sind Mieter dazu bereit durchschnittlich 4,5% höhere Mietkosten für nachhaltige Immobilien zu bezahlen (vgl. Roland Berger 2010). Dies trägt u.a. dazu bei die Risiken einer Quartiersentwicklung zu minimieren. Nicht zuletzt können durch die frühzeitige Betrachtung des Quartiers über den gesamten Lebenszyklus hinweg Emissionen reduziert und Kosten eingespart werden.

7 AUSBLICK

7.1 Marktversion

Aus den Erkenntnissen welche im Laufe der Pilotphase gewonnen worden sind, werden die Kriterien derzeit intensiv diskutiert und anschließend überarbeitet. Das Ziel ist die überarbeiteten Kriterien auf der Messe CONSENSE im Juni 2012 in Form eines Handbuchs präsentieren zu können. Anschließend soll dieses System in regelmäßigen Abständen evaluiert und optimiert sowie eine Ausbildung zum DGNB Auditor für Stadtquartiere aufgesetzt werden.

7.2 Neue Systemvarianten

Das vorliegende System ist für den Neubau von Stadtquartieren entwickelt worden und lehnt sich dabei an das Idealbild der kompakten und durchmischten europäischen Stadt an. Jedoch besteht die Möglichkeit, dass auch kleinere monofunktionale Gebiete, wie beispielsweise ein innerstädtisches Wohnquartier, zertifiziert werden können, wenn durch ihre Lage eine Nutzungsmischung auf Stadtteilebene gegeben ist.

Zukünftig soll das System internationalisiert, die Übertragbarkeit auf Bestands- Gewerbe und Industriequartiere evaluiert und ggf. neue Systemvarianten entwickelt werden.

7.3 Weiterer Forschungsbedarf

Daten für Infrastruktur und Freiraum

Die verfügbaren Daten für Herstellungs- und Nutzungskosten, aber auch zur Ermittlung der durch den Bau und Betrieb verursachten Emissionen, beschränken sich derzeit hauptsächlich auf den Gebäudebereich. Daten für den Bereich der Infrastruktur und dem Freiraum sind dagegen nur sporadisch vorhanden. Dies liegt u.a. daran das der Bau von Grün-, Frei und Verkehrsflächen im Regelfall eine öffentliche Aufgabe ist und die Daten für Herstellung und Nutzung dieser Flächen meist bei unterschiedlichen Ämtern einer Stadt archiviert sind und dem Datenschutz unterliegen. Insbesondere für den Nutzungsbereich ist es schwer Daten für die Pflege und Instandhaltung, beispielsweise von einem Quadratmeter Weg mit spezifischen Eigenschaften, zu ermitteln, da die damit verbunden Kosten für Personal und Material nur insgesamt vorliegen und nur schwer auf eine Bezugseinheit gebracht werden können. Ebenso hängen diese stark von dem jeweiligen Pflegestandard und den spezifischen Lohnkosten der Region ab. Eine systematische Aufarbeitung und Bereitstellung dieser Daten, wie dies im Gebäudebereich für die Kosten der Fall ist (vgl. BKI), fehlt für den Bereich der Infrastruktur und dem Freiraum bisher gänzlich.

Bewertung sozialer Nachhaltigkeit

Die Bewertung von Kriterien im sozialen Bereich, wie beispielsweise der Aufenthaltsqualität in öffentlichen Räumen oder die gestalterische Qualität eines Stadtquartiers, ist quantitativ nicht möglich. Im Hinblick auf die Internationalisierung des Systems gilt es hierbei, auf Basis von wissenschaftlichen gesichertern Erkenntnissen, geeignete Indikatoren für unterschiedliche Regionen der Welt zu finden, welche gleichzeitig die klimatischen und kulturellen Unterschiede berücksichtigen.

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🏆 *reviewed paper*

Do New Urban Densities Provide Urban Landscape Identity? A Concept for Operationalizing Qualitative Factors Combining Sophisticated Visualization Workflows

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1 ABSTRACT

Continuing pressure on urban areas due to growing population and further urbanization affects urban quality. Many cities and agglomerations try to cope with negative effects of urban sprawl by further densification of existing built-up areas. As a consequence green and open spaces are disappearing. Among other ecological and socio-economic urban qualities, this is affecting the sense of a place and place attachment of the local inhabitants. However, there are no indicators available, which allow in planning processes for an effective assessment of the impact of further densification on the urban landscape's identity. One challenge is that assessing the impact on the landscape's identity requires both objective and subjective approaches. Objective approaches are well established, for example, in environmental impact assessments untypical elements of a landscape contributing to a loss in landscape aesthetics and character are evaluated. However, these approaches are rather applicable on the rural than on the urban landscape. Furthermore, subjective approaches still lack of suitable tools for integrating individual perceptions of stakeholders into the evaluation process.

In this paper we present an approach based on GIS- and rule-based interactive modeling and visualization tools, which allows for objective and subjective assessment of the urban landscape's identity in participatory planning processes. For the case study of Schlieren, an agglomeration of the city of Zurich (CH), we show exemplarily the implementation of this approach. Combined assessment of hard and soft factors of urban green and open spaces contributing to the urban landscape's identity provides a powerful tool to identify local thresholds of urban densification, and thus proactive planning of sustainable urban development taking into account the residents' requirements directly.

2 INTRODUCTION

In Switzerland, official settlement development concepts focus on a higher utilization of built-up areas (Bundesamt für Raumentwicklung ARE 2009). The main goal of this strategy is to contain urban sprawl (Gennaio et al. 2009) by increasing densities in existing built-up areas of cities and agglomerations. There are evident benefits of planned densification, e.g. support of regional thinking and controlling, setup of priorities, development of economy, sustainable and optimized transportation connections (Bundesamt für Raumentwicklung ARE 2009). However, urban densification may also entail threats to urban quality.

An important factor of urban quality is the sense of place and the people's place attachment, defined as "the positive emotional bonds that develop between individuals and their environment" (Brown & Raymond 2007: 89). Changing urban environment – e.g. due to increasing floor area ratios in land use plans - can have an impact on the people's place attachment. Thresholds with regard to this aspect are not yet known. Existing planning instruments for securing spatial identity are predominantly based on objective indicators. These comprise, for example, the amount of recreation offers or the connectivity of foot and bike paths in or next to the settlement areas (Bundesamt für Raumentwicklung ARE 2003). More recent approaches stress the relationship between social aspects of urban densification and the people's identity with their area (Bundesamt für Raumentwicklung 2011). The significance of relationships between soft and hard factors are too important to be disregarded (Soini et al. 2012).

For solving most of the challenges in future urbanization, spatial knowledge of both urban and spatial planning and stakeholders are required (Taubenböck & Esch 2011). The emphases of individual and

emotional (soft factors) compared to physical (hard factors) indicators are still unknown so that they are not yet taken into account in urban planning processes comprehensively. Moreover, subjective perception contributes to individual place identity (Soini et al. 2012). In order to achieve an urban densification, which is accepted by the people and is identity generating, the subjective perception has to be integrated into the assessment of urban densification proposals.

We present the framework for preparing 3D visualizations linked to objective indicators that offers suitable means for assessing both the soft and hard indicators for the quality of urban densification. First, a literature review is given on the theory of landscape perception and indicators to measure a landscape's potential to generate identity. Then, a case study area in a suburban region in Switzerland, the community of Schlieren, is presented. In the methods section, the framework is described and results of preliminary 3D visualizations linked with objective indicators are given. These are discussed with regard to their suitability and further development possibilities for future application as assessment instruments.

3 THEORETICAL FRAME

3.1 Landscape perception

As Rodewald (2011) describes, there is a three-component view of a place (Figure 1). The first component is evolution based and allows for »reading« the landscape. This view supports orientating oneself and gathering information on a situation in a landscape. The second view component is for receiving colors and aesthetical stimuli. Through this a place gets its characteristic appearance. The third component of our viewing is linked with individual cognitions. A symbolization and identification gives any place a special importance, which depends on preferences, values, preconceived imaginations and individual signs. This third component converts a place to an emotional place, which gets a personal recognition value. Such a sensual, informative and associative view generates the sense of a place.

Girot and Wolf (2010) describe the three components as analytical, physical and poetical view. The analytical view measures the spatial composition and builds relationships between objects. The physical one is described as a corporal experience of cognition. The individual touch is here given by the poetical component, which combines the viewing results to something new and gives them a distinctive attribute for dealing with compositions in landscape.

Figure 1: Illustration of the three component view of landscape perception.

Such subjective parameters should be considered to guarantee comprehensive planning for sustainable urban developments. This requires making aesthetical effects of future developments measurable and visible (Meijer et al. 2011).

3.2 Indicators for a landscape's potential to establish identity

In practice and research, visual impacts are indicated by observers' expressions of preference or judgments/ratings of visual aesthetic quality, which include scenic quality, visual quality and scenic beauty as well (Daniel & Meitner 2001). These preferences are not yet linked with more comprehensive tools, which allow for analyzing both the sense of a place and other factors of urban quality, e.g. urban density, costs for green space infrastructure, energy efficiency and others. Providing tools for subjective and objective assessment, which allow a weighting of different indicators, could support trade-off decision making and the identification of thresholds for aesthetical aspects.

The concept of ecosystem services (ESS) offers a vast systematic framework for goods and services to humanity. The ESS can be categorized into provisioning services (e.g. wild foods, crops, fresh water and plant-derived medicines), regulating services (e.g. filtration of pollutants by wetlands, climate regulation through carbon storage and water cycling, pollination and protection from disasters), supporting services (e.g. soil formation, photosynthesis and nutrient cycling) and cultural services (TEEB 2010). The latter comprise landscape and place identity as well as spiritual and aesthetical services (de Groot et al. 2010). The principal of valuing ecological landscape components by ESS allows a new approach to quantify and bring landscape in comprehensible indicators for enabling a trade-off of several socio-economic values (Grêt-Regamey et al. 2008, 2012).

In urban areas, the ecosystems services depend on the quality of the following major ecosystems: street trees, lawns/parks, urban forests, cultivated land, wetlands, lakes/sea, and streams. Services provided by these ecosystems are, for example: air filtration, micro climate regulation, noise reduction, rainwater drainage, sewage treatment, and recreational and cultural values (Bolund & Hunhammar 1999). In fact, ecosystem services provided by urban green space patterns can provide healthy environments and physical as well as psychological health benefits to the people residing within them. A healthy environment can also contribute an improvement of socio-economic benefits (Tzoulas et al. 2007). The number or area of culturally important landscape features or species support the service of providing signs of cultural heritage and identity (de Groot et al. 2010). Since land use management affects the provision of mainly regulating and cultural ecosystem services (van Oudenhoven et al. 2012), it is very important to develop suitable approaches for integrating the assessment of the impact of landscape changes on the identity into urban planning.

4 CASE STUDY AREA

The 3D urban model is developed for the case study area Limmattal (valley of the river Limmat), an agglomeration in the northwest of Zurich (Figure 2). Special focus will be laid on a dwelling zone in the community of Schlieren. It comprises an area of about 6,38 km² and a population of 16'100 (about 2'462 inhabitants/km²) (Statistisches Amt des Kantons Zürich, 2010).

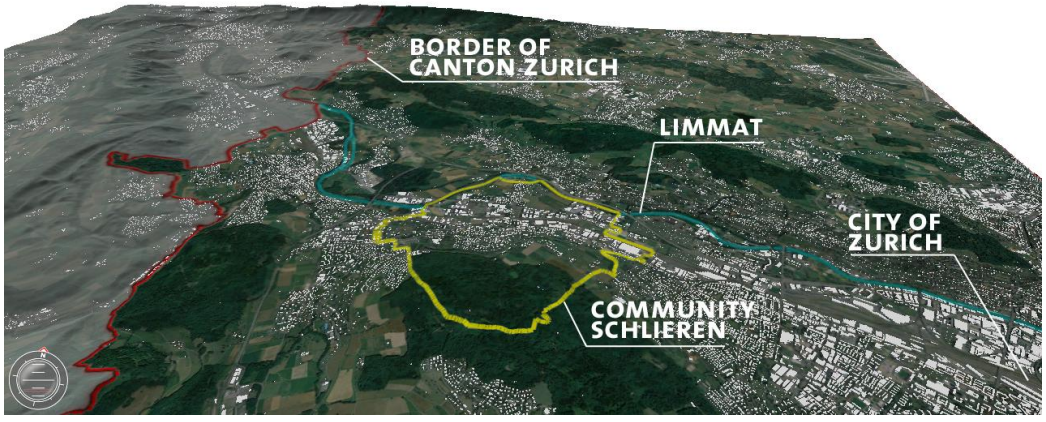

Figure 2: Overview of the community of Schlieren (yellow line) situated in the valley of the river Limmat. Red line marks the border of Canton Zurich with the city of Zurich in the lower right corner of the figure.

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Schlieren is a Swiss city in the agglomeration of Zurich. It combines residential areas, industry and, at the river Limmat, important recreational area for the core center of Zurich city in tight space. Since the 1960s the population increased rapidly up to 10.000 inhabitants (Statistisches Amt des Kantons Zürich, 2010) due to relocation of industry to the agglomerations and good traffic connections to Zurich. Today, it has an important role as transit area and as arising living space for a heterogeneous population. Currently, Schlieren has an annual growth of 800 people and an increase of 4'000 inhabitants was registered for the last seven years. The problem of such a moving in is that living space for only 2'500 people is in planning (Vögli 2012). Thus, this focus area is ideal for analyzing different possible future situations and development strategies in order to cope with the development pressure.

5 METHODS

A participatory approach is necessary for detecting accepted thresholds of densification in dwelling zones taking into account place attachment (de Groot et al. 2010). 3D visualizations of the urban landscape offer high potentials to effectively support such participatory processes (Xu & Coors 2012). New and innovative steps in data acquisition and mapping offer a flexible back-end for land use modeling and 3D visualization (Grêt-Regamey & Wissen Hayek 2010). An interactive approach might be important for a high rate of return and variety of indicator information from the participants (Belton & Elder 1994; Bruigat & Chittaro 2008; van Schaik 2010).

Taking into account these requirements, we set up an interactive collaborative modeling and visualization platform linked with objective indicators of identity and urban density. The preliminary platform was tested with stakeholders with regard to its suitability for participative assessment. The final platform shall be suitable for identifying trade-offs and thresholds associated to urban densification scenarios and place identity. In the following, the major components of this platform (Data acquisition and mapping, Procedural 3D visualization, Participative assessment) are described (Figure 3).

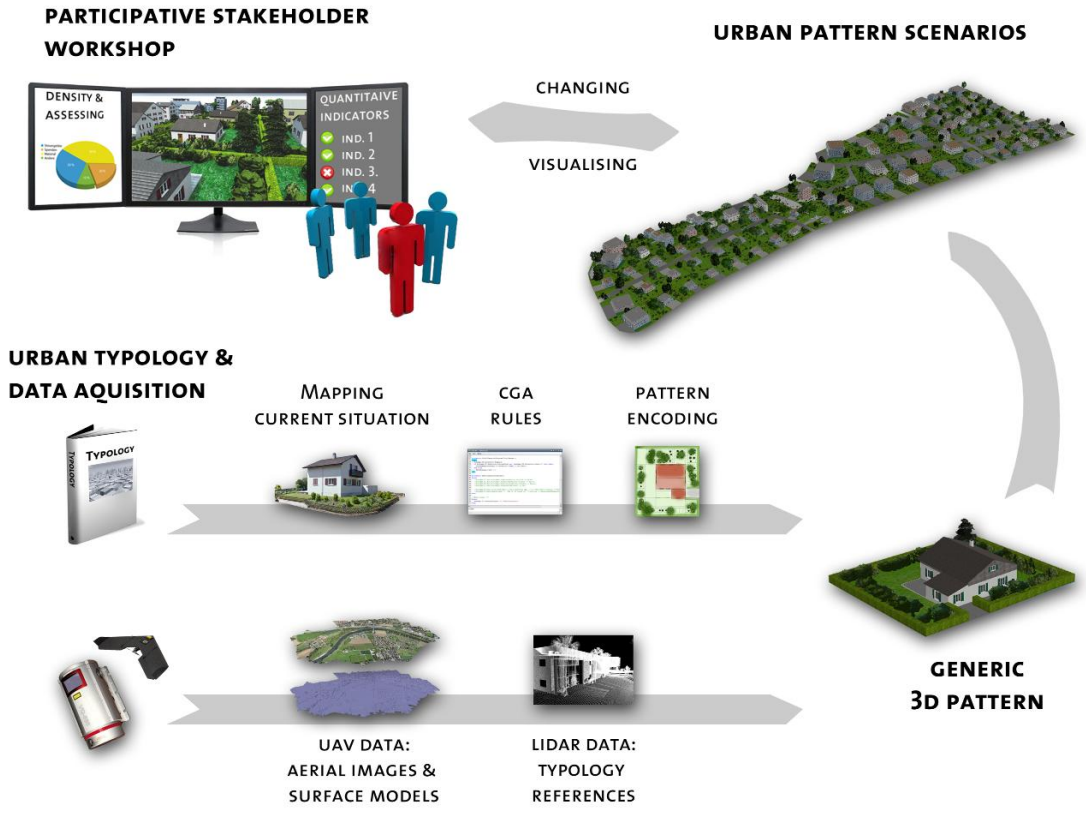

Figure 3: Framework demonstrating the strings of data acquisition and 3D pattern generation suitable for interactive scenario visualization in participative stakeholder workshops or interactive choice experiments.

5.1 Data Acquisition & Mapping

On the one hand, modeling approaches are necessary in order to assess and communicate consequences of complex urban system scenarios and calculate meaningful indicators. On the other hand, realistic 3D visualization with a high level of detail is necessary to assess effects of landscape change scenarios on the landscape view and the people's landscape perception (cf. Wergles & Muhar 2009).

For these reasons, we focused on highly accurate data acquisition methods for accurate modeling and realistic 3D visualizations. To this end, modeling and 3D visualization is based on two methods of data acquisition. We generate high accurate and up to date elevation models and aerial images by implementing (1) a terrestrial laser scanner (TLS) (Riegl VZ-1000) and (2) an unmanned aerial vehicle (UAV).

(1) A terrestrial laser scanner scans with a horizontal and vertical moving laser beam over the landscape. Through detection of the back-reflected laser beam from objects, the distance to these target points can be calculated by time-distance method. The device registers in this way point clouds of landscape objects, which are hit by laser. Depending on the defined scan resolution (moving speed of laser beam on horizontal and vertical axes) a dense point cloud is created, in which each single point has its own geo-referenced xyz-coordinate through GPS localisation of the scanner position itself. With a mounted camera on top the point cloud can be colorized by the RGB values of the photos (Lemmens 2011).

(2) The unmanned aerial vehicle consists of a modified camera, GPS autopilot and radio module. Linked with a ground-based notebook, the fly path for the airframe is defined. The UAV flies autonomously by defined waypoints and heights over the terrain and takes images. Through exact trigger-coordinates and attitude of the images by GPS-autopilot and inclination sensors, a afterwards auto-processing of control points is possible to generate geo referenced surface models and orthophotos (Figure 4), (Manyoky et al. 2011).

Figure 4: Processed high resolution digital surface model (DSM) with orthophoto texture of an Unmanned Aerial Vehicle (UAV). The data shows a part of the case study area of Schlieren (Canton Zurich, Switzerland) and has an accuracy of 8 centimeters (DSM and orthophoto).

Both data pools are complementary, which simplifies the acquisition and modeling parts. Aerial images are used for GIS data processing (orthophotos, digital surface/elevation model) as well as for typology mapping next to field work. Point cloud data gathered from terrestrial laser scanning is used for generating elevation models and for generating 3D building objects (direct implementation of architecture details by manual and automatic modeling tools). Particular strength of these acquisition methods is that they offer a new level of detail and spatial coverage in up-to-date basic data.

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5.2 Procedural 3D visualization

3D visualizations have been proved to be supportive tools for participatory landscape planning workshops (Pettit et al. 2011; Wissen Hayek 2011). For 3D visualization of urban densification scenarios, we implement a procedural urban modeling approach using CGA shape grammar implemented in ESRI's CityEngine system (www.esri.com/cityengine). The software can quickly visualize urban environments including green spaces in interactive three-dimensional views with a high level of detail (Neuenschwander et al. 2011; Wissen Hayek et al. 2010) enabling for evaluation of alternatives and iterative design workflows (Halatsch et al. 2008; Ulmer et al. 2007).

In field mapped building types (e.g. single-family houses, multi-family houses) are encoded as CGA rules. Combining rules for building types leads to rule sets for urban patterns, in our case a dwelling zone. The density aspects are integrated in those rule sets. Executing these rules, 3D urban patterns are generated. Rule parameters can be changed interactively, which allows for iteratively assessing alternatives in real-time to detect the trade-offs between urban densification and place identity. These quantitative parameters offer stakeholders the possibility to check the basic assumptions of the scenarios and thus can contribute to the transparency of the visualization model. Through a live reporting option of quantitative indicators in ESRI's CityEngine system, iterative analyses based on objective indicators are possible. In our preliminary model, we calculated floor area ratios, population densities, population of dwelling zone, green space, green space maintenance costs, potential habitat population, infrastructure costs, for an indicator-based comparison of scenarios.

Newer features in ESRI's CityEngine support import of geo-located Google Warehouse buildings (http://sketchup.google.com/3dwarehouse). However, 3D object models can also be generated from the TLS and UAV data. The data can be easily prepared and processed to get high detailed 3D objects and ground data. This workflow is useful for modeling static non-CGA based buildings, which won't be influenced in scenarios and support the stakeholders' in orienting themselves and thus contribute to the suitability of the model for assessing place identity (Figure 5).

Figure 5: Colorized point cloud from terrestrial laser scanning (left), static 3D building object model based on point clouds (mid), example of a building type generated in the CityEngine system implementing CGA shape grammar rules (right).

Furthermore, there is high potential to automate CGA rule processing and reconstruct buildings by detection tools (Mathias et al. 2011, Becker 2011). This automatic detection methods offer new flexibility in generating a larger set of CGA building rules for more detailed scenarios with realistic appearance. In this way, rules can be automatically detected out of real architectonic patterns. With an integration of such detection technologies in the data acquisition workflow, the creation of present conditions in CGA would highly reduce manual visualization work. The scenario setups would base on detected CGA grammar out of real field data by modifying rule parameters.

5.3 Design of a participative assessment of place identity implementing the tools

Expectations with regard to the landscape scenery differ between heterogeneous population groups (Soini et al. 2012). To this end, participation of a broad population should be aimed at, to collect these various individual opinions and conceptions about threshold values of landscape components concerning place identity. In combination with the interactive modeling approach, online surveys can facilitate an extensive participation. Van Schaik (2010) has shown that interactive 3D visualization for public consultation has a broad acceptance – also of older people – and that it can be offered also in a "survey mode" with back-channel for user comments, questions, preferences and critics for a qualitative data collection.

Technical options increase the quality of feedback (quantitative and qualitative data) on thresholds and trade-offs. The possibilities of NVidia's RealityServer (www.mentalimages.com) supports CityEngine models in interactive and photorealistic web-application and low system resources (e.g. mobile devices) through cloud computing. This setup can bring the CityEngine models as interactive experiments online. Thus, all interviewees can define their own thresholds and supply a high return-rate and extensive data of individual trade-off decisions.

5.4 Pre-Test Design

We conducted a pre-test for assessing preliminary results of implementing the presented framework focusing on the interactive procedural 3D visualization with linked objective indicators. The pre-test was set as interview with the goal to identify the critical steps and technical issues in participative application of the tool and get also first comments and critics of potential users. It was not set up as representative study. Five experts were interviewed to get information on their impressions of the model. The interview was divided in three stages: introduction, presentation and interview.

In the introduction part, the interviewee was introduced to the topic, the visualization method and goals of the interview. The second part comprised a presentation of the case study area, scenarios, thematic integration, theoretical impacts of indicators and technical background. In the actual interview we asked first for the interviewee's ambitions of interacting with the model (indicator setting and navigation). After demonstration of indicator influences by interactive modeling, we asked for stating preferences for a scenario referring to the indicators. Finally, the provided level of detail was assessed by the interviewees.

6 PRELIMINARY 3D URBAN VISUALIZATION MODEL AND PRE-TEST RESULTS

First visualizations and pre-test results show a quite good acceptance of interactive modeling with ESRI's CityEngine system. In a first interview series with stakeholders and experts it was said that interactive modeling helps to understand the presented scenarios (see example in Figure 6).

In these interviews, the participative part was applied as a semi-interactive survey. This means, the model parameters were directly shown in CityEngine. Positive feedback from stakeholders supports that this helps to understand the scenarios and their coherence with the indicators. The option to change camera positions within the visualization to get a close distance view to dwelling zones of special interest or positions with special view axes (Figure 7) was rated as a positive feature.

Figure 6: Example of a densification scenario generated in ESRI's CityEngine of the case study area in Schlieren.

However, the interviewees did not want to navigate themselves through the model and change between the scenarios. Because of the interview structure and option for model interaction after only a short theoretical introduction, the participants asked rather for being navigated through the model.

The most adverse point identified in this pre-test was the complexity of the CityEngine's user interface. Because of this and the big variety of indicators, the stakeholders were deterred to modify them and set up their own scenarios. It was not directly clear for them, where they have to set the parameters, because there are no options for designing any custom bars or buttons for indicator setting. For presentation mode a full-screen option with custom possibility for rule and indicator setting is still missing in CityEngine.

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Although the CityEngine system generally supports interactive change of scenes, for real interactivity in participatory situations the need of system recourses is a hindrance. For generating the scene, a 24GB Ram Workstation with high-performance GPU and CPU was used. For large-scale visualization with included vegetation such a configuration is necessary to handle the changed model parameters re-rendering rapidly. In interview situation we had to use a mobile device, which has a comparatively bad system performance. Therefore, a preparation of the scene was inalienable – the renderings for all scenarios were done before the interviews and interactively modifying and re-renderings were only done for selected lots.

Figure 7: Example of different close up camera positions of two scenarios generated in ESRI's CityEngine.

7 DISCUSSION AND CONLUSION

Our goal was to set up a framework suitable to integrate objective and subjective indicators for assessing urban landscape identity in participatory settings. To this end, we elaborated a workflow combining sophisticated data acquisition and 3D modeling and visualization approaches.

Implementing the framework resulted in 3D visualizations with a rather high level of detail, which were linked to a set of indicators. The used techniques allowed visualizing large landscapes as static high realistic visualizations, which can display relevant aspects for assessing landscape identity. With regard to the visualization workflow, (semi-)automatic generation processes for CGA rules should be implemented in order to generate even more realistic landscapes with reduced effort.

In the pre-test, the interactive modeling supported the interest of interviewees and helped them to understand scenario parameters. However, they did not try to interact with the setting of indicators or change the parameters themselves, which considerably can be ascribed to the complexity of the interface (van Schaik 2010). Further software options of the CityEngine are desirable, such as e.g. hiding complex parameter windows that are confusing for the interviewees. Next to already known benefits of visualizations as communication tool for common strategy development in stakeholder workshops (Figure 8, left), the software design allows new approaches for stakeholder involvement (Figure 8, right), which might be suitable for citizen-sourcing (Nam 2012; Fritz et al. 2012).

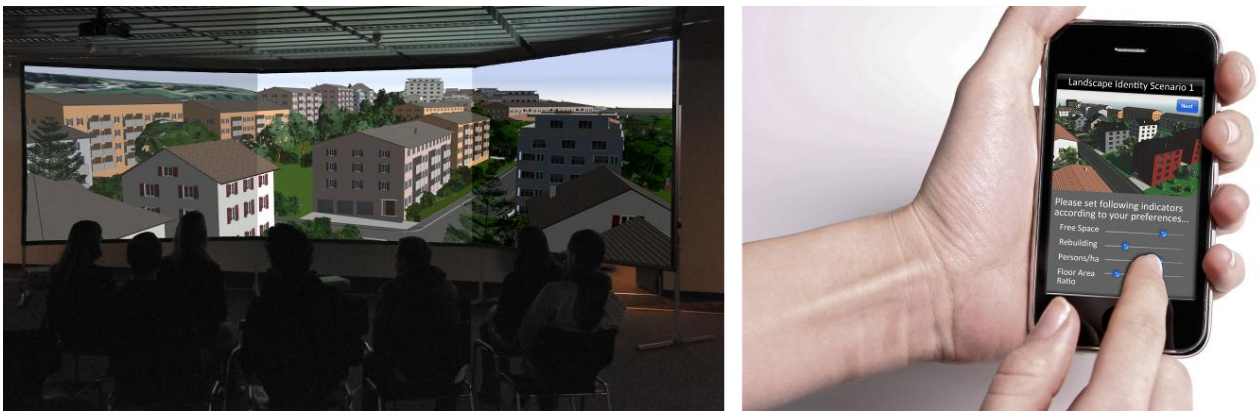

Figure 8: Future application of interactive modeling in stakeholder workshop (left) and in future online applications (right).

Already existing solutions (e.g. RealityServer) can handle the high system requirements of interactive realistic real-time modeling. These techniques could be used for interactive online experiments to get general threshold values of indicators and use these for setting trade-offs in stakeholder workshops with experts. The variety of web application is high, so the integration of the models in game engines is also conceivable (Bishop 2011), which run on nearly all mobile devices and operation systems. This flexibility offers also a high rate of return and the interviewees get an interactive user interface with navigation and indicator setting possibilities online.

Current technical possibilities offer multiple options for an operationalization of qualitative factors like landscape aesthetics and identity. Although concepts of how to develop the supporting tools already exist, the lack of operable interfaces makes their implementation difficult. All methods of the modules in the presented workflow are rather sophisticated. The challenge is to design the interfaces between the modules in order to let the workflow run smoothly. Then, the resulting tool can really improve participative planning processes and potentially provide suitable means to also taken into account urban identity.

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🏆 *reviewed paper*

"Dream" Regional Planning – "Real" Estate Development Based on Shopping Center Developments as Examples of "Real" Re-Mixing

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1 ABSTRACT

The task of a regional planner was, is and will be to keep dreaming of an imaginary ideal future – and to prepare concepts and plans by harmonizing different uses to get the surroundings as close as possible to the dream.

The task of a real estate developer is to look for needles in the haystacks of plots and projects – and to identify successful property opportunities for reaching a profit target.

The interdisciplinary methods and manifold theories of regional and urban planning have undergone scientific research and practical evaluation "for an eternity", whereas real estate development started shy attempts at first theories and new project development standards not even 20 years ago. These were mainly postulated by economists, who didn`t (yet) have as a basis a comprehensive knowledge of planning responsibilities with their entanglements of environmental, historical, technical, social, legal, political and many other aspects of forward-looking planning.

Both disciplines are still in most respects separated not only by different points of view, but also by educations, frameworks, theories, processes, strategies, terminologies, etc. Indeed they need to improve their mutual understanding, as planners have the major knowledge of realistic project opportunities, and real estate developers have the financial resources to realize the dreams in due time.

I will describe some of the gaps between planners and developers that need to be closed to make the planners` dream of Re-mixing the Cities REAL - as the name REAL CORP 2012 implies.

2 INTRODUCTION

Isn`t it remarkable that REAL estate developers do not attend or present at the REAL CORP Conference? But I can reassure you that regional and urban planners do not usually visit real estate conferences either. Endless examples show that without a sound knowledge of real estate development urban and regional planning remains a faraway dream. And vice versa: real estate developers need a better understanding of the stringent complexity of regulations and regional politics.

Do we need real estate developers when we have succeeded without them for ages?

Aren`t proposals as well as designs and solutions safe in the hands of architects?

The reason we need them:

is comparable to why we are already used to the (additional) expertise of regional and urban planners in any architectural process. The complexity of requirements is rising sharply, regulations and laws are getting more and more challenging and this calls for ever increasing expertise. Due to globalisation, the complexity of projects, as well as the requirements from investors to construction companies, are increasing relatively even in less-favourable areas. Financing and commercialisation are examined according to international banking and feasibility standards even for small projects, and commercial tenants are already used to comparing their contracts with frame contracts and rental studies of "big players" even when their demands are not comparable in that regard ...

So the answer is:

Yes, we need real estate developers at least for commercial, industrial and hotel projects, retirement homes, healthcare facilities, and last but not least for mixed use project developments, due to the growing demands of our society.

… and an additional answer is:

The solution to the far-reaching misunderstandings of planners and developers is to analyse, explain and work together on solutions to harmonise the different points of view. And to accept that regional and urban

planners have as their responsibilities the "eternal" consequences for society, but real estate developers take their decisions according to economic calculations for the investment period.

In recent years a few (postgraduate) programmes have been started to offer education combining both disciplines, but in most European countries there is still no "real estate development" education at the university level as there are just few scientific investigations and assessments.

3 INTERDEPENDENCE OF REGIONAL PLANNING AND REAL ESTATE DEVELOPMENT

Everyone involved in planning procedures knows that the basis of regional and urban concepts and plans are collections of more or less practically useful planning theories and many legal and technical preconditions.

But these regional planning instruments theoretically summarize, in advance, project possibilities which are not clearly defined until specific plots are examined in details by real estate developers who usually investigate different variants during an initial real estate development process with respect to their economic potential.

It would be advantageous if these initial feasibility studies from real estate development were already also based on the legal and technical constraints according to all available planning instruments.

Unfortunately many examples of project ideas still show that in the opinion of developers, especially regarding large-scale projects, planners and "serving" politicians are expected to adapt regional planning instruments to develop ideas as quickly as possible – time for investors runs very fast.

3.1 Excursus: regional and urban planning

Different political cultures produce very different kinds of planning and this is not just valid in the comparison of different continents or countries, but also for any region, project or involved decision maker, and especially for the political decisions of the permitting process.

Planning theory is not a universal theory, and we must constantly reinterpret what we do in the light of our own experiences is another fundamental piece of Prof. John Friedmann (Prof. em. University of British Columbia, Canada), based on his over 60 years of theoretical and practical experience, and who is at the age of 86 still recognised in specialist circles worldwide as one of the leading academics in the field of planning culture and planning theory.

The driving forces behind regional and urban planning are in particular:

- public authorities (regional planning laws / infrastructure requirements)
- land owners (transactions to market / own use / specific projects)
- regional and urban planners
- political decision makers

and just to mention the main professions who are entitled by governments to regional and urban planning:

- regional and urban planners (technical education)
- architects (technical education)
- cooperation with social, technical, legal, demographic and other experts

But as mere technicians are accepted officially to lead a planning process, the involvement and question "Who are the planners" is an ongoing discourse. In this respect I shall quote once more without comment John Friedmann: professionals with a tertiary degree in the field? Architects specializing in urban design? The city engineer?Housing experts?Public officials who occupy positions in municipal planning offices? And should we distinguish city planners from, say transportation or environmental planners? Are social planners in or out? What about planners who are not engaged in drawing any sort of plan (strategic or otherwise) but are involved in the resolution of conflicts about urban issues of one kind or another? Do certain lawyers qualify, even though they have no planning degree? And what of city managers? … we also loose ourselves in another part of the labyrinth, whenever we ask about the "planning process" ...

3.2 Excursus: real estate development

Real estate development is the motor of the estate economy, which provides the market with new products in the form of new buildings and reactivation of existing buildings . It provides according to most experts, the idea-location-capital triangle to a real estate development project.

The driving forces behind real estate development are in particular:

- investors (private / institutional)
- (large) construction companies
- real estate development companies
- real estate agencies
- public authorities (incl. public private partnerships)

and 3 main types of developers, depending on their type of involvement:

(1) trader developer (market / investors / funds – trading profit))

(2) investor developer (own portfolio / property – rental profit)

(3) service developer (counselling / advice - fee)

Depending on these different driving forces behind the profession "developer" the professional background of these developers includes a wide range from economists, lawyers, politicians to other (self-made) experts, but astonishingly few architects and other planners.

The reason might be that technicians are not just different personalities with other professional expectations but rather that they are poorly educated in the necessary complex economies.

I would, however, like to emphasize once more from another point of view the different real estate development approach to projects by giving some examples of typical methods which are not, or at least not in detail, considered by planners during regional planning procedures:

- location analysis
- market and competition analysis
- user requirements programme
- cost-utility analysis / feasibility analysis
- capital budgeting
- valuation of real property / performance measurement
- market placement / public relations
- property management

3.3 Different approaches and perspectives of RP and RED

The following short descriptions are intended to highlight the cross-sectoral perspectives that are of key significance for the development and evaluation of individual projects.

Regional planning is decided primarily by politics with the objective of sustainable use of land and infrastructure, with a lack of short term instruments and money for realisation.

Real estate development is initiated primarily based on market forecasts with the objective of an appropriate return on investment either from development of a defined area or the need for an area/building for a defined use.

(1) regional planning (RP) - "eternal" / future generations

- focus: development for the benefit of a region – POLITICS
- framework: + political + legal + technical requirements

(2) real estate development (RED) - "20 years" / investment period

- focus: return on investment (RoI) of a specific project – MARKET

- framework: + economic + legal + technical requirements

Comparison of Principles

Real Estate Developments		Regional Planning
1 project	**basic**	region
return on investment	**focus**	regional benefit
market development	**success**	regional development
economic calculations	**theories**	multiple planning theories
investment period (e.g. 20 y)	**time frame**	eternity (life cycle of buildings)
investors	**final decision**	politicians

4 EXAMPLE: SHOPPING CENTER DEVELOPMENT

"Shopping Center" doesn`t need any explanation, does it?

Is shopping center development similar to other challenges of real estate development?

Starting with the 1st "no"-answer:

Even though America is said to be the homeland of "shopping centers", they are unknown there as they are called "shopping malls" and in British English it is "shopping centres" - therefore it depends on the authors preference to a country or continent which terminology is found in the names of the centers/centres/malls or in literature.

Also the respective definition of size is not regulated, so in Austria the minimum size for a shopping center is 4,000 sqm or more than 10 shops plus 2 anchors, or more than 20 outlets whereas the international minimum starts at 10,000 sqm – but these are no official accepted regulations either.

Architect Victor Gruen, who was born in Austria but worked from 1938 onwards mostly in America as an urban and regional planner, is quoted by many experts as "father of shopping centers" but criticised in a speech 1978 London "Americans for perverting his ideas …and proclaimed "I refuse to pay alimony for those bastard development" and he claimed that their [developers] motives had changed ...present day developers, Gruen lamented, only look at the bottom line. The developer were new anonymous real estate entrepreneurs ... promotors and speculators who just want to make a fast buck". So the initiative for his development of shopping malls was to offer a kind of meeting place with shops, social infrastructure, restaurants, with a mall construction as protection from the weather. Cars and parking "deserts" were not a big issue that time and Victor Gruen kept fighting against the influence of individual mobilization or what the politicians, planner, and developers made out of it: tree or cars? cars!

… and to continue with the 2nd "no"-answer:

The development of a shopping center is not comparable for a developer with other development projects, in respect of their far reaching consequences and specialised knowledge with high complexity which is shared within mostly international "inner cercles" of investors, tenants, planners, statisticians, construction companies, center managers, etc. using a specialised range of key figures.

Retail developments, and especially shopping centers, are perfect examples to demonstrate the tip of the iceberg in regards of the interdependence regional planning and real estate development, as they see themselves in terms of

- highly specialised knowledge
- high economic drive
- high total retail turnovers
- high turnover per deal size
- international developers
- international investors

- increasing shopping center percentage to other retail
- increasing investment of cross border compared to local purchasers
- high employment opportunities
- high tax revenue
- good political reputation
- good monumental reputation – as long as the architecture is respectable

but according to my own experience as well as official statistics there are some other factors such as

- few serious players in the market
- high economic risk
- high impacts on regions
- high percentage of cancelled and postponed developments
- high number of unprofessional "wannabe developers"
- high risk of reusability when a center has seen already better days ...

After the real estate crises in 2008 the economic power of retail and shopping center development in Europe reached € 37.2 billion in 2011, with a revival in high value deals and of international buyers . Therefore the economic drive of profit calculations for specific locations versus best possible use of land, technical and social infrastructure continues to challenge urban and regional planning.

The first year after the 2008 crises, forecasts were somewhere between "hope" and "hell", but the total retail investment turnover in Europe had recovered already to € 36.2 billion in 2010 , for some experts an unexpectedly high level.

Nevertheless, the figures for developments which were stopped / postponed / new in 2010 showed the confusion in the market and the challenge for regional planners who had to deal (or not to deal, that`s the question?) e.g. in Romania, a country not known for high purchasing power of its 19 million inhabitants and 370 km of motorways, with 86 shopping center projects, of which 35 were stopped, 48 postponed and 3 new.

Another key figure demonstrated in the year 2010 – therefore 2 years after the crisis – is the comparison of projected and existing leasable areas in shopping centers per 100 inhabitants.

Hungary is one of the EU countries which pushed itself 2012 in a deep financial crisis, but nevertheless was already in 2010 at a high level with 24 sqm existing leasable area per 100 inhabitants (see e.g. Switzerland with 28 sqm) and additional projects up to nearly 50 sqm (see Switzerland existing + projected 37 sqm in total). With these high dreams of developing the country, Hungary was on the way to becoming the second best-equipped country in Europe.

At least according to statisticians the "winner" 2010 was Estonia with a total of 59 sqm (43 sqm existing, 16 under development) per100 inhabitants.

As a comparison, well developed Austria was in 3rd place with a total of 38 sqm (32 sqm existing).

Last but not least, Bulgaria as an example of the challenges which regional planners and developers are facing, where shoppers had 10 sqm leasable area / 100 inhabitants and an additional 10 sqm were planned.

As a final example Turkey with its 8 sqm existing leasable in shopping centers per 100 inhabitants, and including projects under development a total of 11 sqm,. And this country is, in comparison to many other countries full of development dreams, expected to have a promising development of the economy due to the demographic numbers with 50 % younger than 29 years.

5 CONCLUSION

Nomen est omen:

REGIONAL planning needs to act as the PRINCIPAL in long term REGIONAL development, whereas

REALestate development has to take as the AGENT for short term REALisation measures.

Regional planners are not used to profit calculations and "feasibility studies" and real estate developers are not willing "to get rejected by butterflies on a wild meadow or a mistrust in their traffic concept".

The challenge for urban and regional planning is to find

theoretical as well as political and practical answers for the key question:

"how can regional planning on the basis of sustainable use of land and infrastructure

support and ensure real estate developments of shopping centers for a reasonable retail policy?"

To realize project visions and concepts – from either regional planners or real estate developers – in due time there is, besides the mutual understanding and knowledge an unconditional need for clear objectives from politicians and planners regarding zoning and prioritisation, including instruments supporting realisations, especially for developments with high profit expectations such as commercial, industrial, and hotel projects, retirement homes, healthcare facilities, and the supreme discipline of mixed use project developments,

Comprehensive knowledge of both disciplines is the basis

for making sweet dreams of sustainable developments come true

in due time and

combining quality with profitability

… and never to forget:

to save enough money for subsequent projects!

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🏆 *reviewed paper*

3-Plus der Initiierung und Umsetzung smarter Mobilitätslösungen: Die Gunst der Stunde nutzen!

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1 ABSTRACT

Smarte Mobilitätslösungen (Carsharing 3G, Fahrradverleihsysteme, E-Mobilität und organisierter Sammelverkehr), die von Entwicklungen im Bereich der mobilen Technologien stark profitieren, besitzen das Potenzial sowohl zum Klima- und Umweltschutz beizutragen als auch die Mobilitätschancen der Bevölkerung zu verbessern. Eine wesentliche Schlüsselfrage lautet daher: Wie lassen sich smarte Mobilitätslösungen in der Praxis besser imitieren und letztlich umsetzen? Ausschlaggebend dafür sind eine Vielzahl unterschiedlicher Einflüsse, die von der Gesetzeslage, Fördersituation, Innovations- und Mobilitätskultur vor Ort über die Eigenschaften smarter Mobilitätslösungen hinsichtlich Akzeptanz und CO_2-Reduktionspotenzial bis hin zu den Akteuren mit ihren Netzwerken reichen. Ausgehend von theoretischen Ansätzen aus der Politikfeld- (z.B. Multiple-Stream Ansatz und dem Policy-Cycle) und Sozialforschung (Sozialen Netzwerkanalyse) wird die formulierte Schlüsselfrage aus unterschiedlichen Perspektiven mit den Methoden der Delphi-Befragung, der Sozialen Netzwerkanalyse und der Expertenbefragung empirisch analysiert, um umfassende Hinweise für die Initiierung und Umsetzung smarter Mobilitätslösungen zu erhalten. Entscheidend sind letztlich sich öffnende Gelegenheitsfenster: Wenn gleichzeitig mehrere fördernde Einflussfaktoren vorhanden sind, dann steigen die Chancen für eine erfolgreiche Implementierung enorm. Dazu zählen robuste Netzwerke und gut vernetzte Schlüsselpersonen, die das Projekt unterstützen, staatliche Förderungen und eine ausgeprägte Innovations- und Mobilitätskultur vor Ort sowie smarte Mobilitätslösungen mit CO_2-Reduktionspotenzial, die von der Bevölkerung akzeptiert und genutzt werden.

2 EINLEITUNG

2.1 Ausgangslage und Zielstellung

Anspruch und Realität einer nachhaltigen Mobilität klaffen immer noch auseinander. Trotz ambitionierter verkehrs- und klimapolitischer Leitvorstellungen, Ziele und Programme (z.B. CEC 2005, Klimastrategie 2010) wird immer mehr statt weniger Pkw gefahren. So verschiebt sich der Verkehrsmarkt nach wie vor zugunsten des Pkw-Verkehrs, wie eine zunehmende Pkw-Verkehrsleistung (Anstieg von 79,2 Mrd. auf 101,4 Mrd. Personenkilometer (+ 28 % von 1990 bis 2009) (Anderl et al. 2010) und ein steigender Motorisierungsgrad[1] (+5 % von 2005 (504 Pkw/1000Ew.) bis 2010 (530 Pkw/1000Ew.)) zeigen. Entsprechend trägt der Verkehrssektor mit einem Anteil von 27 % und 21,9 Mio. t CO_2-Äquivalente (2009) maßgeblich zu den österreichischen Treibhausgasemissionen bei. Bislang wurden die in der Klimastrategie 2010 formulierten Reduktionsziele von ca. 2,8 Mio. t CO_2-Äquivalente (2009) verfehlt (Anderl et al. 2010). Ob und inwieweit diese Ziele zukünftig erreicht werden, hängt insbesondere davon ab, wie multimodales Verkehrsverhalten in der Bevölkerung durch eine stärkere Verbreitung von smarten Mobilitätslösungen und der nahtlosen Vernetzung mit dem bisherigen Angebotsspektrum des Umweltverbunds forciert werden kann.

Smarte Mobilitätslösungen profitieren dabei von technologischen Entwicklungen der digitalen Welt: Smartphones mit mobilem Internet, Ortungsfunktionalität und Touchscreen, deren Verbreitung in der Gesellschaft rasant fortschreitet, vereinfachen das Informieren, Organisieren, Reservieren und Bezahlen. Somit rückt „Mobility-on-Demand“ immer näher. Smarte Mobilitätslösungen gelten als innovativ, intelligent, effizient und attraktiv, wobei im Folgenden Carsharing 3G, Fahrradverleihsysteme, E-Mobilität und organisierter Sammelverkehr thematisiert werden.

Obgleich smarte Mobilitätslösungen das Potenzial haben CO_2 zu reduzieren, weniger Lärm zu verursachen, weniger Fläche zu beanspruchen etc. und die Mobilitätschancen in der Bevölkerung zu verbessern, bleiben diese bislang eher Nischenprodukte. Daher gilt es die komplexen verkehrspolitischen Mechanismen sowie Einflüsse, die sich fördernd oder hemmend auf die Initiierung und Umsetzung smarter Mobilitätslösungen in

[1] Quelle: http://www.statistik.at/web_de/services/wirtschaftsatlas_oesterreich/verkehr/index.html (Zugriff: 25.02.2012)

der Praxis auswirken, zu identifizieren. Es werden gegliedert nach drei Einflussbereichen folgende Fragestellungen beantwortet:

Smarte Mobilitätslösung	**Beschreibung**
CarSharing 3G (3. Generation)	CarSharing ist eine organisierte, gemeinsame Verwendung von Pkw durch mehrere Nutzer. Gegen ein zeit- und/oder entfernungsabhängiges Entgelt erhält der Nutzer ein CarSharingfahrzeug, welches vom Anbieter unterhalten, gepflegt und repariert wird. Die 3. Generation des CarSharings zielt auf eine stärkere Flexibilisierung durch eine Spontannutzung („Instant Access“) und „One-Way-Fähigkeit“ ab.
organisierter Sammelverkehr	Sammelverkehre zielen auf eine bessere Auslastung von Pkw-Fahrten durch Mitfahren ab. Dazu zählen beispielsweise spontane, privat organisierte Fahrgemeinschaften, Shuttledienste und auch die Nutzung von bestehenden Kapazitäten im Taxiverkehr zu Zeiten eines geringen bzw. nicht vorhandenen ÖV-Angebotes. Aktuell existieren dynamische Ridesharingsysteme, welche mit Social Media Plattformen kombiniert sind. Durch Echtzeitinformationen mittels Internet und Standortbestimmungen (GPS) wird „On-Demand“ Service möglich.
Fahrradverleih-Systeme	Öffentlich zugängliche Fahrräder lassen sich unentgeltlich oder gegen Verleihgebühr temporär nutzen. Es wird ein bestimmtes Gebiet abgedeckt und das Angebot ist 24 Stunden am Tag mit geringem Aufwand zugänglich. Die letzte Generation zeichnet sich durch ein erweitertes Angebot mit Pedelecs aus, ist multimodal verknüpft insbesondere mit dem ÖV, basiert auf Informationstechnologien und die teilautomatisierte Fahrradausleihe erfolgt per Telefon, per Chipkarte, Internet oder Smartphone. Zusätzlich besteht die Möglichkeit Fahrräder an verschiedenen Orten auszuleihen und rückzugeben („One-Way-Fähigkeit“).
E-Mobilität mit Organisations-system	Betreiberunternehmen (z.B. Stromanbieter, Automobilhersteller) bieten Batteriefahrzeuge, Hybridfahrzeuge und/oder von Brennstoffzellen angetriebene Fahrzeuge an. Mögliche Geschäftsmodelle der Mobilitätsanbieter für E-Auto, E-Bike, Pedelec, E-Roller, E-Moped, E-Motorrad, Segway etc. sind Fahrzeugverkauf, Fahrzeugleasing, Fahrzeugverkauf und Batterieleasing, CarSharing etc.

Tabelle 1: Smarte Mobilitätslösungen.

Smarte Mobilitäts¬lösungen

- Welche Verbreitungschance haben die einzelnen smarten Mobilitätslösungen?
- Welche CO_2-Wirksamkeit sind durch die smarte Mobilitätslösungen zu erreichen?
- Welche Zielgruppen zeigen eine Affinität zu welchen smarten Mobilitätslösungen?

Initiierungs- und Umsetzungs¬prozess

- Welche Rahmenbedingungen (rechtliche und finanzielle) hemmen oder forcieren die Initiierung und Umsetzung smarter Mobilitätslösungen?
- Inwiefern hat die Struktur vor Ort (Siedlungs-, Wirtschafts-, Bevölkerungsstruktur, Innovations- und Mobilitätskultur) eine Auswirkung auf die Initiierung und Umsetzung smarter Mobilitätslösungen?

Soziale Netzwerke und Akteure

- Welche Rolle haben Schlüsselfiguren (Förderer, „Provider“, „Gatekeeper“ etc.) und wer sind diese?
- Wie gut sind Personen aus unterschiedlichen Institutionen z.B. Verwaltung, Politik, Verkehrs-betrieben etc. vernetzt?
- Wie lässt sich die Netzwerkstruktur charakterisieren? Was zeichnet optimale Netzwerke aus, wenn es um die Umsetzung und Verbreitung smarter Mobilitätslösungen geht?

3 STAND DER WISSENSCHAFT

Smarte Mobilitätslösungen zu initiieren und umzusetzen ist aufgrund ihres Innovationscharakters eine große Herausforderung. Aufgrund ihrer Umsetzungskomplexität sind diese als sogenannte „Wicked Problems" (Rittel und Webber 1973) einzuordnen, wobei eine Reihe von Besonderheiten eine Rolle spielen: Machtpolitische Verhältnisse, die verkehrspolitische Entscheidungen beeinflussen, eine hohe soziale Komplexität mit einer Vielzahl unterschiedlicher Akteure, Zielvorstellungen und Lösungsvorschläge, spezifische lokale bzw. regionale Problemlagen und Potenziale etc. Für ein besseres Verstehen dieser vielschichtigen, miteinander verwobenen Zusammenhänge, wird daher ein umfassender analytischer Erklärungsansatz verfolgt. Während der aus der Organisationstheorie stammende Multiple-Streams-Ansatz

(Kingdon 1984, Rüb 2009) drei unterschiedliche Ströme mit (i) Problemwahrnehmung, (ii) Lösungsansätzen und (iii) politischen Machtverhältnissen sowie die von einer günstigen Situation geprägten Gelegenheitsfenster („window of opportunity“) als Erkärungsmodell für politisches Handeln thematisiert, untersucht die Soziale Netzwerkanalyse (Jansen 2006) Beziehungen von Akteuren. Das Konzept des sozialen Netzwerkes basiert auf der Austauschtheorie, die den sozialen Alltag von Menschen durch einen wechselseitigen Austausch von Leistungen („Reziprozitätsprinzip“) beschreibt (Schubert et al. 2001: 13). Menschen können dabei nicht unabhängig voneinander betrachtet werden, sondern es ist vielmehr von einer ständigen gegenseitigen Beeinflussung durch Andere auszugehen (Widmer und Troeger 2005). Hingegen beschreibt das Modell des Policy-Cycles den politischen Entscheidungsprozess in mehreren Stadien (Howlett et al. 2009, Jann und Wegrich 2009) und dient hauptsächlich der analytischen Strukturierung des Initiierungs- und Umsetzungsprozesses. Die dargelegten Ansätze bilden den theoretische Rahmen der eigenen Untersuchung, um der hohen Komplexität verkehrspolitischer Initiierungs- und Umsetzungsprozesse besser gerecht zu werden.

Zu smarten Mobilitätslösungen liegen eine Reihe von Studien vor, die unterschiedliche Aspekte thematisieren: Systembeschreibungen (z.B. Monheim et al. 2011), Chancen und Hemmnisse der Umsetzung (Frick et al. 2003, Beckmann et al. 2005), Akzeptanz und Mobilitätsverhalten von Nutzer (Knie et al. 2012; Bundesamt für Energie 2006), Umwelteffekte (Firnkorn und Müller 2011) etc. Bislang eher wenig betrachtet sind die Prozesse der konkreten Umsetzung, wobei die Studie von Beckmann et al. (2005) hierzu einige wesentliche Anhaltspunkte liefert. Es wird dargelegt, dass das Zusammenwirken einer Vielzahl von fördernden Faktoren aus den Bereichen Akteure und Kommunikation, Art der Maßnahmen und Rahmenbedingungen in einer spezifische Situationen für ein Gelingen entscheidend sind. Weniger die Art der Maßnahme sondern stärker die beteiligten Akteure sind dabei bedeutsam. Eine vertiefende quantitative Analyse von verkehrspolitischen Akteurskonstellation mit der bereits in anderen Teildisziplinen der Sozialforschung stark präsenten Sozialen Netzwerkanalyse ist bislang in diesem Zusammenhang nicht erfolgt. Beispielsweise beschränkt sich Schreiner (2003) in seinen Ausführungen auf die Akteursgruppen Verwaltung, Ingenieurbüros und Wissenschaft und diskutiert deren Beziehungen innerhalb und zwischen den Akteursgruppen.

4 METHODIK

Für eine umfassende und systematische Analyse des Initiierungs- und Umsetzungsprozesses smarter Mobilitätslösungen wurde eine Delphi-Befragung (Häder und Häder 2004, Rowe und Wright 1999), eine Prozessanalyse mittels leitfadengestützten Experteninterviews (Mieg und Näf 2005) und eine Soziale Netzwerkanalyse (Jansen 2006) realisiert. Tabelle 2 beschreibt die einzelnen Methoden anhand unterschiedlicher Kriterien. Im Gegensatz zu quantitativen Befragungen der Sozialforschung zählen Experteninterviews aufgrund der kleinen Anzahl an Befragten und aufgrund der Offenheit der Fragen zu den qualitativen Methoden der Datenerhebung (Mieg und Näf 2005).

	Delphi-Befragung	**Experteninterviews**	**Soziale Netzwerkanalyse**
Untersuchungs-gegenstand	Beurteilung smarter Mobilitätslösungen	Analyse Initiierung- und Umsetzungsprozess	Analyse von Netzwerkstruktur, Gruppenbeziehungen und Schlüsselpersonen
Forschungs-ansatz	quantitativ (Häufigkeitsverteilung, Mittelwerte)	qualitativ (Zitate, Bestätigung oder Ablehnung von Arbeitshypothesen, Nennungen)	quantitativ (Netzwerkvisualisierung und Kennwerte)
Methoden-charakteristika	zweistufige und reflexive Befragung	prozessorientierte Inhaltsanalyse des Interviews	gegenseitige Beeinflussung und Austausch von Wissen, Ressourcen etc.
Datenerhebung	postalisch und per E-Mail versendeter Fragebogen	telefonisches, leitfadenorientiertes Interview	telefonische Befragung
Stichprobe	35 internationale Experten/-innen	18 beteiligte Personen an konkreten Umsetzungen	34 Akteure mit Bezug zum Thema Mobilität in der Region
Untersuchungs-raum	europaweit	österreichweit	Obersteiermark-West

Tabelle 2: Methodik.

5 ERGEBNISSE

Nachfolgend dargestellte empirische Ergebnisse zeigen erstens das Potenzial smarter Mobilitätslösungen auf Basis einer Delphi-Befragung, zweitens deren Initiierungs- und Umsetzungsprozess nachgezeichnet mit Experteninterviews und drittens die Bedeutsamkeit von Netzwerken und Akteuren analysiert und visualisiert mit der Sozialen Netzwerkanalyse.

5.1 Potenziale smarter Mobilitätslösungen

Verbreitungschance und CO_2-Wirksamkeit

Eine hohe Verbreitungschance existiert unter der Voraussetzung, dass Verkehrsteilnehmer smarte Mobilitätslösungen kennen, akzeptieren und letztlich nutzen. Ebenso ist die CO_2-Wirksamkeit von Interesse.

Abbildung 1 zeigt eine kombinierte Betrachtung dieser beiden Faktoren.[2] Laut der Expertinnen und Experten der Delphi Befragung weisen Fahrradverleihsysteme und die organisierte E-Mobilität sowohl eine hohe CO_2-Wirksamkeit als auch eine große Verbreitungschancen auf, was optimal ist. Hinsichtlich der CO_2-Wirksamkeit stimmen Carsharing 3G und der organisierte Sammelverkehr überein, jedoch hat letztere Mobilitätslösung die geringste Verbreitungschance.

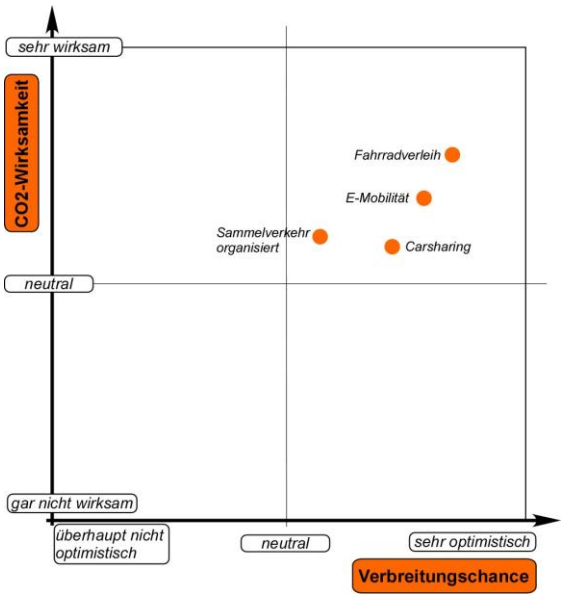

Abbildung 1: Verbreitungschance und CO_2-Wirksamkeit von smarten Mobilitätslösungen (Delphi Befragung n=35, Quelle: verkehrplus).

Entwicklungstrend und Nutzungspräferenzen zukünftiger Zielgruppen

Untersuchungen (z.B. Bamberg et al. 2000) zeigen, dass eine zielgruppenspezifische Ausrichtung und Anpassung von verkehrlichen Maßnahmen - hierzu zählen auch smarte Mobilitätslösungen - zur Steigerung der Akzeptanz sinnvoll sind. Für die Zielgruppenanalyse werden Mobilitätstypen aus einer Untersuchung von Hunecke und Haustein (2007) zugrunde gelegt, bei denen die Einstellungen der Verkehrsteilnehmer wesentliches Klassifizierungsmerkmal sind. Aus Tabelle 3 geht als Expertenurteil der Delphi-Befragung hervor, sowohl wie sich die Entwicklungstendenz der unterschiedlichen Mobilitätstypen in den nächsten 20 Jahren verändert als auch wie hoch der zukünftige Nutzeranteil für die jeweiligen Mobilitätslösungen prognostiziert wird. Es wird von den Experten abgeschätzt, dass vor allem die Anteile der Mobilitätstypen „selbstbestimmte Mobile“, „umweltsensibilisierte ÖV-Fans“ und „wetterresistenten Rad-Fans“ zukünftig steigen. Diese Mobilitätsgruppen sind eher multimodal unterwegs und zeichnen sich durch eine Affinität gegenüber smarten Mobilitätslösungen aus. Im Gegensatz dazu liegt die Einschätzung der Nutzung von smarten Mobilitätslösungen durch die Gruppen „Pkw-Individualisten“ und „ÖV-distanzierte Zwangsmobile“

[2] Als Antwortkategorien standen bei der Frage nach der Verbreitungschance „überhaupt nicht optimistisch“, „nicht optimistisch“, „neutral“, „optimistisch“ und „sehr optimistisch“ und bei der CO2-Wirksamkeit „gar nicht wirksam“, „wenig wirksam“, „neutral“, „wirksam“ und „sehr wirksam“ zur Auswahl.

deutlich niedriger. Zu beachten ist, dass die Bevölkerungsanteile dieser Zielgruppen zukünftig abnehmen, wie die Experteneinschätzung zeigt.

	Prognostizierte Nutzungspräferenzen smarter Mobilitätslösungen				
	Selbstbestimmte-Mobile	**Umwelt-sensibilisierte ÖV-Fans**	**Wetterresistente Rad-Fans**	**Pkw-Individualisten**	**ÖV-distanzierte Zwangsmobile**
Sammelverkehr	32%	35%	13%	8%	12%
CarSharing	35%	28%	14%	11%	12%
Fahrradverleih	32%	28%	23%	7%	10%
E-Mobilität	28%	25%	15%	18%	14%
Einschätzung Entwicklungstrend der Mobilitätstypen[3]	**+4%**	**+3%**	**+1%**	**-3%**	**-4%**

Tabelle 3: Einschätzung Entwicklungstrend der Mobilitätstypen in den nächsten 20 Jahren sowie deren Nutzungsverteilung (Delphi Befragung n=35, Quelle: verkehrplus).

5.2 Rahmenbedingungen und Strukturen vor Ort

Finanzierung und staatliche Förderungen

Eine Grundvoraussetzung für die Initiierung und Umsetzung von smarten Mobilitätslösungen ist die Verfügbarkeit von finanziellen Mitteln. Fast drei Viertel der 18 Fallbeispiele profitieren dabei von einer finanziellen Förderung (Abb. 2, links). Der Einfluss dieser wird durchweg als positiv beurteilt (Abb. 3, Mitte). Bei differenzierter Betrachtung von geförderten oder nicht geförderten Projekten fällt auf, dass im letzteren Fall die finanzielle Lage wesentlich schlechter beurteilt wird, so dass gerade dann staatliche Förderungen das Risiko senken (Abb. 3, rechts), die sowohl für Investitionen als auch den laufenden Betrieb verwendet werden. Aktuell werden vorwiegend E-Mobilitätsprojekte und Fahrradverleihsysteme gefördert. Geringer fällt die Förderquote für CarSharing und den organisierten Sammelverkehr aus (Raithofer 2011).

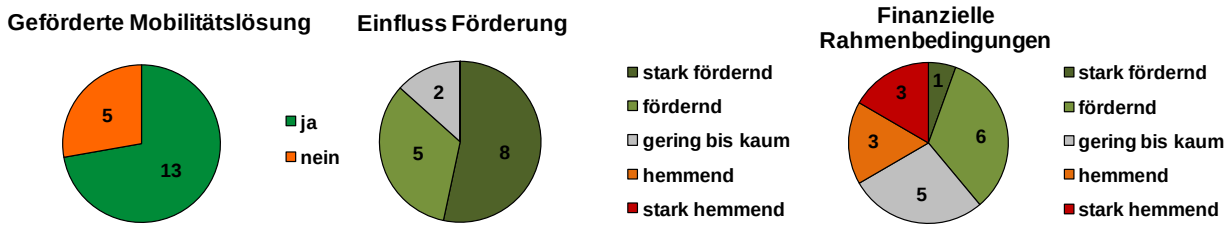

Abbildung 2: Anzahl der geförderten Mobilitätslösungen [li.], Einfluss von Förderungen auf die Initiierung und Umsetzung [mi.] und allgemeine finanzielle Situation (Prozessanalyse n=18, Quelle: verkehrplus).

Öffnungs- und Experimentierklausel

Sowohl Experimentier- als auch Öffnungsklauseln (Maaß 2001) dienen der Aufhebung von Standardregelungen (z.B. Stellplatzverordnungen, Kraftfahrliniengesetz). Durch die legale Möglichkeit von bestehenden „starren" Regeln abzuweichen, können smarte Mobilitätslösung flexibel umgesetzt werden. Beispielsweise schaffen befristete Ausnahmegenehmigungen den erforderlichen Spielraum.

In fast der Hälfte der Fälle existieren zu starre Gesetze, Regelungen oder Verordnungen (Abb. 3, links). Dementsprechend empfinden ca. 1/3 der Befragten die rechtliche Lage als hemmend (Abb. 3, rechts). Experimentier- als auch Öffnungsklauseln werden als Möglichkeit gesehen Rahmenbedingungen zu schaffen, die auf die jeweilige smarte Mobilitätslösung abgestimmt sind und somit die Initiierung und Umsetzung fördern (Abb. 3, Mitte).

[3] In Anlehnung an Hunecke und Haustein (2007) sind die einzelnen einstellungsbasierten Mobilitätstypen aktuell mit je 20 % gleichverteilt.

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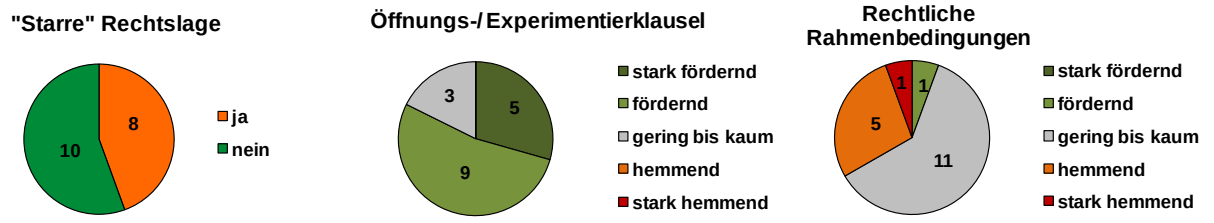

Abbildung 3: „Starre“ Rechtslage [li.], Einfluss von Öffnungs-/Experimentierklauseln auf die Initiierung und Umsetzung [mi.] und Wahrnehmung der allgemeinen rechtlichen Situation [re.] (Prozessanalyse n=18, Quelle: verkehrplus)

Strukturen vor Ort

Smarte Mobilitätslösungen müssen zu den Strukturen vor Ort (z.B. Tourismus als maßgebender Wirtschaftsfaktor, Streusiedlungsstruktur, Überalterung der regionalen Bevölkerung) passen, damit diese optimal funktionieren. So wird in fast allen Fällen die hohe Bedeutung der Strukturen vor Ort bestätigt (Abb. 4, links). In 12 von 15 Fällen fördern z.B. der Tourismus, ein hoher Anteil an ÖV-„captives“ (Pendler, Schüler, ältere und einkommensschwächere Personen) die Initiierung und Umsetzung smarter Mobilitätslösungen (Abb. 4 Mitte). Gleiches gilt für eine ausgeprägte Innovations- und Mobilitätskultur (z. B. offene Akteure, hohes Umweltbewusstsein, viele realisierte Vorreiterprojekte) (Abb. 4, rechts), die den Rahmen für neue Ideen und innovative Ansätze schafft.

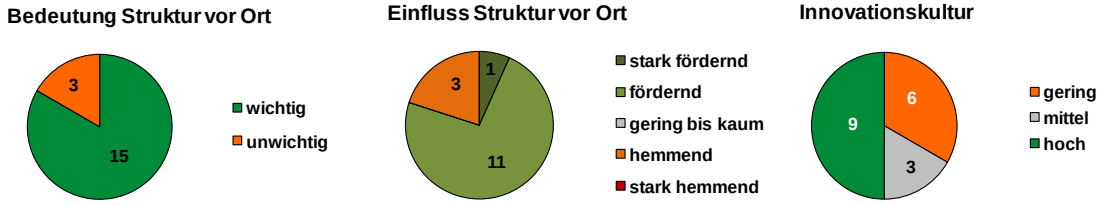

Abbildung 4: Regionale Eigenheiten [li.], deren Einfluss auf die Umsetzung [mi.] und Ausprägung der regionalen Innovationskultur [re.] (Prozessanalyse n=18, Quelle: verkehrplus)

5.3 Soziale Netzwerke

Soziale Netzwerke verbinden Menschen und sind deren soziales Kapital. Zu den relevanten Akteuren der Beispielregion Obersteiermark-West zählen Bürgermeister, Landtagsabgeordnete, Gemeinderäte, Unternehmer, Taxibetreiber, Busunternehmer, Interessenvertreter, Verwaltungsmitarbeiter etc. Über das soziale Netzwerk knüpfen Personen formelle oder informelle Kontakte. Außerdem lassen sich Informationen und Wissen leichter und schneller austauschen, wenn stabile Verbindungen zu Anderen bestehen. Je besser bedeutsame Akteure einer Region vernetzt sind, desto günstiger sind die Voraussetzungen für Innovationen und die Umsetzung smarter Mobilitätslösungen.

Identifikation von Schlüsselpersonen

Für die Netzwerkbildung sind Schlüsselpersonen mit vielen Beziehungen zu anderen und/oder einer strategisch wichtigen Netzwerkposition von besonderer Bedeutung. Schlüsselpersonen können unterschiedliche Rollen einnehmen: Einerseits fungieren sie als „Aushängeschilder” und tragen dabei zu einem Wandel der Innovations- und Mobilitätskultur bei, erzeugen ein positives mediales Echo (Marketing), sind Vorbilder etc. Ihre Mitarbeit wirkt sich z.B. positiv auf die Entschlossenheit und Motivation anderer Akteure aus. Andererseits sind Personen als Vermittler einer Idee und/oder deren Umsetzung (Provider, Kümmerer etc.) relevant. Besonders wichtig ist dabei die Fähigkeit von Personen – den sogenannten „Gatekeepern“ – den Kontakt zur Peripherie des Netzwerkes mit unterschiedlichen Institutionen zu halten (Abb. 5 links). Schlüsselpersonen stammen vor allem aus der Politik und regionalen Organisationen (Abb. 5, rechts).

Günstige Netzwerkstruktur für die Initiierung und Umsetzung

Das Potenzial einer Region für smarte Mobilitätslösungen hängt stark von der Struktur des sozialen Netzwerkes ab (Katzmair 2010). Beispielhaft lässt sich das Netzwerk der Obersteiermark-West folgendermaßen charakterisieren:

- Homogenes und stabiles Zentrum: Zentral gelegene Akteure kommen vorwiegend aus regionalen Organisationen und der Politik. Der sehr häufige Kontakt („strong ties“) und die vorhanden Dreiecksbeziehungen zwischen Menschen aus diesen beiden Personengruppen steigern die Stabilität und letztlich das Vertrauen (Abb. 5, links).
- Vielfältige Peripherie: Die vorhandene Diversität und Heterogenität in den Randbereichen des Netzwerkes führen zu einem vermehrten Angebot an unterschiedlichen Ressourcen, Wissen und Informationen im Netzwerk. Hierbei handelt es sich im Speziellen um Akteure aus den Bereichen Ausbildung, Tourismus und Verwaltung aber auch regionalen Verkehrsunternehmen. Diese eher fachspezifischen und dezentral gelegenen Subgruppen sind eher lose über „Dyaden“-Beziehungen („weak ties“) miteinander vernetzt (Abb. 5, rechts).
- Effektive Vernetzung zwischen Zentrum und Peripherie: Innerhalb des Gesamtnetzwerkes bestehen keine auffälligen Lücken oder Redundanzen. D.h. es fallen beim Wissensaustausch zwischen der innovationsfreudigen Peripherie und dem stabilen Zentrum nur geringe Transaktionskosten an. Durch das Zusammenspiel unterschiedlicher Wissens- und Erfahrungsquellen steigt die Wahrscheinlichkeit der Umsetzung und Verbreitung von smarten Mobilitätslösungen.

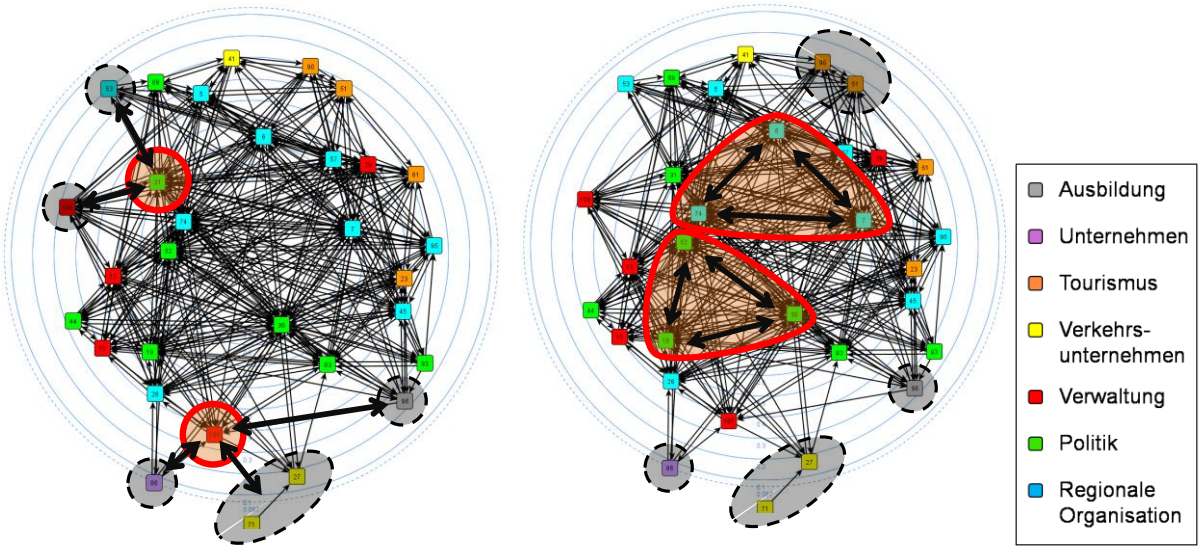

Abbildung 5: Netzwerk „Häufigkeit Kontakt“ der Obersteiermark-West: Maklerpositionen im Netzwerk [li.] und Zentrum und Peripherie [re.] (Netzwerkanalyse n=34, Quelle: verkehrplus).

5.4 3-Plus der Umsetzung - Gelegenheitsfenster: „Nutze die Gunst der Stunde!“

Insgesamt zeigen die empirischen Ergebnisse, dass weniger einzelne Faktoren für die Initiierung und Umsetzung von smarten Mobilitätslösungen verantwortlich sind, als vielmehr sogenannte Gelegenheitsfenster („windows of opportunity“), d.h. ein gleichzeitiges Auftreten vieler miteinander verwobener Einflüsse (Abb. 6 rechts oben). Gelegenheitsfenster für die Implementierung smarter Mobilitätslösungen öffnen sich durch vorhersehbare (z.B. Machtverschiebungen infolge zu Ende gehender Legislaturperiode, Neuwahlen und Verfolgung spezifischer Parteiprogramme etc.) oder zufällige Ereignisse (z. B. Katastrophen), die kurzfristig als äußere Impulse Veränderungen ermöglichen.

Wenn zeitgleich günstige Voraussetzungen bei

- den Rahmenbedingungen mit Förderungen sowie einer existierenden Innovations- und Mobilitätskultur vor Ort (vgl. Kap. 5.2),
- den Eigenschaften smarter Mobilitätslösungen mit einem hohen Potenzial zur CO_2-Ersparnis und einer hohen Akzeptanz in der Bevölkerung (vgl. Kap. 5.1) und
- den Akteuren, Netzwerken und Kommunikation mit einer robusten, dezentralen Vernetzung und Schlüsselfiguren als Katalysatoren, Gatekeepern etc. (vgl. Kap. 5.3)

vorhanden sind, dann steigen die Chancen für eine erfolgreiche Initiierung und Umsetzung von smarten Mobilitätslösungen (Abb. 6, rechts unten). Daher gilt es, Gelegenheitsfenster für die Initiierung und Umsetzung smarter Mobilitätslösungen zu erkennen und die Chance im „richtigen Moment" zu ergreifen.

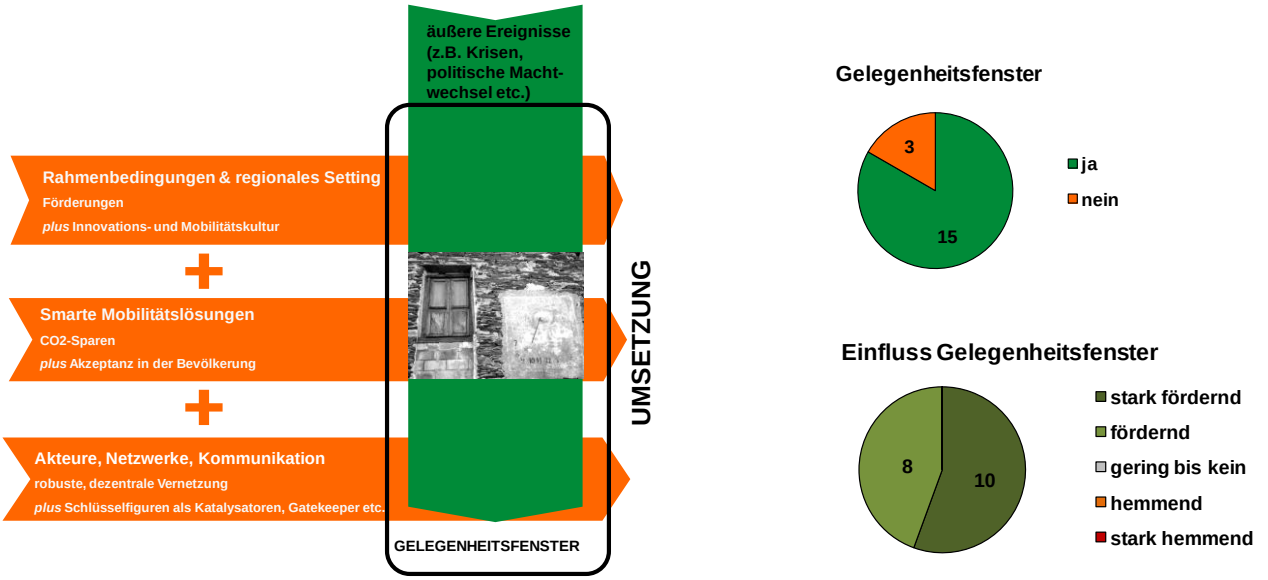

Abbildung 6: 3-Plus der Umsetzung [links] und Auftreten von Gelegenheitsfenster [re. oben] und deren Einfluss auf die Initiierung und Umsetzung [re. unten] (Prozessanalyse n=18, Quelle: verkehrplus).

6 ZUSAMMENFASSUNG UND AUSBLICK

Die Initiierung und Umsetzung smarter Mobilitätslösungen bleibt immer einzelfallbezogen und hängt von einer Vielzahl von fördernden und hemmenden Faktoren ab (Abb. 7). Somit dienen die dargestellten Ergebnisse als Anhaltspunkte für flexible Umsetzungsstrategien, wobei es gilt, die spezifische Situation zu begreifen und zu berücksichtigen.

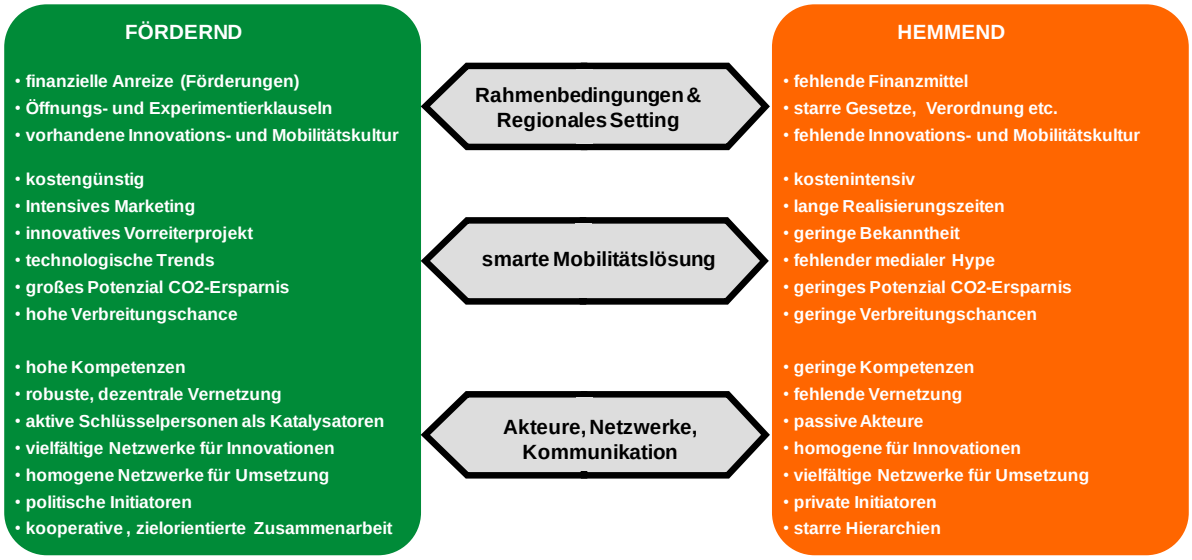

Abbildung 7: Fördernde und hemmende Einflussfaktoren bei der Initiierung und Umsetzung smarter Mobilitätslösungen (Quelle: verkehrplus).

Um den komplexen Initiierungs- und Umsetzungsprozess smarter Mobilitätslösungen besser nachzuskizzieren, bilden Ansätze aus der Politikfeldforschung mit dem Multiple-Stream-Ansatz und dem Policy-Cycle sowie aus der Sozialforschung mit der Sozialen Netzwerkanalyse die theoretische Grundlage der empirischen Analysen.

Aus unterschiedlicher Perspektive werden empirische Befunde zusammengetragen, die in ein umfassendes Erklärungsmodell in Analogie zum Multiple-Stream-Ansatz münden. Integriert betrachtet werden sowohl der Kontext der drei Ströme mit (i) Rahmenbedingungen, (ii) Eigenschaften der smarten Mobilitätslösung sowie

(iii) Akteure, Netzwerke und Kommunikation als auch die Situation mit dem Gelegenheitsfenster: Die Gunst der Stunde nutzen!

6.1 Handlungsempfehlungen

Derzeit stehen viele smarte Mobilitätslösungen an der Schwelle zum Breiteneinsatz. In dieser Phase sind Initiierungs- und Umsetzungswissen von besonderer Bedeutung. Einige wesentliche Handlungs¬empfehlungen lauten:

- Globale Trends als Katalysator smarter Mobilitätslösungen nutzen: Beispielsweise kommen als Katalysatoren ein steigendes Umweltbewusstsein („CO_2 sparen“, globale Klimaerwärmung, Ressourcenverknappung und –verteuerung etc.), das Prinzip „Teilen statt besitzen“ (z.B. CarSharing) und die rasante Weiterentwicklung neuer Schlüsseltechnologien (z.B. Smartphones, Internet etc.) in Frage.
- Bekanntheit von smarten Mobilitätslösung steigern: Gezielt symbolisch-emotionales Marketing (Hunecke et al. 2007) betreiben und mediale Hypes initiieren, um Emotionen zu aktivieren und neue Symbole (Erlebnis, Status etc.) für smarte Mobilitätslösungen zu schaffen, ist folgerichtig.
- Wirkungen von smarter Mobilitätslösungen systematisch kontrollieren: Wirkungskontrollen überprüfen mit empirischen Erhebungsmethoden, ob die mit der smarten Mobilitätslösung beabsichtigten Effekte (z.B CO_2-Reduktion) objektiv erreicht wurden. Dadurch wird die Qualität der Mobilitätslösungen verbessert, Lerneffekte induziert, Transparenz gegenüber der Öffentlichkeit hergestellt und Erfolg sichtbar gemacht.
- Staatliche Förderungen gewähren: Förderungen senken das finanzielle Risiko; folglich steigt der Anreiz smarte Mobilitätslösungen zu implementieren.
- Leuchturmprojekte initiieren: Vorreiterprojekte stellen besonders innovative smarte Mobilitätslösungen dar, über die nur geringe Erfahrungswerte über Umsetzung und Betrieb vorliegen und als „Blaupause“ für Nachahmerprojekte dienen können.
- Verstärktes Augenmerk auf Regionen richten: Smarte Mobilitätslösungen müssen eine kritische Masse an Nutzern überwinden, um zu funktionieren, effizient betrieben werden zu können und CO_2 zu sparen. Hierzu bieten Regionen als größere Einheiten ein entsprechendes Marktpotenzial.

6.2 Forschungsbedarf

Empirisch fundierte Wissensgrundlagen für die Initiierung und Umsetzung smarter Mobilitätslösungen sind zu erweitern. Folgender Forschungsbedarf besteht:

- Überprüfung und Erweiterung des entwickelten Analyserahmens: Der aus der Politikfeldforschung abgeleitete Erklärungsansatz des Multiple-Stream Ansatzes für den Initiierungs- und Umsetzungsprozesses sollte verfeinert und an weiteren empirischen Beispielen - insbesondere mit höheren Fallzahlen - auf seine Tauglichkeit überprüft werden. Erst dadurch lassen sich Ursache-Wirkungs-Zusammenhänge zwischen Erfolgsfaktoren bzw. Hemmnissen und erfolgreichen bzw. gescheiterten Implementierungen smarter Mobilitätslösungen tiefgründig aufarbeiten. Durch die Berücksichtigung vieler sich wechselseitig beeinflussender Einflüsse entsteht ein realistischeres Bild der Initiierungs- und Umsetzungssituation. Dafür ist ein Theorie- und Methodentransfer aus der Sozial- und Politikwissenschaft adäquat.
- Stärkere Fokussierung auf die Beziehungen zwischen Menschen: Da Akteure und ihre Netzwerke die Initiierung und Umsetzung smarter Mobilitätslösungen maßgeblich beeinflussen, sind vermehrte Forschungsarbeiten mit der Sozialen Netzwerkanalyse in diesem Anwendungskontext sinnvoll. Nur so gelingst es, wertvolle Einsichten in das komplexe Beziehungsgeflecht der Menschen zu erhalten und somit neues Umsetzungswissen zu generieren. Insbesondere stellt sich die Frage, wie die aufwändige und komplexe Soziale Netzwerkanalyse durch Vereinfachungen stärker in Praxis diffundiert werden kann.
- Lernen aus gescheiterten Projekten: Meist werden bei der Analyse von Fallbeispielen für den Aufbau von Umsetzungswissen für Maßnahmen ausschließlich typische Erfolgsfälle und weniger Misserfolgsfälle, die möglicherweise sogar ein besseres Lernen ermöglichen, betrachtet.

7 DANKSAGUNG

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Durchmischung verstehen – neue Einsatzfelder von 3D-Stadtmodellen zur Visualisierung und Simulation urbaner Prozesse

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1 ABSTRACT

Im Zuge der Schaffung nachhaltiger, nutzungsgemischter Stadtstrukturen im Sinne der europäischen Stadt haben ganzheitliche Strategien sowie das abgestimmte Handeln aller am Stadtentwicklungsprozess beteiligten Akteure in den vergangenen Jahren an Bedeutung gewonnen. Den daraus resultierenden Anforderungen muss insbesondere auf der Ebene der Stadtplanung im Sinne der baulich-räumlichen Ordnung der Stadt entsprochen werden. Zwar wurden bereits eine Vielzahl erfolgreicher Strategien entwickelt und in der stadtplanerischen Praxis verankert, dennoch werden auch weiterhin Strategien und Instrumente etabliert werden müssen, mit denen unter effizientem Ressourceneinsatz Entscheidungen ermöglicht werden, die den zunehmend komplexen Anforderungen gerecht werden.

Eine zentrale Rolle zur Qualifizierung der Stadtplanung vor dem Hintergrund der sich wandelnden Rahmenbedingungen und den zukünftigen Herausforderungen kommt dem Einsatz von Informations- und Kommunikationssystemen zu. Einhergehend mit den rasanten technologischen Entwicklungen der Methoden und Techniken zur Visualisierung und Simulation räumlicher Fragestellungen ergibt sich eine nahezu unüberschaubare Menge an neuen Einsatzmöglichkeiten im Rahmen der Stadtplanung. Hierbei ist es von wesentlicher Bedeutung, die neuen Technologien und Anwendungen hinsichtlich ihrer Relevanz für das stadtplanerische Handeln zu untersuchen und Anforderungen zu definieren, die zum optimalen Einsatz sowie zur zielgerichteten Weiterentwicklung bestehender Methoden und Anwendungen beitragen können.

Exemplarisch für die rasanten Entwicklungen steht die zunehmende Bedeutung der dritten Dimension, insbesondere im Rahmen digitaler 3D-Stadtmodelle, zur Darstellung stadtplanerischer Fragestellungen sowie zur Simulation urbaner Prozesse. Hinsichtlich ihrer Bedeutung für die Stadtplanung stellen digitale 3D-Stadtmodelle in erster Linie ein wichtiges Instrument zur Kommunikation, Diskussion und Vermarktung räumlicher Planungen dar. Gleichzeitig bilden sie durch die Möglichkeiten zur statischen oder dynamischen Darstellung räumlicher Zusammenhänge und Wechselwirkungen ein wertvolles Analysetool. Vor diesem Hintergrund erfüllen Stadtmodelle auch im Rahmen des Entwerfens unter komplexen Rahmenbedingungen wichtige Funktionen bei der Erstellung und Überprüfung planerischer Alternativen.

Ziel des Tagungsbeitrages ist es, neue Anwendungsfelder von 3D-Stadtmodellen als Instrumente zur direkten Darstellung von Geodaten im dreidimensionalen Kontext zu identifizieren sowie Ansätze zur Etablierung von 3D-Stadtmodellen als eigenständige Kommunikations-, Entscheidungsunterstützungs- und Planungsinstrumente aufzuzeigen.

2 AUF DEM WEG ZU NACHHALTIGEN, NUTZUNGSGEMISCHTEN STADTSTRUKTUREN

2.1 Rahmenbedingungen der Stadtentwicklung

Die Entwicklung der Städte Europas wird aktuell und zukünftig von tiefgreifenden demografischen, ökonomischen und gesellschaftlichen Umwälzungen bestimmt sein. Neben knapper werdenden finanziellen Ressourcen und politischen Handlungsspielräumen stellt im Zuge des Umgangs mit besagten Umwälzungen insbesondere das gewachsene Bewusstsein gegenüber den hochkomplexen Wirkungszusammenhängen und teilweise gegenläufigen Prozessen, unter denen die Transformation der Städte stattfindet, die Planenden vor große Herausforderungen. Es muss nach neuen Wegen gesucht werden, auf denen unter effizientem Ressourceneinsatz rationelle Entscheidungen ermöglicht werden, die allen Aspekten der Stadtentwicklung Rechnung tragen und den komplexen Anforderungen gerecht werden.

Hierbei werden vor allem Ansätze der integrierten Stadtentwicklungspolitik eine zunehmend wichtige Rolle spielen, in deren Rahmen bestehende stadtplanerische und städtebauliche Aufgaben und Instrumente mit denen anderer raumrelevanter Politiken verknüpft werden sowie unter Einbeziehung aller am Stadtentwicklungsprozess beteiligten Akteure koordiniert werden (BMVBS [2007a]; S.2).

Die wachsende Bedeutung ganzheitlicher Strategien zum Schutz, zur Stärkung sowie zur Weiterentwicklung der europäischen Städte hat durch die ‚Leipzig Charta zur nachhaltigen europäischen Stadt', die im Rahmen eines informellen Treffens der für Stadtentwicklung zuständigen Minister aller EU-Mitgliedsstaaten im Mai 2007 in Leipzig verabschiedet wurde, ebenfalls Eingang in die europäische Politik gefunden. Neben der Forderung zur Erarbeitung gemeinsamer Grundsätze und Strategien zählen die besondere Berücksichtigung von benachteiligten Stadtquartieren im gesamtstädtischen Kontext sowie die Forderung, die Ansätze einer integrierten Stadtentwicklungspolitik stärker zu nutzen, zu den zentralen inhaltlichen Aussagen der ‚Leipzig Charta' (Ebenda). Zur Fortsetzung und konkreten Ausgestaltung des mit der ‚Leipzig Charta' auf europäischer Ebene begonnen Dialogs soll das ebenfalls im Jahr 2007 durch das Bundesministerium für Verkehr, Bau- und Stadtentwicklung veröffentlichte Memorandum ‚Auf dem Weg zu einer nationalen Stadtentwicklungspolitik' beitragen. Ausgehend vom Leitbild der europäischen Stadt sollen im Rahmen der nationalen Stadtentwicklungspolitik neue Strategien und Instrumente für gerechte, kooperative, nachhaltige und schöne Städte erarbeitet werden (BMVBS [2008]).

2.2 Planerische Herausforderungen im Rahmen der Schaffung nutzungsgemischter Stadtstrukturen

In Umsetzung der vorangegangen beschriebenen integrierten Ansätzen steht die Stadtplanung großen Herausforderungen gegenüber. Diese liegen einerseits in der Notwendigkeit zur Verknüpfung stadtplanerischer Aufgaben und Instrumente mit denen anderer raumrelevanter Politiken sowie andererseits in der Notwendigkeit zur Einbindung und Koordination der weiteren Akteure. Somit steht zum einen die Etablierung kooperativer Strategien der Stadtplanung im Vordergrund, mit deren Hilfe zum raumverträglichen und zukunftsfähigen Ausgleich der unterschiedlichen Ansprüche und Interessen beigetragen werden kann. Zum anderen kommt der Stadtplanung die Aufgabe zu, unter Berücksichtigung der vielfältigen Ansprüche an den Raum Entwicklungsmöglichkeiten mit dem Ziel eines schlüssigen und möglichst konfliktfreien zukünftigen Zustandes vorwegzunehmen und so zu verknüpfen, dass sie eine zielführende und belastbare Grundlage zur weiteren Entwicklung der städtischen Bereiche bilden.

Bezogen auf die Herausforderung zur Schaffung nutzungsgemischter Stadtstrukturen im Sinne der nahahltigen europäischen Stadt muss die Stadtplanung nach Wegen suchen, anhand derer beispielsweise den anhaltenden Entdichtungs- und Ausdünnungsprozessen sowie den damit einhergehenden Tendenzen zur weiteren Funktionstrennung (Jessen [2007]; S.57) in den Städten begegnet werden kann. Dies kann durch die Schaffung von Entwicklungsmöglichkeiten für Nutzungen geschehen, die beispielsweise aufgrund von bodenpreisbedingten Monostrukturierungsprozessen aus Kernstadtbereichen verdrängt wurden. Die Entwicklungspotentiale müssen durch das „Zusammenführen von Wohnen, Arbeit, Handel, Bildung, Freizeit und ÖPNV" (Kiepe [2007]; S.4) zur Herausbildung mischgenutzter Bereiche im Sinne der europäischen Stadt genutzt werden. Ein wesentliches Ziel bei der Etablierung nutzungsgemischter Stadtstrukturen ist hierbei in der Reduzierung der Verkehrsbelastungen durch den MIV in den Kernstädten. Die nutzungsgemischte Stadt muss durch stadtverträgliche Verkehrs- und Mobilitätskonzepte unter „Aufwertung des Fuß- und Radverkehrs und die verstärkte Förderung des ÖPNV" (Ebenda) unterstützt werden.

Die zentrale planerische Aufgabe liegt somit im Erhalt und in der Wiederherstellung von Multifunktionalität insbesondere in den Bereichen der Kernstädte, wobei vor dem Hintergrund der demographischen und sozialen Rahmenbedingungen insbesondere den Bedürfnissen älterer Menschen sowie der Bevölkerungsgruppen mit Migrationshintergrund Rechnung getragen werden muss (Ebenda).

„Was für eine Nutzungsmischung ist anzustreben, um die Integration von Ausländern und älteren Menschen in unser gesellschaftliches Leben zu ermöglichen? Welche bauliche Dichte ist angemessen, um gegenseitige Beeinträchtigungen zu vermeiden, aber eine zunehmende Zersiedelung der Landschaft zu verhindern" (Bielefeld/ El Khouli [2007]; S.34). Diese und andere Fragen gilt es sich zu stellen. Die nachfolgende Abbildung abstrahiert das Ziel einer kleinteiligen Nutzungsmischung.

Abb. 1: Nutzungsmischung im Städtebau (eigene Darstellung nach: Breuer/ Müller/ Wiegandt [2000]; S.8)

Potentiale zur Entwicklung und Etablierung neuer baulich-räumlicher Strukturen mit einem hohen Grad an Nutzungsmischung bieten sich hierbei im Rahmen der Reaktivierung von Brachflächen im Bestand, wie ehemaligen Bahnflächen oder Militärstandorten, bei Stadterweiterungen sowie bei der Stadterneuerung. In Folge einer höheren Nutzungsmischung kann den gegenwärtigen Entdichtungsprozessen entgegengewirkt werden, wodurch wiederum den Forderungen nach einem urbanen Zentrum, einer multifunktionalen Stadtstruktur und einer höheren Effizienz der Siedlungsstrukturen entsprochen werden kann. SIEDENTOP et al. geben allerdings zu bedenken, dass „von einem Sättigungspunkt ausgegangen werden [kann], oberhalb dessen keine weiteren Einsparungen an Ressourcen (z.B. Baustoffe, Energie, Kosten) pro Einheit Nutzfläche oder Haushalt mehr erzielt werden können“ (Siedentop et al. [2007]; 107). Auch gilt es die im Zuge einer Nutzungsverdichtung zunehmenden Konflikte mit nutzerbezogenen Präferenzen im Rahmen der Planung zu berücksichtigen (Ebenda).

Der diesem Handeln zugrundeliegende Anspruch der Stadtplanung, die gesamtstädtische Entwicklung im Sinne integrierter Strategien in räumlicher, ökonomischer und gesellschaftlicher Hinsicht zu steuern, setzt hierbei ein umfassendes Wissen über den zu planenden Raum, die darin stattfindenden ökonomischen und gesellschaftlichen Prozesse sowie deren Wirkungszusammenhänge voraus. Vor diesem Hintergrund muss nach Wegen gesucht werden, anhand derer die Entscheidungsfindung im Rahmen komplexer stadtplanerischer Fragestellungen unterstützt und qualifiziert werden kann.

3 COMPUTERBASIERTE VISUALISIERUNG UND SIMULATION IN DER STADTPLANUNG

3.1 Entscheidungsunterstützung in der Stadtplanung

Spricht man angesichts der sich wandelnden Rahmenbedingungen und den Herausforderungen bei der Schaffung nutzungsgemischter Stadtstrukturen von Unterstützung und Qualifizierung der Entscheidungsfindung, so spielt der Einsatz von Informations- und Kommunikationssystemen eine zunehmend tragende Rolle.

Während in diesem Zusammenhang die kommunikationstechnischen Anwendungsmöglichkeiten auf der prozessualen Seite, beispielsweise durch den ergänzenden Einsatz des Internets in Planungs- und Beteiligungsverfahren der Bauleitplanung (Steinebach/ Müller [2006]; S.7), zum Einsatz kommen, greift auf der materiellen Seite der Planverfahren die informationstechnische Komponente (Engelke [2002]; S.183). Letztere bietet vielfältige Möglichkeiten zur computergestützten Verarbeitung und Aufbereitung komplexer Datengrundlagen zur Qualifizierung der Planungsgrundlagen, zur zielgerichteten Bewertung und Abwägung aller relevanten Ansprüche und Bedürfnisse an den städtischen Raum sowie zur Abschätzung der möglichen Auswirkungen geplanter Maßnahmen.

Basierend auf den genannten Möglichkeiten lassen sich zwei grundsätzliche Ebenen identifizieren, unter denen die Entscheidungsfindung angesichts der komplexen stadtplanerischen Fragestellungen durch den Einsatz von EDV-Anwendungen unterstützt werden kann. Eine der besagten Ebenen ergibt sich aus den vielfältigen technischen Möglichkeiten zur Sammlung und Archivierung umfassender Datenbestände. Diese ermöglichen im Rahmen der Dokumentennavigation sowohl die zielführende Aufbereitung als auch die strukturierte Vorhaltung und kontinuierliche Aktualisierung aller für den Entscheidungsprozess notwendigen Informationen. Somit erlauben die EDV-Systeme den „schnellen Zugriff auf planungsrelevante Informationen im Sinne einer Hilfe und Unterstützung der planenden Instanzen“ (Pflueger [2000]; S.21) und dienen dadurch im Wesentlichen der „Planungsvorbereitung durch die Bereitstellung von raumbezogener

Information und raumbezogenen Analyseergebnissen“ (Schwarz-von Raumer [1999]; S.57). Die zweite Ebene zur Unterstützung der Entscheidungsfindung bildet sowohl die Möglichkeiten zur Analyse und Bewertung der zur Verfügung stehenden Daten als auch zur Simulation zukünftiger Entwicklungen. Zum einen lassen sich hiermit neue raumbezogene Daten durch die Verknüpfung von raum- und prozessbezogenen Daten gewinnen, deren Analyse und vergleichende Bewertung von Alternativen das Treffen planerischer Entscheidungen unmittelbar unterstützt. Zum anderen können durch die Simulation möglicher zukünftiger Zustände die Konsequenzen planerischen Handelns bereits im Vorfeld abgeschätzt werden und erlauben das Treffen von Entscheidungen im Sinne von hinreichend begründeten ‚Wenn- Dann‘-Aussagen.

Ausgehend von seinen Ursprüngen in den späten 1950er- Jahren fand in den darauf folgenden Jahrzehnten weltweit eine hochdynamische Entwicklung statt, die sowohl durch den rasanten technischen Fortschritt als auch durch zahlreiche Entwicklungssprünge und -brüche in gesellschaftlicher und fachlicher Hinsicht gekennzeichnet war. Basierend auf SAUBERER und KIAS (Sauberer [1984])/ Kias [1990]; S.119ff.) sowie unter Weiterführung der von ihnen definierten Phasen lässt sich die Entwicklung des EDV-Einsatzes in fünf wesentliche Adaptionsphasen unterteilen:

- die „Pionierphase“,
- die „Euphoriephase“,
- die „Realismusphase“,
- die „GIS-Phase“,
- die „Netz-Phase“.

Letzgenannte Phase fand in den letzten Jahren unter intensiver Fortentwicklung und weitgehender Etablierung von Netzwerktechnologien statt. „Die Vernetzung von Computern und einzelnen Arbeitsstationen erlaubt Formen der elektronischen Kommunikation, die ein ortsungebundenes und kooperatives Arbeiten auf verschiedenen Ebenen unterstützen“ (Pflueger [2000]; S.39). Die Verfügbarkeit von leistungsfähigen Netzwerken ermöglichte somit sowohl den Zugriff auf verteilte Datenbanken und deren Verknüpfung untereinander als auch die Nutzung und den gegenseitigen Austausch der zur Verfügung stehenden verteilten Daten und Methoden. Allem voran das Internet, dass sich durch die Verknüpfung von lokalen bis internationalen Computernetzwerken zu einem globalen Netzwerk entwickelte und im Zuge umfassender Privatisierungs- und Kommerzialisierungstendenzen seit Ende der 1990er-Jahre zu einem Massenmedium zur Kommunikation sowie zum Austausch von Informationen und Daten geworden war, begann in der Planung eine wesentliche Rolle zu spielen.

Zusammenfassend bildeten sich hierbei durch die neuen Möglichkeiten der Informations- und Kommunikationstechnologien nach PFLUEGER (Ebenda; S.37f.) fünf inhaltliche Schwerpunkte für den Einsatz in der Stadtplanung heraus:

- Optimierung von Planungsinformationssystemen durch verbessertes Daten- und Informationsmanagement.
- Neue Wege zur Projektsteuerung und zum verbesserten Controlling im Pla¬nungsprozess.
- Entwicklung und Bereitstellung offener, benutzerdefinierter Plattformen für entwurfsorientierte CAD- und GIS-Systeme.
- Das Internet als Medium für neue Formen und Strategien der Öffentlichkeits¬arbeit sowie der Partizipation.
- Weiterentwicklung computerbasierter Visualisierungs- und Simulationsformen im gesamten Planungsprozess.

Insbesondere die Nutzung computerbasierter Visualisierungen und Simulationen zur Darstellung räumlicher Sachverhalte sowie zur Vorwegnahme möglicher Entwicklungen leistet einen wichtigen Beitrag zur Qualifizierung des stadtplanerischen Handelns im Zuge der Schaffung nachhaltiger, nutzungsgemischter Stadtstrukturen.

3.2 Visualisierungen und Simulationen räumlicher Prozesse

Bezogen auf die Stadtplanung kommen visuelle Darstellungen auf zwei grundlegenden Ebenen zum Einsatz. Zum einen unterstützen sie das gezielte Erfassen, Analysieren und Verstehen der im stadtplanerischen Kontext relevanten Rahmenbedingungen, Prozesse und Wechselwirkungen. Visualisierungen leisten somit bereits im Vorfeld der eigentlichen Planung einen wichtigen Beitrag zur Sichtbarmachung und zum Verständnis räumlicher Situationen und Prozesse, aus dem sich planerische Maßnahmen zum Erreichen eines angestrebten zukünftigen Zustandes ableiten lassen. Zum anderen dient die visuelle Darstellung der eigentlichen Planungen sowohl der Überprüfung als auch der Erläuterung und Veranschaulichung möglicher zukünftiger Entwicklungszustände. Vor diesem Hintergrund sind Visualisierungen wie kein anderes Medium dazu geeignet, räumliche Planungen zwischen den am Planungsprozess beteiligten Akteuren sowie gegenüber der Öffentlichkeit zu kommunizieren.

Zusammenfassend kommt Visualisierungen im Kontext der Stadtplanung somit die Rolle eines zentralen Informations- und Kommunikationsmediums zu, welches sowohl die visuelle Abbildung quantitativer und qualitativer Raumeigenschaften und -zusammenhänge (Planungsnetzwerk geo-Innovation [2010]; S.2) als auch die umfassende Veranschaulichung der daraus resultierenden Planungen und ihrer Auswirkungen zum Gegenstand hat.

Über die visuelle Darstellung räumlicher Sachverhalte und möglicher Entwicklungszustände hinaus ermöglicht der EDV-Einsatz in der Stadtplanung die Simulation räumlicher Prozesse und somit das „Nachbilden eines dynamischen Prozesses in einem System mit Hilfe eines experimentierfähigen Modells, um zu Erkenntnissen zu gelangen, die auf die Wirklichkeit übertragbar sind“ (VDI-Richtlinie 3633 [1992]), Hieraus lassen sich die wesentlichen Aufgaben ablesen, die eine Simulation erfüllen muss. Diese liegen in der Beschreibung des Verhaltens von Systemen, in der Ableitung von Theorien und Hypothesen sowie letztendlich in der Vorhersage des zukünftigen Verhaltens dieser Systeme auch unter veränderten Rahmenbedingungen. Der Faktor Zeit spielt im Rahmen der Simulation in zweierlei Hinsicht eine wesentliche Rolle. Zum einen sollen aktuelle oder zukünftige Zustände zu vorab definierten Zeitpunkten in Form von Momentaufnahmen simuliert werden, zum anderen gilt es, dynamische Prozesse in ihrem zeitlichen Ablauf zu simulieren und diese Prozesse über bestimmte Zeitspannen hinweg nachzuahmen. Die Qualität der durchgeführten Simulationen und somit der auf diesen basierenden Erkenntnisse und Entscheidungen hängt dabei in hohem Maße von den hinterlegten Modellen sowie der Richtigkeit, Aktualität und Vollständigkeit der zugrundeliegenden Datensätze ab, anhand derer die Simulationen durchgeführt worden sind.

Angesichts rasanter und vielfältiger technischer Entwicklungen haben sich in den vergangenen Jahren unzählige neue Möglichkeiten und potentielle Einsatzfelder für Visualisierungen und Simulationen herausgebildet. Diese neuen Möglichkeiten haben bisher nur sehr eingeschränkt Eingang in die Planungspraxis gefunden, da die Planungswissenschaft nicht mit den tatsächlichen Entwicklungen mitgehalten hat und die technischen Neuerungen bislang lediglich auf experimenteller Ebene betrachtet.

Vor diesem Hintergrund stehen sowohl die Suche nach klar definierten Anwendungsfeldern im Kontext der Stadtplanung als auch die darauf aufbauende zielgerichtete technische Weiterentwicklung der bestehenden Anwendungen der Visualisierung und Simulation im Fokus der weiteren Untersuchung. Hierbei gilt es aktuelle Forschungsfelder und Entwicklungsrichtungen zu berücksichtigen und im Weiteren hinsichtlich ihrer Potentiale zur Qualifizierung der Stadtplanung mit ihren spezifischen Charakteristika und Aufgabenfeldern zu analysieren.

Gleichzeitig bildet der effektive und zielführende Einsatz der aus den rasanten Entwicklungen, insbesondere der letzten Jahre, hervorgegangenen vielfältigen Technologien und Anwendungen eine der aktuell größten Herausforderungen. Die nahezu unüberschaubare Menge an neuen Einsatzfeldern, wie sie sich beispielsweise durch weiterentwickelte CAD- und GI- Systeme, 3D-Stadtmodelle und Web Mapping-Tools bis hin zu den Möglichkeiten, die sich im Rahmen der so genannten ‚Neogeographie‘ (Eisnor [2006]) ergeben, bieten vielfältige Qualifizierungsmöglichkeiten für die gesamte Stadtplanung. Hierbei ist es zunächst von großer Bedeutung, diese neuen Technologien und Anwendungen kritisch auf ihre planungsrelevanten Einsatzmöglichkeiten hin zu analysieren und daraus Bedürfnisse abzuleiten (Berchtold/ Krass in: SRL [2007]; S.8), die den optimalen Einsatz und zielgerichtete Weiterentwicklung bestehender

Methoden und Anwendungen zur Darstellung der komplexen Rahmenbedingungen sowie zur Simulation räumlicher Prozesse und zukünftiger Entwicklungszustände ermöglichen.

4 3D- STADTMODELLE ZUR VISUALISIERUNG UND SIMULATION URBANER PROZESSE

4.1 Potentiale und Einsatzfelder von 3D-Stadtmodellen

Exemplarisch für die Weiterentwicklung im Bereich der Geografischen Informationssysteme steht die zunehmende Bedeutung der dritten Dimension bei der Darstellung räumlicher Sachverhalte und Planungen (Kleinschmit [2010]; S.190).

Während sich die Möglichkeiten zur dreidimensionalen Darstellung von zweidimensional erstellten Inhalten bereits sehr früh zum Standardrepertoire der CAD- und GI-Systeme entwickelten und hier, je nach Visualisierungszweck und eingesetzter Software, Planungen unter Ausnutzung der Vorteile dreidimensionaler Darstellungen in abstrakter bis hin zu fotorealistischer Weise abgebildet werden können, kommt 3D-Stadtmodellen in diesem Zusammenhang eine zunehmend bedeutende Rolle zu.

Neben den Vorteilen digitaler Visualisierungen sowie den generellen Potentialen dreidimensionaler Visualisierungen zeichnen sich digitale 3D-Stadtmodelle gegenüber physischen Modellen in erster Linie durch ihre hohe Flexibilität aus.

- Schnelle Modifizier- und Erweiterbarkeit bei gleichzeitiger hoher räumlicher und grafischer Genauigkeit,
- freie Wahl des Blickwinkels und Erlebbarkeit der Stadtstrukturen mittels festgelegter Animationspfade oder der freien ‚Begehung',
- vielfältige Möglichkeiten zur Veröffentlichung und Verteilung beispielsweise über das Internet
- sowie Möglichkeiten zur Integration raumbezogener Datenbanken und Anwendungen zur Simulation räumlicher Prozesse

stellen hierbei einige der mit der Nutzung von 3D-Stadtmodellen verbundenen Potentiale dar.

Eine wegweisende Entwicklung für die zunehmende Etablierung und vielfältige Nutzung von virtuellen 3D-Stadtmodellen war hierbei die Etablierung des ‚CityGML' -Standards zur Erstellung und Editierung der Modelle sowie zum Aufbau der zugrundeliegenden Datenbanken (www.opengeospatial.org; Zugriff: 12.11.2011). Im Jahre 2008 wurde ‚City-GML' durch das ‚Open Geospatial Consortium' (OGC) als internationaler Standard definiert (Ebenda). Im Rahmen der hiermit verbundenen Vorschriften zur Modellierung und zum Aufbau der 3D-Stadtmodelle wurden unter anderem verschiedene Modellierungsebenen festgelegt. Gemäß ihrer Detaillierungsgrade unterscheidet man hierbei fünf ‚LODs – Levels of Detail', die sich wie folgt kategorisieren lassen (Slingsby/ Raper [2008]; S.51):

- LOD 0 in Form von digitalen Geländemodellen, die auf regionaler Ebene zum Einsatz kommen und je nach Einsatzzweck um Texturen und Orthofotos ergänzt werden,
- LOD 1 zur Abbildung von Stadt- und Baustrukturen durch die Extrusion von flächen- oder gebäudescharfen Kubaturen aus dem Geländemodell,
- LOD 2 als die Ergänzung der Gebäudekubaturen um Dachformen, sowie gegebenenfalls prägende Anbauten und grobe Texturen
- LOD 3 visualisiert Einzelgebäude oder Gebäudegruppen inklusive umfassender architektonischer Details und stellt somit ein klassisches Architekturmodell dar,
- LOD 4 ergänzt als Innenraummodell das Architekturmodell um Aussagen zur inneren Organisation der Gebäude und ihrer Gestaltung.

Hinsichtlich ihrer Bedeutung für die Stadtplanung stellen digitale 3D-Stadtmodelle in erster Linie ein wichtiges Instrument zur Kommunikation, Diskussion und Vermarktung räumlicher Planungen dar. Anhand der dreidimensionalen Visualisierung der gegebenen räumlichen Rahmenbedingungen als auch des geplanten zukünftigen Zustandes kann allen am Planungsprozess beteiligten Akteuren ein sehr guter Eindruck der tatsächlichen Wirkung einer Planung vermittelt werden.

Abb. 2: 3D-Stadtmodell mit Texturen als Zusatzinformation am Beispiel Londons (www.bp.blogspot.com; Zugriff: 18.03.2011)

Gleichzeitig bilden sie durch die Möglichkeiten zur statischen oder dynamischen Darstellung räumlicher Zusammenhänge und Wechselwirkungen ein wertvolles Analysetool, beispielsweise im Rahmen von Simulationen zur Schadstoffausbreitung oder zur Simulation der möglichen Auswirkungen einer Planung bereits im Vorfeld. Vor diesem Hintergrund erfüllen Stadtmodelle auch im Rahmen des Entwerfens unter komplexen Rahmenbedingungen wichtige Funktionen bei der Erstellung und Überprüfung planerischer Alternativen.

4.2 Hemmnisse hinsichtlich des Einsatzes von 3D-Stadtmodellen

Trotz weitreichenden technologischen und methodischen Entwicklungen in den vergangenen Jahren steht der Einsatz von 3D-Stadtmodellen in der Stadtplanung noch großen Hemmnissen gegenüber, die im Wesentlichen folgende Bereiche umfassen:

- hohe Kosten im Rahmen der Datenbeschaffung, des Kaufs der zum Einsatz notwendigen Hard- und Softwareausstattung sowie zur Schulung der Mitarbeiter (Kleinschmitt [2010]; S.187),
- eingeschränkte Interoperabilität sowohl zwischen den unterschiedlichen Systemen und Anwendungen der Visualisierung und Simulation als auch der zugrundeliegenden Datensätze,
- fehlende Standards bezüglich Verwaltung, Herausgabe und Kosten planungsrelevanter Daten,
- vorhandene Softwarearchitekturen erfordern zeitintensive Einarbeitung, da ihre Handhabung in der Regel nicht intuitiven Handlungsweisen folgt (Hagen et al. [2006]),
- anhaltende Dominanz zweidimensionaler Anzeigemedien trotz wachsender Bedeutung dreidimensionaler Visualisierungstechniken (Wietzel [2007]; S.241),
- fehlende Transparenz und Verständlichkeit komplexer Simulationen versus geringe Praxisrelevanz zu stark vereinfachter Simulationsmodelle und
- mangelnde Flexibilität und Modularität bestehender Stadtmodelle.

Gleichzeitig bildet der effektive und zielführende Einsatz der aus den Entwicklungen der vergangenen Jahre hervorgegangenen vielfältigen neuen Technologien und Anwendungen eine der aktuell größten Herausforderungen auch im Rahmen der Nutzung von 3D-Stadtmodellen. Die nahezu unüberschaubare Menge an neuen Einsatzfeldern, wie sie sich beispielsweise durch weiterentwickelte CAD- und GI- Systeme, und Web-Mapping-Tools bis hin zu den Möglichkeiten, die sich im Rahmen der so genannten ‚Neogeographie' (Eisnor [2006]) ergeben, ermöglichen vielfältige neue Einsatzfelder, die es in die bestehenden 3D-Modelle zu integrieren gilt. Hierbei ist es zunächst von großer Bedeutung, diese neuen Technologien und Anwendungen kritisch auf ihre planungsrelevanten Einsatzmöglichkeiten hin zu analysieren und daraus Bedürfnisse abzuleiten (Berchtold/ Krass in: SRL [2007]; S.8), die den optimalen Einsatz und zielgerichtete Weiterentwicklung bestehender Modelle ermöglichen.

In ihrer Gesamtheit lassen sich diese Hemmnisse am Besten in der großen Diskrepanz zwischen dem Stand von Technik und Wissenschaft sowie dem eigentlichen Einsatz in der Planungspraxis beobachten. Bei letzterem stehen Faktoren wie unklare Einsatzfelder, geringe Transparenz und Nachvollziehbarkeit sowie zahlreiche technische Hürden dem umfassenden Eingang in das Planungshandeln entgegen.

4.3 Ansätze zur Qualifizierung von 3D-Stadtmodellen

Um den vorangegangen aufgeführten Hemmnissen, denen der zielgerichtete Einsatz von digitalen 3D-Stadtmodellen aktuell gegenübersteht, effektiv begegnen zu können, bedarf es neben der rein technischen Auseinandersetzung mit den gegebenen Einschränkungen in zahlreichen Fällen auch der interdisziplinären Forschung unter intensiver Beteiligung der Planungswissenschaften.

Hierin spiegeln sich die zwei Ebenen wieder, unter denen die Qualifizierung von 3D-Stadtmodellen erfolgen muss. Während sich die erste Ebene in methodischer und inhaltlicher Hinsicht mit den Anforderungen der Stadtplanung an das zielgerichtete und effektive Arbeiten mit 3D-Stadtmodellen auseinandersetzt, steht auf der zweiten ebene die Auseinandersetzung mit den bestehenden technischen Möglichkeiten zur Visualisierung räumlicher Sachverhalte und zur Simulation städtischer Prozesse mittels 3D-Stadtmodellen im Fordergrund.

4.3.1 Inhaltliche Ebene

Bezogen auf das Ziel der Schaffung nutzungsgemischter Stadtstrukturen im Sinne der nachhaltigen europäischen Stadt müssen seitens der Stadtplanung Anwendungsfelder für 3D-Stadtmodelle sowie daraus resultierende Anforderungen definiert werden, anhand derer zielführend und effektiv bestmögliche Informations- und Entscheidungsgrundlagen geschaffen werden können. Angesichts der besonderen Herausforderungen der Planung im Bestand müssen hierbei vielfältige, teilweise gegenläufige Entwicklungstrends in die integrierte Betrachtung miteinbezogen und der bestmögliche Ausgleich der Ansprüche an den städtischen Raum sichergestellt werden. 3D-Stadtmodellen kommt hierbei die Aufgabe zu, die Bestimmungsfaktoren der räumlichen Entwicklung zielgerichtet darzustellen und mögliche räumliche Entwicklungen zu simulieren. Besagte Bestimmungsfaktoren reichen hierbei von äußeren Bestimmungsfaktoren wie ökonomischen, gesellschaftlichen, demographischen und rechtlichen Rahmenbedingungen sowie übergeordneten Planungszielen bis hin zu lokalen Bestimmungsfaktoren beispielsweise der Bau-, Raum-, Verkehrs-, Akteurs- und Sozialstrukturen.

Zur Identifikation weiterer Anforderungen zur zielgerichteten Weiterentwicklungen der Methoden und Anwendungen der Visualisierung und Simulation ist die Planungswissenschaft gefordert, unter Beteiligung der Informatik und weiterer relevanter Disziplinen, vertiefende Erkenntnisse, beispielsweise auch aus den Bereichen der ‚Human-Computer-Interaction' oder der Wahrnehmungspsychologie, zu gewinnen.

4.3.2 Technische Ebene

Hinsichtlich der Möglichkeiten zur Weiterentwicklung der 3D-Stadtmodelle gilt es, diese als eigenständige Kommunikations-, Entscheidungsunterstützungs- und Planungsinstrumente herauszubilden. In Ergänzung ihres ursprünglichen Einsatzzweckes zur reinen Abbildung räumlicher Sachverhalte und Planungen können sie hierbei zunehmend auch als Datenbanken zur georeferenzierten Speicherung großer Datenmengen sowie als Instrumente zu deren direkten, thematisch differenzierten Darstellung im dreidimensionalen Kontext Einsatz finden. Darüber hinausgehend haben sich, insbesondere im Zusammenhang mit den Entwicklungen des ‚Web 2.0', dynamische 3D-Stadtmodelle etabliert, die neben der Integration von statischen GIS-Funktionalitäten auch die Durchführung von raumbezogenen Simulationen erlauben.

Diese Entwicklungen ermöglichen der Stadtplanung neben der Visualisierung räumlicher Rahmenbedingungen und möglicher Entwicklungszustände auch die Simulation dynamischer Prozesse im dreidimensionalen Kontext. Gleichzeitig muss gewährleistet sein, dass der stadtplanerisch Entwerfende in der Anwendungsumgebung eines 3D-Stadtmodells stufenlos zwischen unterschiedlichen räumlichen Ebenen sowie verschiedenen Detaillierungsgraden wechseln und somit in optimaler Weise beispielsweise die stadträumlichen Konsequenzen seiner Planung analysieren und beurteilen kann. „Mit dem starren Sandkastenblick aus der Distanz ist es vorbei. Die Stadtentwerfer zoomen heute locker in die spezifische Situation des geographischen, wirtschaftlichen, soziologischen oder kulturellen Terrains hinein – und von da zur Gesamtschau zurück" (Hanimann [2009]; S.3).

Weiterhin müssen die Entwicklungsrichtungen im Bereich der Visualisierung durch die neuen Möglichkeiten zur weitreichenden Vernetzung und Interaktion, wie beispielsweise durch das ‚World Wide Web', gesehen werden. Diese Entwicklungsrichtungen umfassen:

- die kontinuierliche Weiterentwicklung von ‚Web 2.0'-Anwendungen hinsichtlich ihrer Möglichkeiten zur Visualisierung raumbezogener Informationen,
- die Identifizierung von Anwendungsfeldern im Zuge der Herausbildung des ‚Semantic Web',
- den Einsatz von ‚Web Mapping'-Diensten zur Analyse raumbezogener Informationen, beispielsweise durch die Integration von GIS-Funktionalitäten,
- die Nutzung der Möglichkeiten zur ortsungebundenen Kommunikation und Interaktion in Verbindung mit Anwendungen der ‚Neogeografie' zur Verortung und Echtzeitvisualisierung räumlicher Informationen,
- die Etablierung neuer interaktiver und kollaborativer Elemente der ‚Augmented Reality' und der ‚Virtual Reality' zur Visualisierung raumbezogener Daten und Informationen.

Eine daraus resultierende Anforderung an 3D-Stadtmodelle ist somit in ihrer Flexibilität zu sehen. Hierbei darf Flexibilität nicht im Sinne von ‚anything goes', sondern vielmehr als die Definition von fixen und flexiblen Elementen (Christiaanse [n.b.]; S.1) gesehen werden, die auf ihre wesentlichen Inhalte reduziert sind und sich gleichzeitig flexibel erweitern und hinsichtlich ihrer Eigenschaften modifizieren lassen.

Zur Gewährleistung der geforderten Flexibilität ist eine weitere wesentliche Anforderung in der weitestmöglichen Standardisierung und Interoperabilität zu sehen. Diese Forderung umfasst sowohl die zur Verfügung stehenden raumrelevanten Daten als auch die integrierten Möglichkeiten der Visualisierung und Simulation. Bezogen auf die Datengrundlagen steht die Schaffung einheitlicher Geodateninfrastrukturen sowie die Etablierung von Standards bezüglich Verwaltung, Herausgabe und Kosten planungsrelevanter Daten im Fokus. Bezüglich der Anwendungen stellen die Etablierung von Schnittstellen sowie die Integration unterschiedlicher Anwendungen innerhalb eines Systems die Schwerpunkte dar. Als Beispiel für eine derartige Anwendung kann ein 3D-Stadtmodell gesehen werden, dass um GIS-Funktionalitäten oder Simulationsprogramme ergänzt wurde.

5 FAZIT

Vor dem Hintergrund der Bewältigung des demografischen, ökonomischen und gesellschaftlichen Wandels sowie dem Ziel der Schaffung nachhaltiger, nutzungsgemischter Stadtstrukturen steht die Stadtplanung vielfältigen Herausforderungen gegenüber. Es müssen Strategien und Instrumente etabliert werden, anhand dener unter effizientem Ressourceneinsatz Entscheidungen ermöglicht werden, die den zunehmend komplexen Anforderungen gerecht werden.

Hierbei kommt insbesondere dem Einsatz computerbasierter Visualisierungen und Simulationen zur Darstellung räumlicher Sachverhalte sowie zur Vorwegnahme möglicher Entwicklungen wesentliche Bedeutung bei der Qualifizierung stadtplanerischen Handelns zu. Ein zentrales Instrument ist hierbei in 3D-Stadtmodellen zu sehen, die es als eigenständige Kommunikations-, Entscheidungsunterstützungs- und Planungsinstrumente zu etablieren gilt.

Wesentliche Anforderungen hinsichtlich des zukünftigen Einsatzes von 3D-Stadtmodellen zur Visualisierung und Simulation räumlicher Prozesse sind in der Gewährleistung größtmöglicher Flexibilität sowie der weitestmöglichen Schaffung einheitlicher Standards zu sehen. Die Fortführung der Suche nach Einsatzfeldern und Qualifikationsmöglichkeiten muss hierbei Gegenstand interdisziplinärer Forschung sein.

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Ecological Problems of Motor Transport of Azerbaijan

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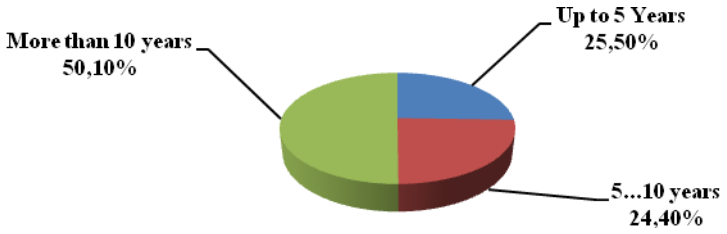
Automobile transport is one of the leading and the most complex means in the transport system of Azerbaijan.

Over the past decade the motor transport has been developing at faster pace relative to other transport modes and sectors of economy (Table 1). This has been provided by its objective advantages supplemented by significant progress in the field of road construction and construction of motor vehicles. It should be noted that the number of cars per 1000 people was 55 in 2000 while in 2011 it was about 115. Currently, the number of car park of the Azerbaijan Republic is more than one million units.

Years	2003	2004	2005	2006	2007	2008	2009	2010	2011
Number of automobiles, unit.									
Azerbaijan	511 460	554 031	612 069	690 012	773318	860 047	925 866	982 553	1030079

Table 1

Car park of the country is relatively old (as shown in the following diagram) and the average age is about 10 years, where about 20% of the car park is being exploited for more than 15 years, and part of that car park has been completely worn out and should be disposed off.



Age structure of the car park of the Azerbaijan

The process of motorization had a significant influence on the rapid development of the economy and social sphere. However, one of the main problems in the motorization of the country are the environmental problems, similar to all developed countries. Motorization in the Republic leads to intense pollution of the environment.

The actual total mass of emissions can be determined by the expression:

$$M = \sum_{i=1}^{n} m_{i.n} \cdot K_{i.m.c} \cdot A_i \cdot L_{i.q};$$

where:

$m_{i.n}$-the regulatory allowable weight of i harmful emissions:

$K_{i.m.c}$-Coefficient taking into account the influence of technical conditions of the vehicle for the weight of i harmful emissions:

A_i-The number of the vehicles of type i:

$L_{i.q}$-The average annual mileage of the vehicles of type i

According to the calculations the total annual amount of emissions of the car park of Azerbaijan Republic (with good technical condition of vehicles) is about one million tons. Of these, about 600 tons of carbon monoxide (CO), 240 tons of hydrocarbon (CH), 85 tons of nitrogen oxides (NOx), 25 tons of soot and 0.05 tons of lead.

In conditions of rapid growth of the car park other problems rise related to the complexity of the situation in organisation of transportation safety in the field of road safety. As a result, road accident rate also increases.

Analysis of accident statistics (Fig. 1) shows that the majority of them are directly or indirectly related to the intensity or tightness of transport movement.

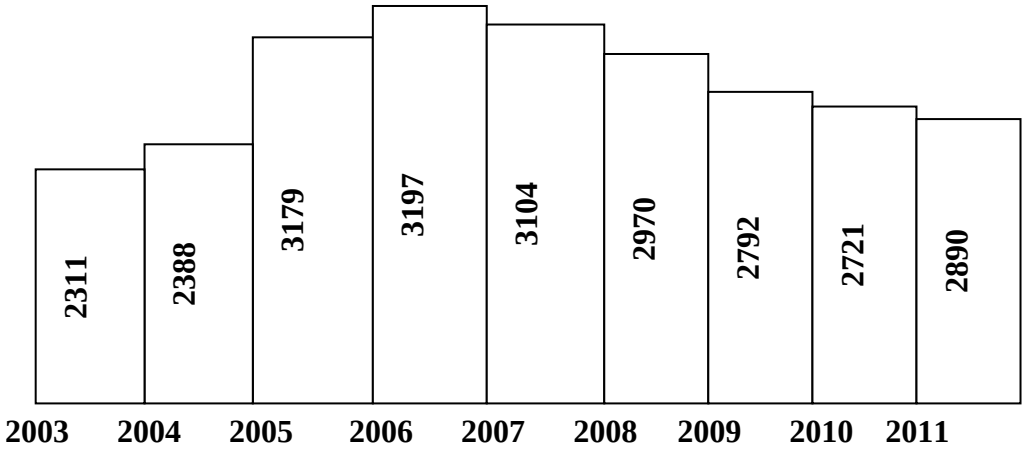


Fig.1. Dynamics of road traffic accident change in Azerbaijan

In addition, one of the main negative aspects is the uneven distribution of the car park around the regions of the country, which is typical for most of CIS countries. That is why, a complex situation regarding the environmental safety and organization of road safety has particularly emerged in Baku. Rapid growth of private car park should also be considered as one of the main reasons for this situation along with unsatisfactory road conditions. Currently, about 60% of the vehicles are located in Baku. It should be noted that the statistics do not consider the number of cars whose drivers are temporarily working and living in Baku without official registration. The accumulation of the main part of the car park in Baku creates huge problems, both in terms of traffic safety (occurrence of traffic jams), and urban air pollution. Proportion of the road transport vehicles in the total amount of pollutants' emissions into the atmosphere by all man-made sources is up to 75%, and the noise impact on the city's population is 85-90%. The greatest harm from air pollution is effecting people. International experience suggests that the biggest concern in this context usually causes such pollutants of the urban environment as lead and fine aerosols. These pollutants result from the use of leaded gasoline.

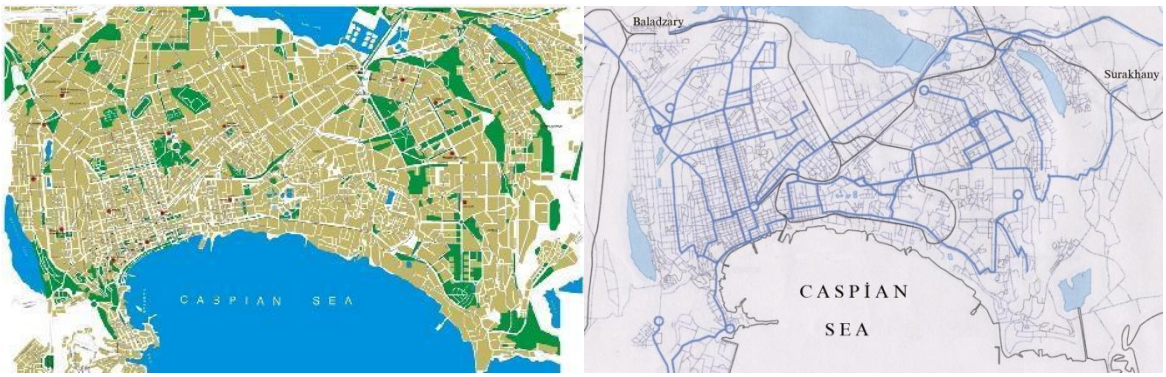


Fig. 2. Scheme of street road network of Baku

One of the main problems of the process of motorization in the Republic is a growing discrepancy between the rate of growth of motorization and the demand for transportion to the rate of development of roads. It would be enough to compare the growth dynamics of cars and roads in the city of Baku for the last 9 years (Table). As can be seen from the table (data from the State Committee on Statistics of Azerbaijan Republic),

the total number of vehicles for the period rose by more than 3.0 times, whereas the total length of the roads increased only by about 16.0%.

Years	2003	2004	2005	2006	2007	2008	2009	2010	2011
Number of Automobiles, units.									
City Baku	205 072	249 857	295 862	363 918	427 083	502 369	549 511	598 132	638 649
Roads, km									
City Baku	1923	1963	2018	2087	2113	2138	2173	2198	2223

Table 2

Baku is an acient city with its formed architecture layout and a complex scheme of the road network (Fig. 2). A part of the city (the old part of town and "Icheri Sheher") was built on a rectangular pattern layout of the road network, another part of the microregions on a neighborhood scheme, and some parts are based on a free style. So this in its turn makes the optimal functioning of the traffic flow and operation of the services and facilities that are responsible for the organization and regulation of traffic even more complicated. The total length of road network suitable for car traffic in Baku city is about 2173 km. Given the above data the most simple and approximate calculations show that for normal traffic conditions (at the level of street and road load of Z = 0.4 ... 0.6) that there is a need for 3550 km of single-lane streets more(which is 1775 km of two-lane or 888 km of four-lane streets).

For constrained motion, these values would be about 1056 km of single-lane or 528 km of two-lane, or 264 km of four-lane streets respectively. Whereas the number of visitors, parked cars and the coefficient of getting to the line which was equal to 0.7 were also taken into account. According to the calculations it is clearly seen that the traffic is particularly busy on the main highways of Baku, especially around the central parts, additionally almost blocked or completely blocked during the “peak” hours. It is impossible to improve the movement on the roads by usual organizational and management methods, which contributes to traffic accidents, increase of emissions and noise pollution, increase in the delay of passengers and cargo transfer.

Different methods are being used in order to change the traffic situation and thus improve the ecological situation in Baku. The most typical of which are the following:

- parking management system (paid parking, parking restrictions);
- development of the public transport network (construction of new subway stations, increasing the length of public transport routes);
- construction of new multi-storey interchanges, tunnels, express highways, construction of new highways;
- restricted access of vehicles to certain areas of the city (the introduction of residential and pedestrian areas, prohibition or restriction of movement of freight transport).

Fig. 3.Transport infrastructure of Baku city

All these methods and tools used in practice do not respond flexibily enough to the traffic conditions and do not provide radical solutions to environmental problems of road transport.

In order to improve traffic management and to provide significant changes in the environmental impact of road transport in Baku the center of intellectual control of transport processes (cictp) has been introduced for explotation in December 2011. This is a comprehensive system of information support and management on land road transport based on the use of modern information and telecommunication technologies and management practices.

Fig. 4. Centre for Intelectual Controle of Transportation Process in Baku

The introduction of the center of intelligent management of traffic processes allows to reduce delays in traffic, travel time and decrease the volume of harmful emissions.

In general, in order to reduce the harmful effects of road transport on the environment of Azerbaijan and to provide the rational management of environmental activities he following must be done:

- The organization of effective management of environmental activities through targeted program planning;
- A gradual upgrade of the age and structure of the car park of the republic:

- Improvement of existing industrial and technological base for the control of technical condition and maintenance of vehicles:
- Creating an effective system of environmental control and monitoring using a network of stationary and mobile monitoring stations, as well as points of control of environmental parameters of vehicles;
- A combination of legal and economic methods of environmental management in transportation;
- The use of mandatory certification on environmental standards for vehicles, fuel, equipment, technology, etc:
- Development of a system of environmental training and retraining of transport specialists.

In order to implement these areas enormous work is being done to improve and technically upgrade the entire transportat system of Azerbaijan in recent years.

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Effects Comparison of Tools to Control the Traffic Demand as an Instrument of Urban Environmental and Climate Policy

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1 ABSTRACT

The Clean Air Directive did not aim to traffic emissions only, but one of the consequences were more than 160 Low Emission Zones throughout Europe, regulating the traffic from polluter cars in urban areas. Most of the Low Emission Zones are drive bans for vehicles with high PM emissions, some are charged zones. Both variants proved to be in a position to change traveler behaviour, though charged zones tend to be more flexible than drive ban zones as people have more time to adopt, more people can be affected, the zones can be substantially larger and the scheme can be tightened more sensitive. Assuming that the instrument of Low Emission Zones might be applied to carbon emissions as well leaves nearly no option but charged zones due to these reasons. As a consequence, the charging scheme is crucial in order to help reducing carbon emissions. Basically two different charging principles are discussed in Europe: conventional cordon prizing and mileage based pricing. With cordon pricing, the charge gets due when passing the zone boundaries, while with mileage based pricing, the charge increases with the distance traveled. So obviously, mileage based pricing is more suitable as it follows the polluter-pays-principle while cordon pricing seems to be insensitive to this. By applying traffic models and demand elasticity models it is possible to determine the achievable benefit of both; comparing this benefit to the system cost leads to the cost-benefit-analysis of both principles. An example is given in this paper.

2 BACKGROUND

The citizens' request for healthy and livable city centers as well as legal regulations like the EU Ambient Air Quality directive [1] effect communalities to take action in order to reduce air pollutants immissions. This directive fixes the threshold values for important pollutants like SO2, NOX, particle matter, etc. Any European citizen can claim for proper measures to be taken by the regional government. Communalities are reacting; in Europe some 160 low emission zones were set up, more will follow.

3 INTRODUCING LOW EMISSION ZONES

According to the Low Emissions Zones Network [2], Low Emission Zones (LEZs) are areas where polluting vehicles are restricted from entering. This means that polluter vehicles are banned or have to pay a charge. The emissions that are aimed to be reduced by LEZs are mainly particle matter and sometimes nitrogen dioxide.

The existing ~160 European LEZs can be classified into the following categories:

	Drive ban	***Charge***
All Vehicles	e.g. German LEZ	Milan Ecopass
Heavy Goods Vehicles (HGV)	e.g. Netherland LEZ	e.g. London LEZ

Table 1: Categories of Low Emission Zones

The experience on these categories can be summed up as follows:

- All vehicles drive bans: The ban affects the whole vehicle fleet (private + commercial) by pollution class sensitively excluding from entering the zone.
- HGV Drive bans: Commercial vehicles are pollution class sensitively excluded from entering the zone.
- HGV charge: Commercial vehicles have to pay a charge according to the pollution class when entering the zone.
- All vehicles charge: All vehicles are subject to a pollution sensitive charge when entering the zone

3.1 Effects of Drive Bans

Drive bans are immediately effective from the first day on; hence this is the fastest way to reduce traffic pollution - if the driver's compliance is enforced.

However, drive bans make necessary a sudden behavioral change like using public transport instead of the private cars or investing into modern or green cars. Frequently, due to the financial burden, certain sections of the population are disadvantaged in adopting properly; such are low income groups, families with many children, economically inactive households, handicapped people and small scale enterprises. A typical vehicle distribution according to the pollution class is shown in Fig. 1.

As vehicles that fail the access criteria become practically worthless, debates are regularly picked up about governmental overriding of private rights. These debates completely overlay the debate about the ecological reasons and the necessity for behavioral changes. In addition, exemptions from the drive ban as well as long transitional periods are set to smooth the deployment, indeed compromising the fact of a rapid pollution reduction, counting on the natural renewal of the vehicle fleet. Applied to the general public, driving bans are very likely to miss the target of sustainably setting minds and changing mobility habits; although applied to the commercial segment (HGV), pollution reductions are achievable: Being electronically enforced, the HGV specific LEZs in The Netherlands caused a significant higher share of less polluting Euro-4 and Euro-5 vehicles within the zone than outside, resulting in a concentration reduction of -0.2 ... -1.1 µg/m³ for NO2 and -0.1 ... -0.6 µg/m³ for PM10 [2].

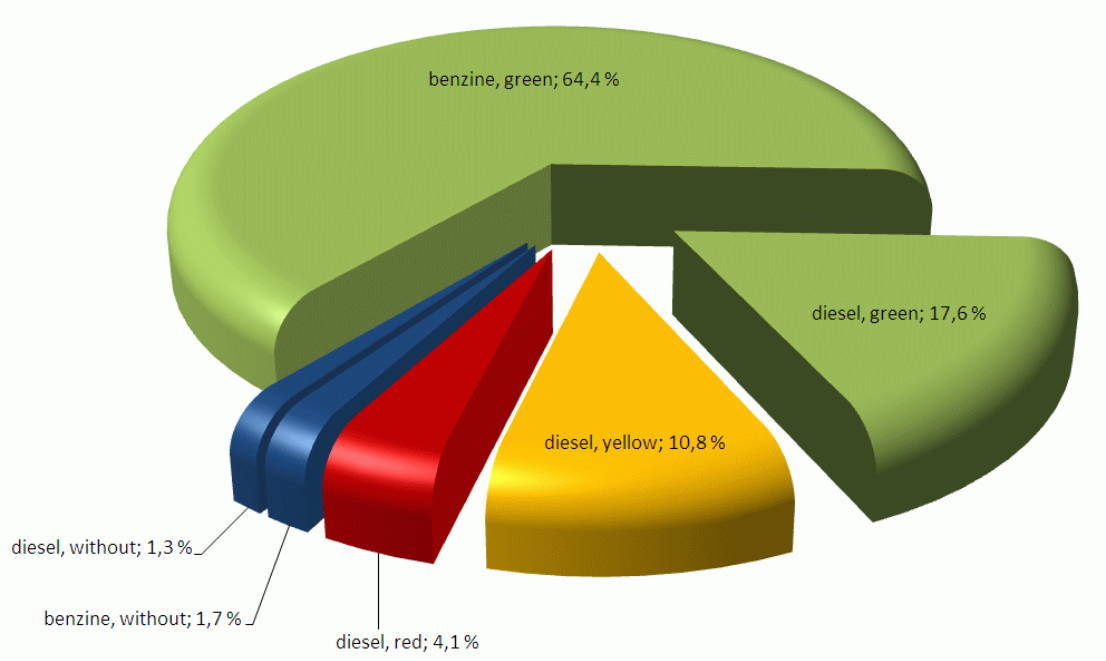

Fig. 1: Typical distribution of passenger cars in a city of ~100.000 inhabitants that is categorizing vehicles according to the PM10 pollution class; the class is depicted with coloured stickers (green for less polluting vehicles, yellow for the mid range, red for heavily polluting vehicles, no sticker in case the vehicle is too old for categorizing); vehicles are excluded from entering the zone according to the sticker color (name of the city is known to the author, source: web-based vehicle registration statistics of the city).

It is noteworthy that the driving bans are static, i.e. 7 x 24, during working hours, etc. Though, particle matter and other emissions and immissions heavily depend on dynamic influence factors like the weather situation or the traffic situation, particularly congestion [5]. Most of all, PM immissions vary seasonally. During summer, the near-ground air gets heated up and rises; wind distributes the particle matter over a larger area, consequentially the pollution in the city is reduced. During winter though, the near-ground air stays where it is and particle matter concentrates with on-going traffic. Additional PM sources are house fires and winter road sand. If precipitation stays out, the air is not cleaned. The immissions thresholds may be exceeded even without any traffic contribution. At the other hand, if the weather is favorable, traffic eventually does not lead to an exceeding of the thresholds. In the first case the driving ban is reasonable, in the second case the driving ban comes to nothing. Particularly the second argument is taken up by lobby groups and gets part of the public discussion, knowing that there are other traffic related emissions like CO2 that are not covered by the driving ban.

3.2 Effects of Charged Low Emission Zones

Charging at the other hand promises a smoother but more sustainable behavioral change as the affected population is not completely excluded from entering the city; people may adopt according to the individual

capabilities and needs. The London LEZ for instance with its nearly 1500 km² aims at the commercial segment [11]; namely HGV have to pay a day pass ticket of 200£ (100£ for vans and minibuses) depending on their pollution class. The result was that fleets were reorganized; in the meantime, a near 100% compliance with the appointed minimum emission class is recognized. Concerning CO2, there may be some small benefits through newer and more fuel-efficient vehicles being introduced into the fleet as a result of the scheme, but the zone does not specifically target CO2 emissions.

On the other hand, charging can be applied to private cars as well: With the "Ecopass" program, the Italian city of Milan charges according to a Euro emission class model [7]. Vehicles with the worst pollution class have to pay a day pass ticket for 10€, other, less polluting vehicles have to pay 2€ or 5€; the most modern vehicles including GPL fuelled vehicles have free access to the zone. The polluter cars were reduced by -56.7% in the first year of operation. Pollution could be reduced quickly; the effects are measurable even outside the zone. Finally, CO2 was reduced by 9% [8]. Secondary effects like reduced congestion and less parking pressure were measurable.

3.3 From LEZ to L-GHG

LEZ with drive bans are hardly an option to be used as a Low Greenhouse Gas Zone because drive bans are digital: Vehicles are excluded or they may enter. Long transition periods would be needed, the political consensus would end up with transition phases that are close to the natural fleet renewal, probably foiling the Commission's White Paper on Transport target of halving the GHG emissions from private car use in cities until 2030 [3]. Considering the experience with conventional LEZ, charged schemes obviously seem to be the better choice.

By analyzing the existing charged LEZs, a traffic cut can be observed; hence GHG is reduced accordingly as shown above. On the long run LEZs produce a shift from old cars to new – compliant – cars. Concerning CO2, there are some small benefits through newer and more fuel-efficient vehicles being introduced into the fleet as a result of the scheme, but no zone specifically targets CO2 emissions. Consequentially, the CO2 reduction first of all comes from the fleet renewal but will increase again according to general traffic increases. This can be demonstrated in the city of Milan, where the daily traffic volume in the zone was cut from 98 thousand to 87 thousand vehicles (see Fig. 2). The scheme encourages the usage of less polluting modern vehicles – and they are entering; People change from older cars to newer ones, but they do not sustainably change their behavior. The vehicles have less polluting engines, though the scheme helps less with congestion [4], bringing the well known increased fuel consumption due to stop-and-go operation and particle matter emissions due to tire and break abrasion – being emitted even by electric vehicles. At the same time, the revenues collected diminish, threatening the ability to keep the system in operation.

Though, is there a hint that a conventional charged LEZ can be turned into a Low GHG zone? By analyzing the time period shortly after introducing the scheme, two behavioral changes are recognizable [6]:

(1) The polluter cars were reduced by -56.7% in the first year of operation. This was a less sustainable achievement as many of those cars are being substituted by less polluting Euro 4&5 vehicles that are not subject to charging.

(2) Car traffic dropped by 5 million vehicles in the first year of operation – at the same time, 35 million additional rides took place in public transport. The local public transport operator increased the rolling stock capacity prior to the introduction.

The lessons learned from the Ecopass program are the following:

The paying for pollution principle is in a position to encourage behavioral changes. people use more public transport instead of (polluting) private cars or renew the fleet in a significant dimension;

The sustainability of behavioral changes depends on the applied scheme; Making GHG emissions part of the scheme allows selectively decarbonising cities;

A prerequisite of introducing such a scheme is the consensual decision making as well as the public consultancy in order to generate knowledge and acceptance.

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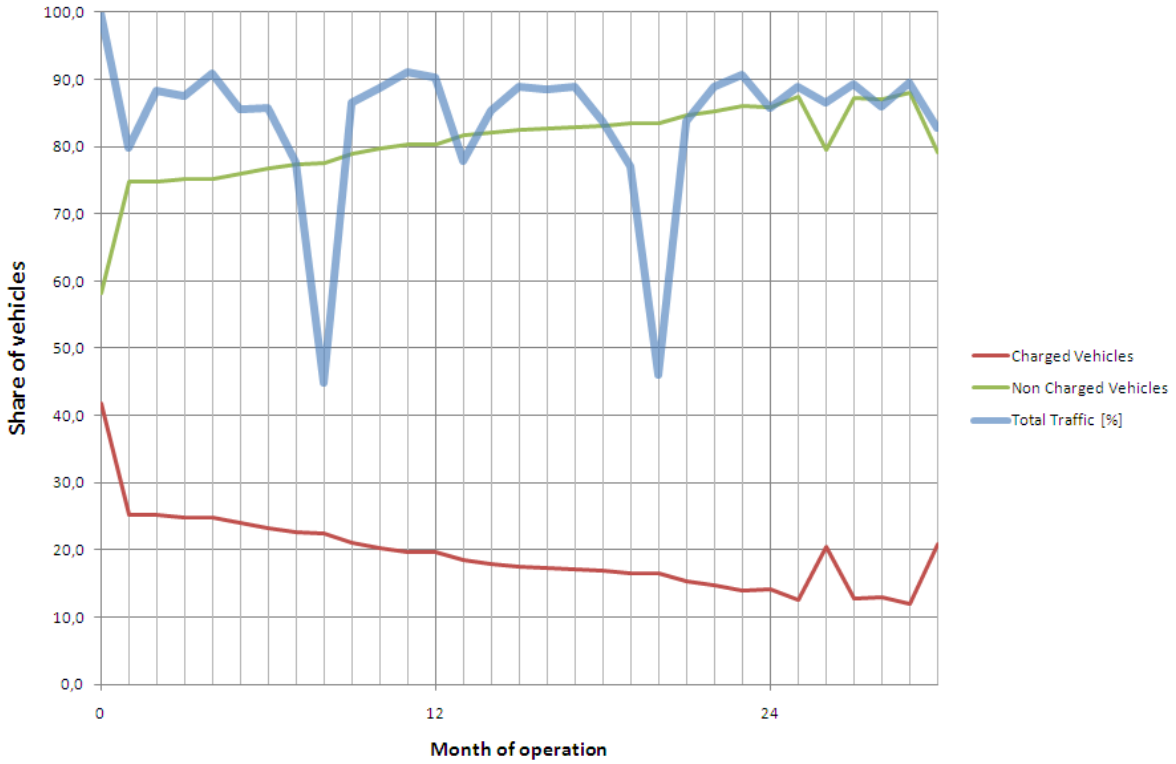

Fig. 2: Monthly traffic development within the Ecopass area since the introduction in January 2008 until June 2010 ("0" is the reference data); Total traffic references to the pre-Ecopass numbers; the share of charged and non-charged vehicles reference to the total traffic. Source: [6]

4 COMPARING CORDON CHARGING TO MILEAGE-BASED CHARGING

Access regulation turns out to be a strong instrument to change traveler behaviour towards a smaller footprint. Applying driving bans for not complying vehicles is simply not feasible, as too many people would be excluded; apart of that, the zones need to be large in order to achieve a substantial effect. So the remaining option is charged zones, accompanied by information & education and a balanced mix of complementary measures. The decision making process of charged zones though covers two crucial questions:

Which measure or scheme can achieve the desired effect while polluter-pays-principle is kept in a fair and transparent way?

Is the cost-benefit-ratio positive?

4.1 Effects comparison of cordon pricing and mileage-based pricing

With cordon pricing, a flat fee is charged when accessing the zone. In contrary, a mileage based charge is up to the distance driven within the zone. How can the two schemes be compared?

The cost model of Prof. Rémy Prod'homme [9] from the University Paris XII offers a possibility to assess the effects of such measures. His model can be applied to any given area; the road usage q can be measured in vehicle*km. It considers the demand for the use of the roads as a function of the unit cost of using the road. The most important element of this unit cost is the cost of the time needed to drive one km. Furthermore it considers the individual cost i(q), which could be considered a supply curve; this is the per-km cost borne by a motorist. And finally he considers the social cost s(q) created by a vehicle as a function road usage. This social cost is equal to the individual cost plus the cost of the additional time spent by all other vehicles because one extra vehicle is on the road. It is given by $s(q) = i(q) + i'(q)*q$. According to the model, the individual optimum is where the individual cost curve intersects with the demand curve; the social optimum is where the social cost curve intersects with the demand curve. A congestion charge increases the individual cost and shifts the intersection points towards less traffic.

Table 2 shows the model parameters that are used for comparing a cordon pricing to a mileage pricing, the model represents a city of 500,000 – 700.000 inhabitants:

Traffic category	Share [%]	Daily traffic count	Average km in the zone	1000 veh*km in the zone
Traffic within the zone	10	41,894	4	168
Short distance traffic with origin/destination in the zone	40	167,577	4	670
Long distance traffic with origin/destination in the zone	40	167,577	4	670
Through traffic	10	41,894	4	168

Table 2: Synthetic traffic model for assessing the effects of urban road user charge

It is worth mentioning, that the above numbers highly influence the shape of the cost curves in Fig. 3. For instance, if the average km in the zone increases, the cost curves get more flat because the same traffic is distributed on longer stretches of road ("less congestion"); if the charges are increased, the cost curves go up. Two charge variants are set:

A cordon charge of € 1,00 for every access/exit

A mileage charge of € 0,15 per km.

The demand curve is typical and is taken from the London Congestion Charge [10]. The effects of these variants are shown in the figure below.

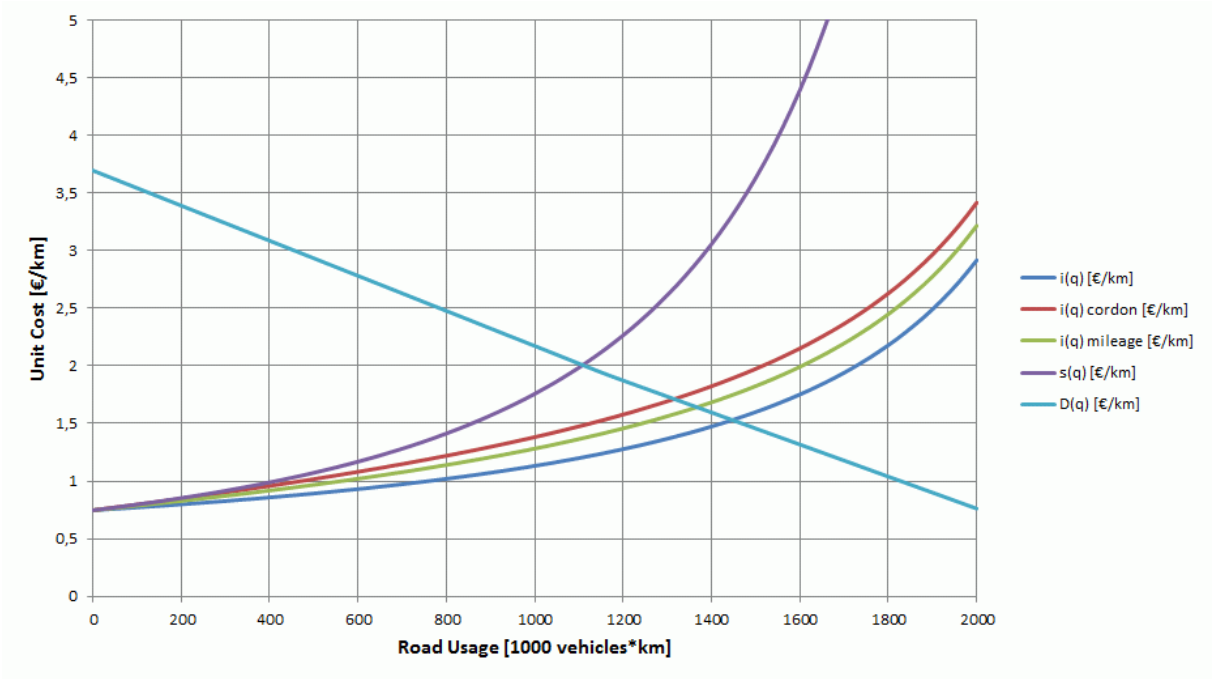

Fig. 3: Effects of urban road user charging on the traffic; individual cost rise with increasing traffic due to higher travel times, consequentially the demand declines with higher traffic; i(q) … individual cost; i(q) cordon … individual cost with cordon charging; i(q) mileage … individual cost with mileage based charging; s(q) … social cost; D(q) … demand curve; Lw … social loss due to congestion without any measure; Lm … social loss due to congestion with mileage based charging; Lc … social loss due to congestion with cordon pricing.

The social loss due to congestion without the charge is Lw; in this example this loss is € 573 mn per year. This loss can be reduced due to the charge variants to Lm (€ 370 mn per year) or Lc (€ 339 mn per year) respectively. The social gain due to the measure is Lw-Lm in the case of mileage based charging (€ 203 mn per year) or Lw-Lc. In the case of cordon charging (€ 233 mn per year). By increasing the charges, the intersection points of the respective individual cost curves (i(q) cordon and i(q) mileage) with the demand curve D(q) would move left towards the social optimum, showing the traffic reducing effects of the charge.

4.2 Cost benefit comparison

In addition to the above parameters, 100 access sites and 700.000 registered users are assumed; in the cordon variant, each access site registers every vehicle passage; for simplicity, in the mileage based charging variant, each access site serves as an enforcement site, verifying that the obliged vehicles carry a working on-board unit. On the basis of state-of-the-art industry cost, the following comparison is given in Table 3:

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	Cordon pricing	***Mileage pricing***
Technology	DSRC on-board units for frequent drivers (30%); standard ANPR registering	GNSS on-board units for all vehicles; GPRS communication to central
Capital expenditures [€]	27 mn.	123 mn.
operating expenditures [€/y]	9 mn.	93 mn.
Social gain [€/y]	233 mn.	203 mn.

Table 3: Synthetic traffic model for assessing the effects of urban road user charge

The most significant reason for the high capital expenditures with mileage pricing is the significant higher GNSS on-board unit price for all registered users. The reason for the high operating expenditures with mileage based pricing is the communication cost for all GNSS on-board units.

5 CONCLUSION

In Europe, Low Emission Zones were the response to the Clean Air Directive that limits the maximum threshold levels of air pollutants immissions. Most of the European Low Emission Zones are pure driving ban zones aiming on PM10 emissions only. Some Low Emission Zones are charged zones, which turn out to be a little more flexible. When bringing carbon emissions into the access criterion, there is nearly no choice than deploying charged zones, but still the open question is to apply a simple cordon scheme or a mileage based pricing that follows the polluter-pays-principle at best.

By applyin demand elasticity models, the proper scheme and charge can be determined in order to achieve the desired traffic reduction and carbon reduction. The outcome of this assessment is the social benefit of the measure. This benefit is facing the deployment and operating cost for the scheme, giving a decision support for choosing the right measure.

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reviewed paper

Enriching Public Spaces in Iran – Challenges and Opportunities

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1 ABSTRACT

Today the urban spaces and attendance of people in public spaces are very problematic and urban planners discuss about it very much.

At a glance if we review the history of urban planning, we can see that after industrial revolution and rapid growth of cities and after some solutions that urban planner thought about it, the appearance of cities changed. During these changes the attendance of citizens was changed too. By the theory of zoning that modernist urban planners suggested as "Aten charter" in 1933, the city was divided to three zones for working, recreation and living and circulation. So the importance of human spaces and urban spaces was reduced and increasing of automobiles became other factor for making urban spaces more unsuitable for people.

2 HISTORY OF URBAN PLANNING IN THE WORLD AND IRAN

2.1 Theories of urban planners after nineteenth centuries

In developing countries that most of urban planning decisions followed from the European theoreticians, their cities changed as well. Urban spaces became to some ugly and dangerous spaces for attending pedestrian and citizens and this situation have been trying till now.

In Europe and other developed countries after facing with these negative affects in their cities, some activities were launched to solve this problem in urban spaces. Some urban spaces were altered or designed to attract people and to have the ability of attendance of citizens in them.

One of the theoreticians that had noticeable theories was "Kamillo sitte", he pointed to the importance of attendace of people in city and urban spaces should be seen as "a place of social interaction" and he mentioned why new urbanism couldn't create attractive and memorable spaces and cities.

There were some other theoreticians such as "Pugin", "Ruskin", "Moris" who also recommended to review the history and returning to aesthetics of the past and there were also some body like Jean Jacobs who emphesized the attendance of people in public spaces and enriching social relationships. [1]

2.2 Principals of traditional urban spaces in Iran

In historical urban planning of Iran, there were some valuable principles which haven't been continued by our contemporary urban planning and these urban spaces have been changed to some unvalued spaces which were just allocated to automobile.

Our traditional urban spaces had some principles which include:

(1) The priciple of juncture of urban elements and houses:

In the old cities of Iran residential units have been jointed to each other with central courtyard and create a united complex. The arrangement and the orientation of all of the elements of houses were obeyed from "modularity" and "order", so there was harmony in city.

(2) The priciple of contrast spaces:

Contrast spaces are some spaces which have different width and length and height. The worth of contrarst spaces is that it can mitigate the monotony of the space.

(3) The priciple of encompassing the space:

Encompassing the space is the first principle of traditional spaces in Iran. This principle is common in all old cities. In Iran, traditional urban spaces are surrounded by arcades and colonnades to create a symmetrical and balanced space.

[1] CHOAY, Francoise

(4) Inner space and outer spaces:

Traditional urban desgining was involved with "outer" spaces which include public spaces such as squares and streets and "inner" spaces that include inner courtyards within the houses.

The concept of both inner and outer space is equal except in their scales.

Inner courtyards in houses are surrounded by rooms and outer spaces are encompassed by mosque, public bath, houses and some other buildings.

(5) The priciple of perception of spaces:

A traditional urban designer had a good perception of the meaning of "space" and "mass". He believed that the city is a combination of "mass" and "space".

(6) The priciple of composition:

In a traditional city, we had a harmonized composition so that it created a unity of forms.

In old cities we can find a composition by integrating different elements, and this composition showed a strong identity.

(7) The principle of territory:

We can identify three different spaces in traditional cities: 1- private space such as courtyards 2- semi-private or semi-public space such as a deadend street or a "Hashti"[2] .3- public spaces like streets and squares.

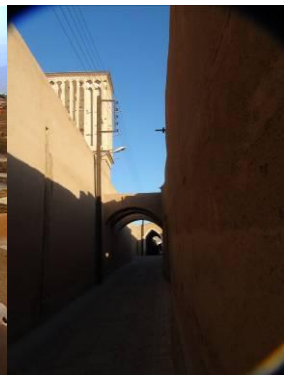
(8) The priciple of proportion and scale:

Proportion means the ratio of dimesions of a space. If we use correct and human proportion in space, it will create a sense of relaxation in people.

Scale is the relation between the sizes of a space with other spaces and Human scale is good relation between the sizes of a space with the size of human beings.

In traditional urban spaces we could find a good proportion and human scale in their spaces. In Iran in the regions with hot and dry climate, there are some norrow streets that get shade most of the time, but inspite of its small width people can feel comfort because of the color of walls which are covered by thatch.

The roofscape of Yazd city



streets which covers with thatch

Naghsh jahan square

Ganjali khan square

[2] Hashti was a semi-private space that was located in the entrance of teraditional houses for rapid and informal meeting.

As it was mentioned, most of the traditional urban spaces of Iran expect few of them were destroyed during the renovation of streets and erecting highways and new regions.

Of course few spaces which have been remained from the past show the magnificence and power of traditional urban planning such as Naghsh Jahan square and Ganjalikhan square.

2.3 Tekiyeh and Hoseyniyeh and Moharam ceremony

One type of spaces which were very important in our traditional urban spaces was Tekiyeh or Hoseyniyeh. These spaces have reserved their importance till now. Tekiyeh or Hoseyniyeh were used mostly for howling ceremony in the month of "Moharam". People howl for their third martyred leader (Imam Hossein) by holding special ceremony, they cry and beat on their chest.

Howling in Moharam - Ashoora

The ceremony of these days is one of the most important ceremonies between Shiite Muslims that people try to hold this ceremony in the best way.

Shah Vali Hoseyniyeh in Taft city

In the past the space for holding this ceremony was identified clearly in traditional cities and now we can't see these spaces in contemporary cities of Iran like past time. Nowadays just some streets and squares are allocated to this ceremony and they are not suitable for it.

Intrupting the traffic of vehicles with parade of howlers

Of course some Tekiyehs have been remained from the past that are still so magnificent and can envelop this social activity such as Amir Chaghmag square in Yazd city and Shah Vali Tekiyeh in Taft city.[3]

[3] BOZORGMEHRY , Zohreh

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2.4 Some recommends for designing Hoseyniyehs and Tekiyehs

In designing the surrounded spaces we sould respect two aspects:

(1) The principle of juncture and relation between urban spaces in the centre of district should be concerned in the other word designed space should be one of the compotent of exist spatial organization in city.

(2) Each urban space should be formed by needs and activities of its citizens. However in general we can mention some recommends for Tekiyeh and Hoseyniyeh as follows:

- In designing Tekiyeh and Hoseyniyeh we should notice the aspect of spatial relation of this element wih other urban elements.
- In designing Tekiyeh and Hoseyniyeh spaces should be surrounded simply and proportionately.
- It should be avoided to convert Tekiyeh and Hoseyniyeh to vehicle access squares.
- Every intrupt in old and historical spaces such as Tekiyeh and Hoseyniyeh should be under surveillance of authorities and axperts. [4]

3 RECENT SITUATION OF URBAN SPACES IN IRAN

Urban spaces of Iran have lost their property as a social space. Our urban spaces such as streets and squares don't present any attraction to attract pedestrian. If some body is seen in this space, it is because of an obligation not for their wish. Most of our streets and square are full of automobile without suitable furniture or attractive function to absorb people and so cities don't have enough civic vitality and most of times they seem ugly, unusable and bore.

Toopkhaneh square in Tehran without any attraction for attendance of people

3.1 Some renovation activities to enrich urban spaces in Iran

Actually pedestrianization and respecting principles in designing historical urban spaces have been launched in Iran but there is still a long distance to ideal situation. Some activities have been done in several cities in Iran during recent years.

For example in centre of Tehran (capital of Iran) some commercial streets were allocated to pedestrian and it caused to increase safty and value in these streets.

Pedestrianization in centre of Tehran (Bazar region)

[4] TAVASOLI, Mahmood

4 CONCLUSION :HOPES AND CHALENGES

By some alteration in urban planning of Iran and suitable execution, we can lead cities to a more human manner that other countries recommend to do it too. We should convert our contemporary city to an attractive and memorable city which shows a strong identity.

It is clear that these changes in cities of Iran need a lot of cost and time but at first we should start it with proper legislation in urban designing and giving priority to the attendance of people than automobile. In this case we should emphasize on some legislation that are related to this case and persuade to execute these laws until we could make a prosperous and vivid city.

For example for Moharam ceremony we need some suitable spaces that like past time peolpe can hold their ceremony in the best manner.

We should revive our Tekiyehs and Hoseyniyehs to be adaptable for this important social activity.

Indeed by restoring these spaces we will enrich one of our important cultural elements to be presented in the world.

At the end I repeat that in designing urban spaces especially in historical districts we should define the principles of their combinations, proportions, scales and forms of buildings and issue some codes about them. Followimg these codes will lead us to a richer space with a storng identity that of course could be more adaptable with social activities and huminty.

Amir Chakhmag Hoseyniyeh in Yazd city

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Environmental Challenges of Peri-Urban Settlements in the Lagos Megacity

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1 ABSTRACT

This paper has investigated the environmental challenges faced by Peri urban settlements in the Lagos Megacity. An intense study of the Isheri, Ibafo and Sagamu Interchange areas along the Lagos Ibadan Expressway axis was done. Socio economic characteristics, housing and environmental conditions as well as rural urban linkages were done to determine the flow of interaction between the settlements and the Lagos Metropolis. Data collection was by the administration of structured questionnaires. 46,113 and 191 were administered on household heads in Isheri, Ibafo and Sagamu Interchange areas respectively. survey was by systematic random sampling. The study revealed a high level of interaction between the settlements and the Lagos Megacity as over 60 % of respondents working in Lagos. The study also revealed that land value, rental value had increase since 2005 when the highest rate of influx was observed. However environmental problems in the area of infrastructure and security were observed. The paper concluded by suggesting strategies for mitigating identified challenges and these include the introduction of participatory planning mechanisms as well as the enforcement of development control.

2 INTRODUCTION

According to OECD (1979:) the impacts of economic growth and physical expansion of the urban area are not confined within urban boundaries; they reach into much wider areas surrounding urban centres, creating so-called urban areas, urban fringe areas, or peri-urban areas. As such, the peri-urban area can be defined as the meeting of urban and rural activities. While the peri-urban area retains the characteristics of the rural area, changes take place with respect to physical configuration, economic activities, social relationships and so forth. This meeting of different systems creates both opportunities and problems, which have significant impact on the environment and people's livelihoods. Lagos has grown from predominantly farming and fishing villages to highly urbanized settlements. With a population of over 10 million people on a built up area of 17500ha, it is regarded as a mega city (Mabogunje, 2002). Lagos with its high migration rate and even higher population rate has grown in an amoebic fashion into surrounding rural areas, hence the proliferation of peri-urban settlements adjacent to Lagos

This study appraises the nature and environmental challenges of peri-urban settlements along the Lagos Ibadan Axis of the Lagos Megacity, and considers in detail, the environmental conditions, socio-economic activities as well as the linkages Lagos Megacity.

3 URBAN-RURAL LINKAGES AND FLOWS

At the broad theoretical level, it is suggested that there are economic, social, political and ideological linkages between urban and rural places. These find their physical expression in measurable flows of people, money and budgetary allocation. These flows are also associated with interactions between people, places and objects, but do not in themselves actually embody those interactions (Unwin,1989). This system proposes four kinds of linkages (i.e. economic, social, political and ideological) and many more flows that are derived from them.

Firman (1996) identified, four levels of interactions occur with major cities and they are

(1) the peri-urban regions: those areas surrounding the cities within a daily commuting distance from the core and characterised by high interaction with it;

(2) the agricultural regions, often lying along the corridors connecting a large city core to smaller town centres;

(3) densely populated rural regions;

(4) sparsely populated frontier regions

The Research team of the Development Planning Unit, University College London (2000) while attempting to characterise the features of the peri-urban interface and the related environmental problems posited that population size, population density in built up areas, infrastructural characteristics, administrative boundaries and predominant economic activities are the main variables that distinguish rural from urban. The peri-urban interface constitutes an uneasy phenomenon, usually characterised by either the loss of rural aspects (loss of fertile soil, agricultural land, natural landscape etc) or the lack of urban attributes (low density, lack of accessibility, lack of services and infrastructure etc) Attempts to conceptualise this new development landscape range from the emphasis on rural-urban linkages as footloose processes rapidly transforming territories, to the notion of the peri urban as a term qualifying areas with mixed rural and urban features. (Dayaratne, 2003). According to Firman (1996), the administrative integration of surrounding rural areas into the jurisdiction of the urban settlements is a pragmatic way of eliminating unnecessary conflicts in a highly integrated rural-urban territory.

Douglass (1998) proposed a new paradigm of networking settlements that integrates the realities and the potential of rural-urban linkages in the process of regional development policy formulation: Rather than trying to make a single large city into an omnibus centre for a vast region, the network concept is based on a clustering of many settlements, each with its own specialisation and localised hinterland relationships. His supposition is that even from the point of view of growth centres, an integrated network of dynamic centres is more likely to counterbalance a big city than some artificially boosted growth centre. (Douglass, 1998)

Dayaratne, (2003) on the transformations of the peri urban areas, averred that peri-urban areas are undergoing major transformations. Large numbers of urban residents, pushed out by high housing costs in the city, look for cheap accommodations in the peri-urban areas. The poorer, informal-sector workers move/rent often overcrowded temporary shack/rooms hurriedly built. Squatting is predomint, while numerous forms of slums and shanties emerge,. At the same time residents of peri-urban settlements usually are employed in the city, while traditional agriculture gives way to new forms of production aimed are fulfilling the urban dweller's need for fresh vegetables.

Rakodi, (1998) sees the peri-urban interface as a dynamic zone both spatially and structurally. Spatially it is the transition zone between fully urbanised land in cities and areas in predominantly agricultural use. It is characterised by mixed land uses and indeterminate inner and outer boundaries, and typically is split between a numbers of administrative areas. The land area which can be characterised as peri-urban shifts over time as cities expand.

It is also a zone of rapid economic and social structural change, characterised by pressures on natural resources, changing labour market opportunities and changing patterns of land use.

Rakodi further recognised the complexities of building a spatial framework around what is essentially an amorphous and mobile site for the interaction of various social, economic and cultural processes and inter-linkages between the rural and the urban, stressing the relationship between urban and the immediate rural areas being the result of a process over time.

DFID (1998) defines the peri-urban interface as characterised by strong urban influences, easy access to markets, services and other inputs, ready supplies of labour, but relative shortages of land and risks from pollution and urban growth. The concept of the peri-urban settlement is one referring to an area where urban and rural development processes meet, mix and inter-react on the edge of the cities. It is often not a discrete area, but rather a diffuse territory identified by combinations of features and phenomena, generated largely by activities within the urban zone proper; hence the development of a peri-urban area is an inevitable consequence of urbanisation and as cities in developing countries continue to grow, the peri-urban area moves outward in waves (DFID, 1998). In addition to their spatial characterisation, peri-urban settlements are conceptualised as squatter settlements, illegal areas, areas of high population growth due to rural migration (and natural growth), low priority areas in terms of urban planning, areas with diverse socio-cultural composition and low income, socio-economic situation (World Bank, 1999, UNICEF, 1999). These approaches may be classified according to the set of variables they choose to emphasize: physical attributes, such as proximity to the city and poor infrastructure; socio-economic variables; or urban-rural flows (of people, energy, goods). Adell, (1999); Allen, (1999) and Jenkins (2003).

Scant research exists on the phenomenon of peri-urban settlements in Nigeria. In a study on the impact of the spatial growth of Ibadan on its surrounding hinterland, Areola (1994) focused on the resource processes and the environmental impact of the growth. The findings of the study focused less on the problems of the growth as it affects the city itself but more on the problems generated in the city region, (Areola 1994). The study concluded that full understanding of the economic and environmental effects of Ibadan city's growth and spatial expansion can be gained only through detailed studies of the region (Areola 1994). Salau (2006) revealed an earlier research by Maconachie and Binns (2003) on people-environment relationships at the rural-urban interface of Kano, Northern Nigeria in which they identified socio-economic and cultural factors as the most significant forces shaping the process of peri-urban change in the city.

Jaiyebo, (2003) avers that there is a death of information on the peri-urban interface in Nigeria, and the rates of city expansion and migration to the city fringes are not adequately documented. Studies which made reference to peri-urban settlements include those of Mabogunje (1968), LASG (2004), Odumosu (2004), CPMS (2005), FGN(2006) Gandy, M (2006) MPPUD (2005),and Salau, T.I. (2006). However, they all made reference to this phenomenon in the context of the growth and development of the Lagos Metropolis. hence this paper is of utmost importance, as it investigates these settlements and identifies the challenges faced as well as the potentials for growth and development and ultimate integration with the Lagos Megacity.

4 CONTEXT OF THE RESEARCH

The spatial growth of Lagos Metropolis has gone beyond the physical boundaries of Lagos State and spilled over at many points into adjoining Ogun State. The Lagos Metropolis is located along the narrow coastal plain of the Bight of Benin. The metropolis, an estimated 300 square kilometres, is a group of islands endowed with creeks and a lagoon. The city began in the fifteenth century as a Portuguese trading post exporting ivory, peppers, and slaves, and has overflowed its natural boundaries of about 3.8 sq. km in 1881 to a huge metropolis of over 1,183 sq. km in 2002 (Oyesiku, 2002), and a diversity of activities, functions and reflections have gradually spread over a larger territorial area as the metropolitan area. According to Odumosu (2004), the spectacular pattern of urban development of Lagos has seen the mainland segment of the Metropolis expand across shanty towns like Agege, Egbeda, Idimu, Ajegunle, Ketu, Bariga, and Ejigbo-Ikotun.

The resulting Lagos Megacity region includes the continuously expanding area comprising for the moment all of the 20 local government areas of Lagos State and the emerging urban, rural communities and peri urban settlements comprising of various geographic areas that have developed at different time in close linkage to the Lagos metropolitan area, Spatial expansion of the metropolitan Lagos has extended outwards annexing nearby settlements along the southwest end of Ojo-Badagry Expressway, the south east axis along the Lekki Epe corridor, the north east axis along Ikorodu corridor, Alimosho-Igando-Iba-Lasu corridor north west of Metropolitan Lagos and the Lagos-Ibadan axis north of Metropolitan Lagos.

Since metropolitan Lagos is practically saturated, growth had being outwards to the peri urban settlements, the regions with the potential for expansion; strong interconnection with the Lagos Megacity, strong local growth for informal activities for the local and urban population. The corridors along the Lagos-Ogun State borders have been experiencing the highest pressure as the Metropolitan Lagos spills over to them. Otta, Ibafo/Mowe, Ojodu/Akute, and Ogijo areas are already under heavy and intense pressure of physical growth with very few indicators of real development. (Lagos Mega city Report 2006) . this study therefore investigates the Lagos Ibadan Peri Urban axis located in this zone.

The peri urban settlements of the Lagos Ibadan Axis is located on between Latitude 60 44' North and Longitude 30 25' East'' of Isheri North and Latitude 60 54' North and Longitude 30 7' East'' of the Sagamu interchange. In aerial distance, Lagos Ibadan Axis of the Expressway is about 32 kilometres between the Isheri North end of Lagos State and the Sagamu Interchange of the Expressway in Ogun State. The peri urban settlements of the Lagos Ibadan Axis are strategically located nodal settlements along the Lagos - Ibadan Expressway absolving the spillover population from the Lagos Megacity.

The Lagos Ibadan Peri Urban settlements are a cluster of small settlements along the axial of the Lagos Ibadan Expressway. The Lagos Ibadan Expressway is a unimode transportation route that links Lagos with other parts of Nigeria via the Sagamu-Ore Expressway. The Expressway also serves as connecting distributaries to major towns and roads that converge along its axis. The street pattern of the Expressway is

decidedly radial, with Ibafo peri urban area street pattern taking shape along its traditional core, while the newer areas of Isheri and Sagamu Interchange portray deliberate mix up of land use activities without recourse to planning standards.

Lagos Ibadan corridor has grown strongly in its physical extent along Lagos - Ibadan Expressway which runs in a north-west direction from Metropolitan Lagos towards Ibadan along the state boundary with Ogun State and extends to a distance of about 32 kilometres terminating at the Sagamu Interchange. The physical extent of the towns and settlements runs in a linear fashion along the Expressway extending inwards to some few kilometres from the Expressway.

The physical development of Lagos Ibadan corridor is further reinforced by various religious institutions that have taken over the corridor in recent years; and are major flash Point for seasonal traffic congestion. They include the Redemption Camp at Mowe, Mountain of Fire Ministry Camp at Km 12, Deeper Life Ministry at Km 15, and NASFAT site at km 16. Other major land uses are those of various private universities, Cargo Airport at Sagamu Interchange, residential estates such as the Gateway Village, Riverview, Havillah, Sparklite Estates, Paradise City and others. The peri urban settlements have similar land use with slight variations along the population pattern. All of them of course provide residential land use. A very high percentage, 86 %, has farmland cultivated by peasant subsistence farmers. These are the two predominant uses of the land. 28 % have social facilities such as schools, police posts and institutions that complement residential land use. Only a few, 12.3 %, have any commercial activities and these are mainly retail shops. The bigger settlements have markets and petrol filling stations. (CPMS, 2005). Only six have any industries at all, and these include textile industries in Ibafo, feed mill in Orimerunmu, cocoa processing industry in Warewa Araromi, and several cottage industries in Mowe, Loburo, Ofada and other smaller settlements.Major development axes are at Mowe, Ibafo, Ofada and the Redeem camp, where intensive development activities extend from the Expressway inwards to a distance of about 2.5 kilometres. Table 1 below highlights the key characteristics of the zone.

Peri Urban Zone Characteristics	**PERI URBAN ZONES ACTIVITIES**
Peri Urban Zone	Sagamu Interchange: 50 %; Ibafo: 30 %; Isheri: 20 %
Dominant Settlements	Mowe; Ibafo; Ofada
Population Estimate (2003)	21,740
Land Area	450 km2
Degree of Land Use	Minimal < 10 %
Topography	Low and gentle 5 – 25 m
Main Access	Lagos-Ibadan Expressway
Roads & Highways	No Road Network; Transit Corridor
Water Supply	No Water Supply System
Economic Infrastructures	Rudimentary
Social Infrastructures	Rudimentary

Table 1: Characteristics of the Lagos Ibadan Peri Urban Zones Source: CPMS (2003) Ogun State Conceptual Regional Plan (2004 - 2025) Main Report

Eighty two settlements have been identified in this zone (CPMS, 2005) of which more than 70 % are hamlet of less than 100 persons. Another 20 % have population of between 1000 and 2500 each. The six dominant settlements are Ofada, Abaren, Orimerunmu and Arepo with population sizes in the range of 2,500 to 5,000; and Mowe and Ibafo with populations greater than 10,000. (CPMS 2003).

The study area comprises three major areas

Isheri Area constitutes a substantial portion of the first OPIC acquisition; occupants in the area include the cattle and ram dealers on the bank of the Ogun River, Sparklite Estate, a private developer housing effort, the Isheri community to the east of the expressway and the OPIC head office. At its northern fringe are the settlements of Arepo and Warewa. This portion of the corridor is low-lying on both sides of the expressway.

Ibafo Area This area is dominated by Ibafo, a town on both sides of the expressway, with several other settlements including Araromi, Magboro Akeran and Magboro Sofolarin. The area also contains three religious settlements, MFM, Deeper Life and NASFAT with their potential to create large flash traffic. The centre of Ibafo is approximately at 13.5 kilometres from the State boundary with Lagos State, and it extends

for about 3 kilometres along the expressway. It is elliptical in shape, tapering off from the 3 kilometres along the expressway to less than 100 metres wide two kilometres away on both sides of the expressway.

Sagamu Interchange Area is made up of the gateway city to the north of Ibafo, starting from Mowe and extending to the Sagamu Interchange. The dominant existing settlement is Mowe, which has grown to merge with Loburo and Pakuro. Others are Ofada, Orimerunmu, Abaren and Asese. Major settlements include the Redemption Camp and CETEP University There is projected to be about 26,500 Mowe today occupies an area of about 11 square kilometres, estimated from digital images. About 90 % of this land area is west of the expressway, and it extends about 3 kilometres inwards. Its extent along the expressway is about 3.5 kilometres starting at about kilometre 20 to 23.5 from the State boundary with Lagos State. The major catalyst for the development of Mowe is the siting of the Redemption Camp in a nearby settlement of Loburo.

5 RESEARCH METHODOLOGY

Lagos Ibadan Peri Urban Axis was purposively selected for this research because of its distinct geographic attribute of linking Lagos to the rest of Nigeria. The study area was delineated on the basis of its linear form of settlements along the Lagos Ibadan Expressway with scattered residential quarters for the purpose of questionnaire administration.

Data collection was by systematic random sampling. Data was collected on the socio-economic characteristics of residents, physical and infrastructural facilities as well as their interaction with the Lagos Metropolis. A sample size of 5 % of the sample frame of the estimated 6840 buildings (CPMS 2005) along the Lagos-Ibadan Axis was selected. 350 questionnaires were administered on household heads in 19 of the 82 settlements that make up the axis. 46, 113 and 191 household heads were sampled in Isheri, Ibafo and Sagamu Interchange Areas respectively. Data analysis was by both simple descriptive statistics as well as parametric analysis.

5.1 Socio-Economic Characteristics of the Respondents

The population is a relatively young one with about 71.1 % aged between 20 and 40 years old. 7.7 % of the respondents are less than 20 years of age, while those between 41 to 60 years make up 18 % of the population. Those above 60 years of age are 9 %. The pattern of the age distribution is similar across the three zones, this may largely due to the fact that the axis is a transitory zone for working age men, unable to afford the cost of living in the Megacity.

The survey also revealed that the male population was 93.5 %, 54.9 % and 39.8 % in Isheri, Ibafo and Sagamu Interchange areas respectively. a significant proportion of the respondents are single; 43.5 %, 41.6 % and 48.2 % in Isheri, Ibafo and the Sagami Interchange areasn respectively, while there are more married people in Ibafo and Sagamu Interchange areas (46.9 % and 45 %). Only about 26.1 % of the respondents in Isheri are married. The differeing figures in gender and marital status in Isheri may be attributed to the Cattle Market which is a sector dominated by men.

The Lagos Ibadan Peri Urban Zones is largely made up of Nigerian nationalities (86.3 %) comprising of various tribes such as the Yoruba speaking people of the Ijebu, Awori, Egba, Yewa, and Egun extraction; the Igbo, Hausa, Isokos, Urhobos, Calaber, and Ijaw. The nationalities fro the West African Coast is about 11.4 % of the respondents, while 2.3 % of the populations are from other African Countries. Educational level is a key determinant for measuring standard of living in the study area. The study carried out revealed that 26.0 % of the total respondents are literate by United Nations standards, having completed a minimum of secondary education. 34.8 %, 32.7 % and 19.9 % have secondary education in the Isheri area, Ibafo area and the Sagamu Interchange respectively, the high level of literacy across the three zones is attributable to its proximity to the Lagos Megacity.

The survey of occupational status of the respondents revealed that 26.6 % are Government employee and self self-employed respectively while the unemployed and retired accounts for 22.6 % and 3.4 % respectively. However, a breakdown of the occupational status of the three peri urban zones revealed that trading, civil service and students/apprentice are the most common activities, representing 15.1 %, 29.4 % and 21.4 % in that order, while 6.9 % are engaged in teaching, 5.4 % in farming, 10 % are artisans, 9.4 % are factory workers, and 2.3 % are retirees. In all the peri urban zones, the majority of the respondents are civil servants

followed by students and apprentice while trading activities was high in Ibafo and Sagamu. While majority of the respondents (26.6 %) are earning less than N10,000 per month, those who are earning between N10,000 and N20,000 are 26.6 % and 25.4 % are earning between N20,001 and N40,000. 3.1 % earn between N40,001 and N60,000, 5.7 % are earning between N80,001 and N100,000. those who claimed to earn above N100,000 per month are 3.5 % of the respondents. Interestingly, mode income per month was less than N10,00 for Isheri and Sagamu Interchange areas, and between N20,000 and N40,000 in Ibafo. 16 % of the respondents in Ibafo area earn over N100,000 monthly. and It could be deciphered from all these that a larger proportion (62 %) of the respondents earn less than N20, 000 per month.

5.2 Housing and Environmental Profile of the Study Area

Majority of the houses in the study area were built between 2000 and 2010. The period that recorded the highest rate of building was between 6 to 10 years, which recorded almost half of the total buildings surveyed. This is followed by the period between 0-5 years recording a total of 17.1 % of the total number of buildings. A study of the pattern of growth within the three peri urban zones shows that majority of the new building construction has been more concentrated around the Isheri-Ibafo areas, which adjoins the Lagos Megacity. Housing types in the study area are small rooming house types (28.6 %). The detached type of houses, 1.7 % and compound houses 27.1 %, while block of flats accounted for 25.1 %. The dominance of the rooming type is explained by the rapid growth of the Lagos Megacity in to the adjoining peri urban settlements by low income earners and the adaptable nature of its design. It is easier to build and less costly to adapt for higher returns. It is also easier to let out to the various sizes of households.

Residential areas in the peri urban zones differ according to the areas, but, the emerging trend is the acquisition of large tracks of land for the construction of housing estates. Major housing projects are Gateway Estates Riverview Estates, Havillah Estates and Sparklite Estates. Residential use in the peri urban zone covers 50.9 % of the total land area

Squatting is widespread across the study area, especially in Isheri. The study also revealed that 30 % of the respondents were landlords, while 39.7 % were tenants. Interestingly 25.1 % were squatters. In Isheri area, about 50 % of the buildings were were occupied by their owners, while 32.6 % were squatters. In Ibafo, 29.2 % are owner occupier, while rented apartments made up 27.4 % and squatters were 15.9 %. 46.6 % of respondents in the Sagamu Interchange areas were rented, 30.7 % were owner-occupiers, while 22 % are squatters. Average number of rooms for exclusive household use is 2 in Ibafo area, 3 in Isheri and Sagamu Interchange areas respectively.

Household wastes generated in the study area are mostly mixed use related wastes such as cartons, papers, foodstuffs, animal waste, and other related commercial and household wasete. Wastes generated in the area are disposed by incineration (15.3 %), 6.9 % in manure piles, 26.6.5 % are thrown into canals and drains, while those collected by garbage operators accounted for 22.6 %. A look at the house waste disposal pattern of the peri urban zones shows a similar pattern for the areas; as disposals through landfills and incineration is the most common means of disposing waste, also, garbage collectors and indiscriminate disposal in to canals and drainage channels are also common.

The peri urban zone is fed primarily by the Lagos – Ibadan expressway with no significant tee-off between the Berger Junction at Isheri and the Sagamu Interchange. About 58 % of the settlements have access by road, and 20 % indeed have tarred roads. However, the dominant mode of transport is the commercial motor cycle locally known as Okada. Only Mowe and Ofada have roadside drains. In the Isheri-Ibafo area, there are a few feeder roads, mainly serving rural communities and some OPIC estates. Most of these roads are earth roads, but a few were designed and constructed by OPIC. All of them have no defined road junctions at intersections with the expressway, which. Developments along the peri urban settlements are therefore very difficult to access. Trailers park along the road at Ibafo constituting serious hazard to high speed vehicles and visual unpleasantness. In the Sagamu Interchange area, there are much fewer feeder roads feeding the expressway, reflecting the limited development in the area. There is, however, an old network of roads connecting Ofada, Mowe and Pakuro and linking with the Papalanto – Sagamu Junction Road. There are other earth tracks in the area linking the villages.

5.3 Linkages of the Study Area to the Lagos Megacity

61.1 % of all respondents work within the Lagos Megacity. 27.7 % work within the peri urban axis while only 9.7 % work in Ogun State. They travel to Lagos mostly by public buses (63.1 %) or private cars (31.1 %). Outside of work, 23.4 % visit Lagos at least twice weekly for social engagements and cultural interactions, while 17.1 % to buy goods.

62.6 % of the respondents are of the opinion that land value has grown with the increasing influx of workers within the city to the peri urban zones. House rent in the Isheri zone was considered to have increased 100 %, Ibafo 38.9 % and Sagamu Interchange by 62.6 % in the period between 2005 and 2010.

54.3 % of the respondents in consider the Lagos Ibadan Expressway to exert a positive impact on their settlement. Reasons adduced include accessibility, increase land value and commercial returns. Those who consider the location of the Expressway as exerting a negative impact gave traffic congestion and accidents, noise, security and influx of strangers as their reasons.

It was discovered that in between 2005 and 2010, when the highest growth rates occurred in the axis, basic infrastructure and social amenities generally worsened. The respondents attributed the situation to the influx of people as well as the settlements still being adjudged rural when their populations had far exceeded rural limits.

Indices	Improved	Worsened	No Change observed
Electricity	33.4 %	59.1 %	6.9 %
Water Supply	43.1 %	46.6 %	9.4 %
Security	31.4 %	55.1 %	12.6 %
Cost of Travel	8.6 %	62.0 %	28.6 %
Traffic Flow	9.1 %	78 %	11.1 %
Land Value	32.3 %	37.1 %	30.0 %
Rent Value	36.9 %	48.6 %	14.0 %
Crime	38.0 %	42.3 %	16.3 %
Pollution	34.0 %	46.6 %	17.7 %

Table 2: Changes in Peri Urban Growth Indices

Generally, majority the respondents believed land value has increased consequent upon the proximity of the Lagos Megacity. Also believed to have increased are such indices as house rent (62.6 %), traffic intensity (69.4 %), population growth (76.6 %), housing density (60.3 %), urban spatial growth rate (64.9 %), crime rate (66 %), and environmental problems (60.9 %). urban sprawl is the only stable activity, while land availability has reduced considerably (51.4 %) occasioned by the different types of development taking place in the peri urban zones as shown in table 3 below

Indices	Increased	Reduced	Stable
Land Value	55.7 %	36.9 %	3.4 %
House Rent	62.6 %	30 %	4 %
Traffic Intensity	69.4 %	13.1 %	13.7 %
Population Growth	76.6 %	19.7 %	0.3 %
Housing Density	60.3 %	30.3 %	6.0 %
Urban Growth Rate	64.9 %	21.1 %	10.6 %
Crime Rate	66.0 %	19.1 %	11.4 %
Urban Sprawl	39.1 %	47.4 %	9.1 %
Land Availability	25.7 %	17.7 %	51.4 %
Environmental Problems	60.9 %	15.1 %	17.1 %

Table 3: Changes in Environmental Indices in the Study Area

In order to determine the intensity of interaction between the Lagos Megacity and the Peri urban settlements, the gravity model was adopted

The formula for calculating the gravitation flow of one settlement from the other is:

The Gravity Model = $\frac{\text{Population}^1 \text{ x Population}^2}{\text{Distance}^2}$

Where:

D^2= the distance between the settlements

P^1= population of Lagos Megacity

P^2= population of Lagos Ibadan Peri Urban settlements

	Distance between the Settlements	Population of Lagos Megacity	Population of Settlement	Force of attraction
Isheri	10,000m	9,3000,000	4,700	437.1
Ibafo	18,000m	9,3000,000	10,000	287.04
Sagamu Interchange	32,000m	9,3000,000	10,800	98.06

Table 4 below outlines the level of intensity

From the foregoing, the force of attractions is stronger at the Isheri peri urban zone. One may therefore say that the expected interaction between the Lagos Megacity Region and the Peri Urban Settlements increases as the product of the populations of the two (PiPj) increases, and it decrease as the distance between the Megacity and the settlemetn (dij) increases. As shown from the calculations above, the attraction between the Lagos Megacity regions and Isheri peri urban zone (437.1) increases as its approaches Ibafo and decreases as it approaches the Sagamu Interchange

6 DISCUSSION

This paper has examined issues relating to the peri-urban settlements along the Lagos Ibadan axis of the Lagos Megacity. The objectives of the study are to determine extent and character of peri-urban settlements of the Lagos Megacity and the relationships that exist between the peri-urban settlements and the Lagos Megacity region looking at the social and economic interactions between them

The rapid growth of the Lagos Ibadan Expressway peri urban settlements and its reflection on the environmental quality of life of the residents has been found to have been largely influenced by its close proximity to the Lagos Megacity and this situation has created a number of environmental effects on the peri urban settlements. Majority (92.3 %) of the respondents believed the town has experienced some changes as a result of the proximity,

An easily notable effect of the Lagos Megacity on the peri urban settlements is the phenomenal increase in the population of the Lagos Ibadan Peri urban settlements over time due to massive relocation of residents from the Lagos Megacity. Study of the trends of population growth pattern of the Lagos Megacity and that of the Lagos Ibadan Peri urban settlements shows direct positive correlation. This research found out that about 76.6 % of the people in the Lagos Ibadan Peri urban settlements moved in from Lagos and about 89.8 % of this group moved in less than 10 years ago. Factors such as cheaper land, cheaper rent, social engagements and cultural interactions, political affiliations nearness to Lagos and nearness to work place were identified as reasons for moving to the Lagos Ibadan Peri urban settlements.

There is intense interaction between the Lagos Megacity and the Lagos Ibadan Peri urban settlements. The spatial pull of Lagos reaches peri urban axis of the Lagos Ibadan Expressway and a dominant commuting pattern between them exists with great implications for the entire Peri urban settlements. A large number of people living in the Peri urban settlements were found to be working in Lagos and commuting to Lagos on daily basis. This study found that about 96.3 % of the respondents commute to Lagos on daily basis and about 64 % of this group do so for employment purpose only.

Traffic situation in the Lagos Ibadan peri urban zones was generally considered by the respondents to be worse accounting for about 78 % of the total respondents the traffic intensity shows that there is an increase in the capacity of the traffic; proximity to the Lagos Megacity was adduced by the respondents for the increase.

Another effects of the Lagos proximity on the peri urban settlements is the increase on house rent and land values. The value of land and house rent in the Lagos Ibadan peri urban settlements has risen sharply especially between the last 10 and 15 years.

The study of land and housing development pattern in the Lagos Ibadan peri urban settlements axis shows that land value has increase by (55.7 %) in the peri urban zones, which relates directly with upsurge in its population resulting from the spillover of the Lagos Megacity. Majority of the developments in the peri urban zones are located along the axial of the Lagos Ibadan Expressway, most of which are done without necessary planning approvals.

Due to the outward and uncoordinated growth of the Lagos Megacity, and the unplanned settlements along the peri urban corridors of the Lagos Ibadan Expressway with the attendant land use conflicts, there is the threat of growing environmental problems. The use of contiguous land between the Lagos Megacity and the Lagos Ibadan Expressway peri urban settlements consequent upon the conurbation process has important ramifications for the environmental management of the zones. The use of land is basic to all human activities and as population increases the intensity of activity becomes accelerated with consequent effects on the uses of land. It therefore implies that activities in the Lagos Megacity have spilled-over into the adjoining peri urban settlements. The issue of land use spill-over between the Lagos Megacity and peri urban settlements has become a problem within the last many years with the rapid increases in developmental activities especially residential and religious settlements that have led to the erosion of the character and integrity of the Lagos Ibadan Expressway. The attendant effects are high land values, high traffic intensity and hold-ups.

The development of these religious settlements and the corresponding residential development all have their implications and ramifications in terms of infrastructures, environmental pollution, farmlands and agric lands, social services, economic base, that brings about an undue pressure and burden on the peri urban settlements resulting in the lopsided use of land and created by the over-spill of the Lagos Megacity into the peri urban zones.

As the Lagos Ibadan peri urban settlements grows in spatial dimensions as a result of the forces exerted by the Lagos Megacity, most of the development occurring along the axis of the peri urban settlements are largely mixed use residential, commercial, institutional use in nature, but, the spate of speed of this developments activities has outstripped environmental management process necessary for proper development and planning of the peri urban zones.

This situation is such that there are developments activities going on at a fast rate with a very low rate of infrastructural provision and environmental management.

Majority of the Lagos Ibadan peri urban settlements residents are of the opinion that the proximity of the Lagos Megacity has definite effects on environmental quality of the peri urban settlements, especially in the areas of pollution, environmental sanitation, water quality, housing, traffic, and crime rate. The study revealed that basic infrastructure as well as security and traffic have generally worsened with the influx of people into the area

This study has shown that the growth potential of any particular settlement is inversely proportional to its distance from the Lagos Megacity. Settlements that are in close proximity to the Lagos Megacity have a higher propensity to grow demographically and spatially than those that are far from such centres. This explains the phenomenal growth and expansion of the Lagos Ibadan peri urban settlements due to its close proximity to the Lagos Megacity. The attraction between the Lagos Megacity region and Isheri peri urban zone increases as its approaches Ibafo and decreases as it approaches the Sagamu Interchange. The expected interaction between the Lagos Megacity Region and the Lagos Ibadan Expressway Peri Urban Settlements increases as the product of the populations of the two increases, and it decrease as the distance between them increases.

7 CONCLUSION

This study has revealed the environmental issues of peri urban settlements along the Lagos Ibadan Axis of the Lagos Megacity. The major elements that were considered are the need for a positive approach to peri urban development in development planning; the need for effective governance of the peri urban settlements of the Lagos Megacity; environmental management of the peri urban settlements and the coordination of development proposals and Implementation mechanisms for infrastructure, housing and land supply in the peri urban zones. The many socio-economic and environmental problems currently found in the peri urban settlements of the Lagos Megacity make it imperative that efforts are made to define the parameters for environmental management and sustainable patterns of peri urban management.

The issues concerning planning, infrastructure, housing, land supply environmental sanitation, traffic management and community participation need to be addressed in an integrated manner through a division of responsibilities between the state and local governments. Activity centres in the peri urban settlements should be identified and redesigned to create rooms for offices, supermarkets, small-scale industrial centres, restaurants, entertainment centres and other urban amenities. These centres should receive the full attention of the Physical Planning Departments of the Lagos and Ogun State Governments and representatives of the Lagos Chamber of Commerce and industries as well as of the Nigerian Economic Summit Group to relocate or establish new employment generating enterprises in the peri urban settlements.

Curtailing the further spread of incompatible and illegal developments within the peri urban settlements is an issue of considerable importance. Anticipating such development by realistic zoning and facilitating the quick and easy access to well laid-out and, if possible, serviced plots of land by individuals or estate developer can be important strategy in this regard.

Apart from the problem of solid waste and generally poor environmental sanitation, the Lagos Megacity Region peri urban settlements suffers from water and air pollution due to the poor waste disposal facilities, traffic intensity along the Expressway, discharges of cattle waste from the operators of the Kara Cattle Market and Slaughter Slab greatly impair the quality of water in the Ogun River. Citizens in the peri urban settlements must be mandated by the local governments to maintain clean and sanitary environment and every household must own refuse dust-bin for their waste materials. The Lagos and Ogun State Governments should relocate and merge many of the existing public centres such as markets, motor parks, bus terminals, abattoirs and re-develop with adequate infrastructural facilities.

A participatory planning strategy which seeks to involve the residents themselves in determining their management of their environment, their needs in terms of the priority infrastructure and services required their willingness to contribute to the cost of providing such facilities and their engagement in poverty-reduction activities to improve on their social, economic and political situation need to be put in place in the peri urban settlements.

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Evaluation of the Current Municipal Slaughterhouse of Babolsar and Locate an Appropriate Site via Fuzzy Logic in GIS for the Future One

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1 ABSTRACT

In 2010, Babolsar (a city in the northern Iran) with a population of about 47927 residence, consumes 14500 Kg meat per day approximately. The results of the current situation of slaughterhouse in Babolsar indicate that this location is inappropriate which in those required principals, standards and criteria for location selection were ignored and revelation of the adverse environmental effects would be predicted in the near future. In this study using a variety of data such as the distance from legal limits of the city, the distance of road communication, The potential for agricultural and construction, the distance of urban infrastructure, the distance of earthquake faults, the distance of surface water, wind aspects, pedology plan, hypsometric, vegetation ,geology and… .

These parameters in special models "fuzzy logic" are composed and selected the best location among different alternatives and different plans were sugested.

2 INTRODUCTION

Not only do Uncontrolled population growth, Urban development, The advent of new technology, The resulting changes in habits and consumption patterns and furthermore Restrictions on the use of natural resources cause a Variety of complex problems in our quality of life but they pose also social, economical and ultimately environmental issues. Growing urban population of Iran and also creating new population centers, policy and performance evaluation and many different urban operations based on Master plan and comprehensive national plans (land use planning) indicate the strongly requirements of planning for municipal slaughterhouse with the specialty of the scientific and correct locating. Continuing the traditional practice of slaughterhouses has posed a devastating effect on our environment, the quality of the public health and the residence in particular. It is widely admitted that the functional system of Iran's slaughterhouses acts based on traditional principles. This matter when would be harsh that its destructive effects on the other current urban systems, particularly ecological system are considered. One of the important research steps along with the planning for the slaughterhouses is locating factors and finding a suitable place of their settlement. Several criteria are involved in order to find the suitable location of slaughterhouse that they have their particular importance and make restriction on the choices either. Final goal of these criteria is to find a location that will pose minimal adverse environmental effects on the surrounding natural environment. Contamination of underground water resources and the soil pollution can be considered as an illustration. Researchers have been conduct that the population of Babolsar has been grown over the recent decades. For instance, in 1966 the average of the population was around 12016 which rose to 18810 in 1976 and 30200 in 1986. This city had 40630 residence approximately in 1996 (a village that is called Miandasht near to Babolsar has a population around 1986 which added to 38644 in terms of integration in this field). Growth rate for the period between1976-1986 was %4.8. Thus the population had a decrease around %3 between 1986-1996 and in 1999 was around 42738. It is also for Bbolsar in 2010, 47927 – growth rate: %2.15, in 2016, 66135n - growth rate: %2.5, in 2026, 84658 - growth rate: %2.5 would be predictable. With an assumed constant for meat consumption, Per capita consumption was 0.12 kilograms in 2010 per day, so that residence daily consumed 5500 kilograms of meat. In the other words based on the latest statistics, each person consumes 0.12 kilograms meat for their daily use that is equal with 43.8 kilograms annually.

According to the table1, Babolsar with a population around 47927 is considered in the category between 30001-50000 so the required area is 0.38 square meter per person or in another word this city needed a capacity around 18212 m² in 2010. But due to consideration of a Twenty-year planning horizon up to 2026 for this research thus, we should concentrate on the category between 50001-100000 that is 0.35 m² per person. As a result the required area for the infrastructure is 29630 m² (3 Hectare approximately). First

location of the Babolsar Slaughterhouse is located on the eastern part of the city. But it seems the current location neither has the standards for its space (7655 m²) based on the above table, nor has the qualified environmental status. Moreover, not only its destructive environmental effects appears now but also its negative impact will be seen in the near future and the sustainable development of the eastern part of this city is confronting a crisis. Locating the current situation of slaughterhouse in Proximity of the Shazdeh-rood river, putting in the city limits, being in the spatial and physical development of the city, local Prevailing winds that contain urbanscape pollution, uncontrolled population growth and the requirement of a wider space in order to prepare meat supply residents and the lack of responsiveness of the current landfill in the near future. The purpose of this study is selection an appropriate location or locations to optimize for Babolsar slaughterhouse which is based on natural and artificial information by the using of geographic information systems. During this study diffirent environmental variables by the using of fuzzy logic technique integrate and combine, then an appropriate location will be selected.

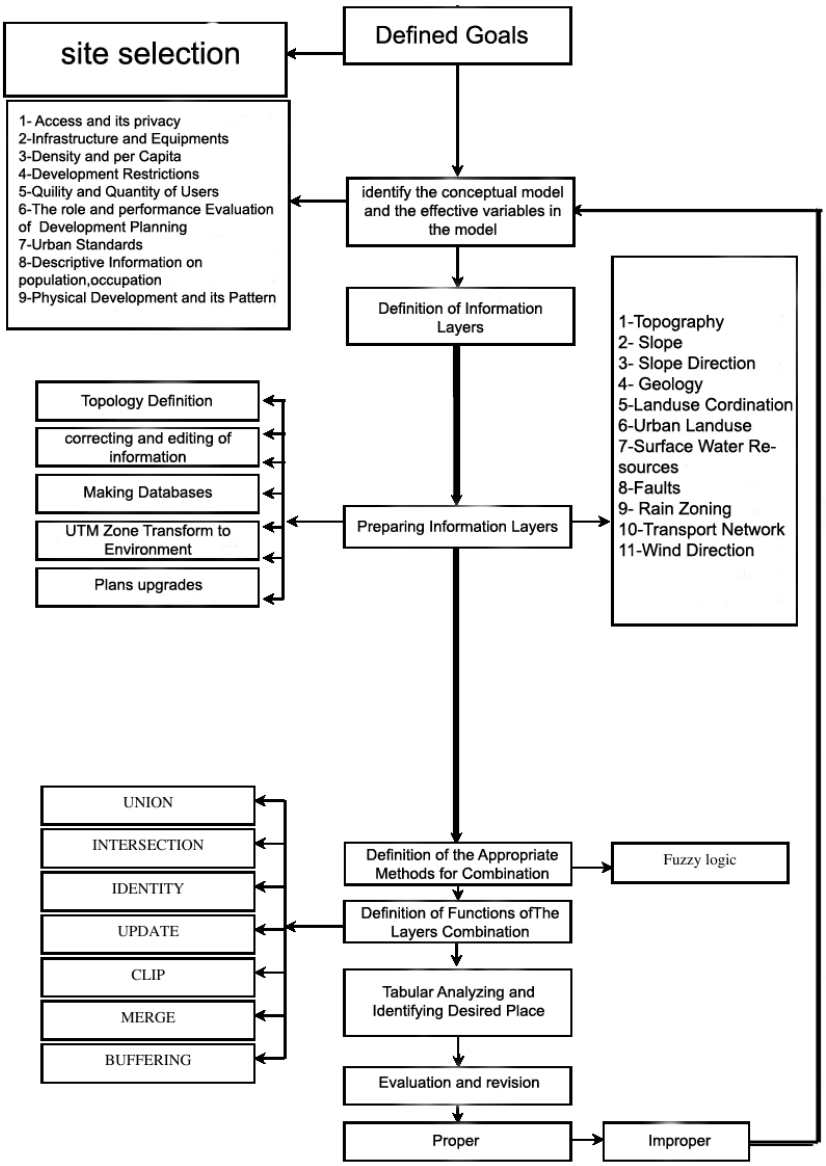
Population of city	Requierd area for each person (m²)
More than 10000 persons	0.86
From 10001 to 20000 persons	0.55
From 20001 to 30000 persons	0.48
From 30001 to 50000 persons	0.38
From 50001 to 100000 persons	0.35
More than 100000 persons	0.18

Table1: Required area for the infrastructure of Slaughterhouse based on population.

3 LITERATURE REVIEW

Finding an adequate location for urban infrastructure is one of the important subjects in Urban development planning. To express the importance of this subject for instance, management and finding a location for urban infrastructure accurately such as landfills, industrial slaughterhouses in some important provinces or states in Canada and The U.S like Quebec, Chattanooga, Washington, Massachusetts are considered as one of the main pillars of sustainable development and American planning association (APA) take it in to account as one of the significant goals for long-term and short-term plans of some states such as Chattanooga, Washington, Massachusetts, California, Seattle in order to reach to a stability in the 21st century.(Krizek et al,1996) Hendrix and Buckly in a study with the title of ‘’use of GIS for selection of sites for land application of sewage waste’’ in Vermont state in 1992, a 210-hectare area evaluated in the cases of physical and economical indicators such as appropriate soil, the depth of main rock, the land use, surface and underground water, zoning height…and they reconnoitered suitable places around an area which is called Mad.(Hendrix et al, 1992) the task of livestock slaughters and its pollution and dealing with this issue has a long experience. For instance, in an article with the title of “The use of water in its regulation in Medieval Siena” by Kucher, the waste water and the pollution from livestock slaughtered in Siena in the Medieval are discussed. He says contaminated water was caused a conflict between Butchers' guild and municipality, because the municipality claimed that the residual water from slaughter was caused the water pollution and as a result fountain contamination and it was believed the location of slaughterhouse must be transferred to somewhere outside of the city. He also mentioned to ancient water supply system of Yazd (a city in the middle part of Iran) that consumption and re-use of water could be considered as a symbol for developing and developed countries (Kucher, 2005). Shanmugan a scientist from Bangladesh has done a research based on the experience of ” GIS-MIS-GPS” for the realization of management of municipal facilities for the local environment and Bengal. In this research various aspects have been covered such as, requirements, methodology, development process for three systems “GIS-MIS-GPS”. The main part of this research is to deduce how the selected systems in each period of urban planning. In Iran finding the location for slaughterhouses has frequently done in the basis of urban master plan. But it is noticeable that the environmental points of view in this matter are not completely clear and it is specified just based on one or some limit indicators. In the seventh century AH, Ibne Okhveh is mentioned in the 16th article of municipal regulations about livestock slaughter that is incumbent upon the certain agent to prevent the butchers of slaughter in front of their shops due to side walk’s contamination which is absolutely forbidden and that

causes outbreaks. Thus, they must slaughter inside the slaughterhouse and moreover butchers are not be able to hang the slices of meat outside of their shops, because they can collision with people and making a mess. In the other part of this article he says, all the butchers are obliged by the agent to salt their work tables in order to prevent infections by the parasites due to high temperature, furthermore, they should cover them by a straw and some heavy dishes in terms of prevention of dogs licking and also protect of insects' entrance. In a research with title of criteria and standards of industries settlement the environment organization classifies the slaughterhouses as highly polluting industries and assigns criteria for finding the appropriate location but just concentrate on dos and don'ts in particular(Habibi, 2005).. In volume 9th of mayor Green series by Saeeid nia, the slaughterhouse discussion is proposed as a section of urban facilities and is mentioned some criteria for finding their location (saeeid nia, 1999). In 1995, in a research with title of placement mathematical model for poultry slaughterhouses in Shahed investment Company by Nouri is explained about select the optimal location, preparation and capacity estimation. He used the transportation model in this research and to maximize profits by the consideration of checking the cost and revenue (Nouri, 1995).



4 METHODS, MODELLING AND RESEARCH DATA

In the process of positioning the appropriate lands, conceptual model and effective variables in model such as access and its privacy, infrastructure and equipment, production, consumption, recycling... identifying and after the definition of the levels of information such as topography, geological slop, geology, barriers to the development, fault, rural communication network, surface water…, preparing these Layers in terms of topology definition, correcting and editing, upgrade…have done and after definition, the appropriate methods of Identify the composition and functions of layer composition in terms of union, intersection,

clipping, buffering, merge, update…in order to combining layers have been performed and after an analyze the database Table is merged, appropriate location has been identified and evaluated. The algorithm of the below indicates the method.

5 VARIOUS MODELS OF INFORMATION INTEGRATION IN ORDER TO SITE SELECTION

One of the most significant capability of GIS which introduces it as a special and exclusive system is site selection, data integration capability in terms of modeling and determination of land suitability by valuation of the land area. Due to the integration and combination of norms, the best place to establish the optimal centers and places would be chosen. There are several ways in order to combination the criterias. The most important are:

(1) Boolean Logic

(2) Index Overlay

(3) Probability Logic

(4) Coefficient of Correlation

(5) Artificial Neural Networks

(6) Fuzzy Logic

Fuzzy was first introduced by Iranian professor Asgar Lotfi Zadeh, professor of Brekly University – USA to implement in uncertainty condition. This theory is able to provide several of phenomena, variables and the ground to deduction, control and decision making in uncertainty condition.

One of critical levels in tradition Site Selection analysis which it's hypothesizes, assured accuracy of fully unreal incoming data. In a comprehensive analysis, is too hard and sometimes impossible to provide accurate numeric data required by traditional methods base on Boolean algebra. For an example, for a particular activity it's possible to have a natural partitioning border between proper and non-proper regions, but in many cases of description cases about location conditions, they do not have natural cut offs determined threshold limit. In the common approach to a threshold limit, for example in a manner which defined that an acceptable site should be located in 1 KM from the river. But such a threshold limit is not natural. Why a site in 0.99km from the river will be acceptable, and a site located at 1.01km from the river will be placed in an acceptable class? Usually there a kind of ambiguity and lace of explicitly in such conditions. In addition usual methods always assume that criteria weights are given in a numeric form, which provide a preference from the most important to most unimportant of Site Selection standards. So, related discussion to ambiguity, doubt and inaccuracy should find a solution in Site Selection problems, which this may work well with Fuzzy set theories and Fuzzy logic (Rajabi et al. ,2009).

6 ANALYZING AND ASSESMENT OF THE BABOLSAR SLAUGHTERHOUSE LOCATION

The Babolsar slaughterhouse was created around 30 years ago and is situated in near the Shazdeh Roud Bridge, Beheshti Street. Municipality of Babolsar has run it during these years. Waste, or possibly sick livestock which produce daily, are burnt by a particular machine and the wastes are carried by waste transporting car. The slaughterhouse is divided in to 2rooms for cattle and sheep slaughter, bath, guard room, veterinary chamber, rest room for slaughterers. The compound is 9980 m^2 and the infrastructure is 695 m^2.

Current location of the Babolsar slaughterhouse is situated in the western legal limits of the city. The different environmental plans of this area express that the current location cannot satisfy scientific criteria for site selecting and it does not consider some problems such as pollution of surface water and groundwater, aesthetic tasks conflict, community(utilization conflict), economy(property and land prices) and neglect of tourist attractions due to its proximity with Shazde Roud river.

The coordinate of Babolsar slaughterhouse's current location in the UTM system is X=649471.09 and Y=4063138.20 which is quite unfavorable environmentally. The most significant reasons are:

(1) Wind diagram based on climate data indicates that the wins blow to the city from the north-west direction mainly and obviously the site selection of the slaughterhouse should not be on the way of prevailing winds, while the current situation is situated on this way.

(2) This current location is located in the legal limits of the city while based on master plan of Babolsar the legal distance form a large slaughterhouse to a town border is around 6 Km, for a middle size one is 3 Km and for small ones is considered 2 Km.

(3) Air pollution and the odor of it especially in the warm seasons pose an unpleasant effect on the tourism and public health and safety of surrounding places are under threat.

Fig. 1: Current location of the Babolsar slaughterhouse.

7 SITE SELECTION CRITERIA FOR THE BABOLSAR SLAUGHTERHOUSE

For site selecting of a slaughterhouse there are not any fixed and defined standards but for the most of variables used in this study, reliable reasons can be find that due to environmental constraints and potential of each area checking back of that criteria is a top priority. In order to find an appropriate landfill as a preliminary and initial instruction, following articles could be followed:

7.1 Location relative to the city

The site location should be place out of the city limits. Moreover site selecting must not be on the way of the city development.

7.2 Distance to the city

The legal distance form a large slaughterhouse to a town border is around 6 Km, for a middle size one is 3 Km and for small ones is considered 2 Km.

7.3 The position in relation to communication roads

The site should be located near to one of the arterial roads or a byroad link to the arterial road. In cities that are located on the railway track, it is more accurate to choose a place for slaughterhouse near the railway and if it possible create a branch line to be observed.

7.4 Slope

It should be constructed in an area lower than the city level in order to prevent the spread of contamination.

7.5 Prevailing wind

It must not situate on the way of prevailing wind.

7.6 Required water

It should be constructed in an area which in the required water can be accessible. Due to high consumption of water, tap water is not recommended. In this task drilling deep or semi-deep wells are favorable

7.7 Geometric shape of the area

It should be selected as rectangular shape because the infrastructure of slaughterhouse is situated longitudinally.

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7.8 Wastewater treatment

The site should be positioned in order to prepared wastewater treatment and outgo as well. Thus, the following points are recommended in order to achieve this purpose: For a city with sewage system, the site should be selected on a place that the slaughterhouse wastewater does not flow in to sewer. When a city does not have sewage system and the slaughterhouse is situated somewhere near a river, after treatment of the slaughterhouse's wastewater, the harmless excess water could be directed in to the river. If there is no a river, the slaughterhouse's wastewater should refined after ensuring that the remaining water to be disposed in to adjacent lands in terms of agricultural use

7.9 Location of polluting industries

Slaughterhouse should not be exposed to pollution from industrial operations, dust, smoke, ash…

7.10 Watercourse

The land of a slaughterhouse should be away from the watercourse and it has an ability to have a durable foundation and columniation.

7.11 Farmers and nomads

Site selection should be in a place which is on the way of nomads but this criterion is important in areas where livestock passes specifically.

7.12 Access to electricity network

In the terms of the requirement of a slaughterhouse to electricity, site selection must be located in a place that the power grid is legally permissible. In large slaughterhouses the required electricity could be prepared by the use of a generator instead of power network but it is not recommended except in emergencies.

It should be noted that some measures such as slope, aspect, rainfall, distance from the historical and cultural monuments due to being non-functional do not consider in this study. For instance, the slop is rarely bigger than 0.5%, so it is not different for the slope direction and the rainfall is almost equal for this area.

According to the given the parameters, Site selection in the eastern Babolsar does not seem appropriate. Thus, reselecting for the slaughterhouse is a priority. On the other hand, physical planning for the urban development in terms of urban, regional and national levels must seek new geographic area that qualify for the creation of new cities, towns, infrastructure locating… or define urban development.

In this research a range of 20 km radius around the legal limits of the city is considered which includes 15 natural and artificial layers. By the use of different methods such as fuzzy logic these layers were combined and by the terms and conditions, prioritizing or in another words weighting the desired location for municipal solid waste landfill for at least 20yeras in the future in three prioritizations will prepare.

As mentioned that for the first time the fuzzy logic theory was expressed by Dr. Asgar Lotfizadeh UC Berkeley professor for the conditions of uncertainty. For reasoning, control and decision making under uncertainty this theory is able to define the mathematical formulation for a host of inaccurate and vague data, variables and systems. Accordingly, for the fifteen-fold layers of this study, membership degree of variables can be defined:

The distance of artificial objects (urban infrastructure, slaughterhouse, gas station, aviculture…) =

$$\int_0^{600} 1/x + \int_{600}^{2700} 2700 - \left(\frac{x}{2400}\right) + \int_{2700}^{\infty} 0/x$$

The minimum distance: 600m

The maximum distance: 2700m

Class number: 7

Data Domain: 300m

First class: 2700-300/2400=1

Second class: 2700-600/2400=0.87

Third class: 2700-900/2400=0.75

For all the layers this operation has done and it's weighting results with its plans present. Then, by the use of overlapping functions, these layers with their membership degrees are combined together and after the calculation of the total weight belong to the final map and classified them in to different classes, 3 sites are selected and defined. It should be noted that the proposed area consists of 32000 Polygon integrating layers is selected and presented. The most important characteristics these three sites are:

- The vegetation cover is low.
- Average distance from water sources is 570m
- Average distance of artificial objects (urban infrastructure, slaughterhouse, gas station, aviculture,…) is 1100m
- Average altitude is -21m
- Windward is low-intensity
- Appropriate for construction
- inappropriate for cultivation
- The lands have the potential for construction
- The lands do not have the potential for cultivation
- The soil type is coastal, gravel, sand and shelly geologically
- In terms of urban development compare with the other areas, construction will not be found
- The field has a saline soil and drainage problems are recognizable
- Average distance to Babolsar is 6000m
- Average distance for all 3 sites to communication roads is 550m
- Average distance to the legal limits of Babolsar is 8100m
- Average distance to the major faults around the city is 1200m

8 CONCLUSION

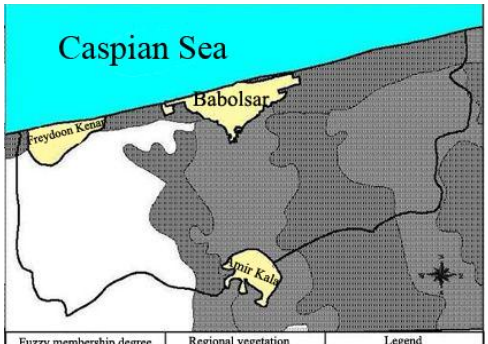
Babolsars urban development has been consequence from two main phenomenon, rural-urban continuum and natural growth of urban population. As an illustration, the growth from 18810 in 1976 to 47921 in 2010 it is clear to everyone that the urban management system in a critical condition and is far from ideal situation. This task is more tangible when the slaughterhouse site selecting was done based on criteria and standards. It means that the current location of slaughterhouse has not constructed based on scientific, technical criteria and appropriate planning. Assuming continuation of current urban meat consumption, 14.5Ton daily and 5296Ton annually, the requirement of accurate and efficient site locating should be a top priority.

The initial location of Babolsar slaughterhouse is situated in the south part of the city. But based on the mentioned criteria, this location is not required the sufficient standards in case of its area in particular (7655m²). Furthermore, it has an inappropriate environmental situation and not only its environmental pollution has emerged now, but also it will pose a devastating effect on the environment in the near future and sustainable development of the eastern city is facing a crisis. The proximity of the location to the Shazdeh Roud, being in the legal limited area of the city, locating in the urban physical development, being on the way of prevailing winds that cause landscape pollution, sharp increase in urban population, the requirement for a larger area in order to produce more meat for the residence and end of useful life of the current landfill in the near future, all the requirements for finding a new location have made it an absolute necessity.

The current site selecting has not considered the environmental parameters such as being away from earthquake faults, agricultural land, human settlements, suitable soil, urban physical development, wind direction, surface water, geology…and it indicates tangible kind of poor urban and regional management which threatens the future sustainability of the area. On the other hand, the future of the city is creating based on growing urbanization, the urban area formation, settlement of refugees….Defining plans and project in terms of guiding and controlling development for urban area which leads to compromise damages to biological resources and improving the tourism around the Shazdeh Roud. So, protection of valuable

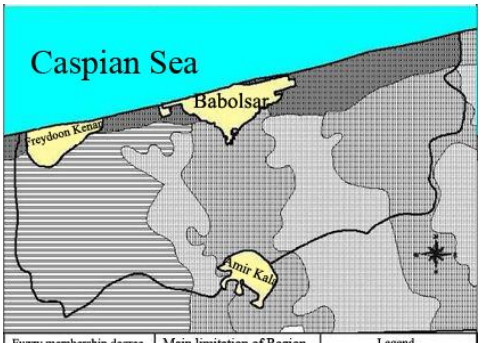
environmental zones around the city, including the current place of slaughterhouse and sufficient site selecting with a less harm effects on environment and sustainable development are of significant requirements.

Combining artificial and natural data by the use of fuzzy logic and implement it in GIS can be practical not only for Babolsar, but also for the other regions of this country. Three areas which have been positioned in this research will satisfy all the requirements in this case for 20 years. The city requirements will satisfy due to its placement in an average radius around 6Km even up to 100 years in the future. The coordination is: the first priority, X=645019.31, Y=4058183.39 the second priority, X=654592.23, Y=4059100.06 the third priority, X=642790.14, Y=4056579.22.



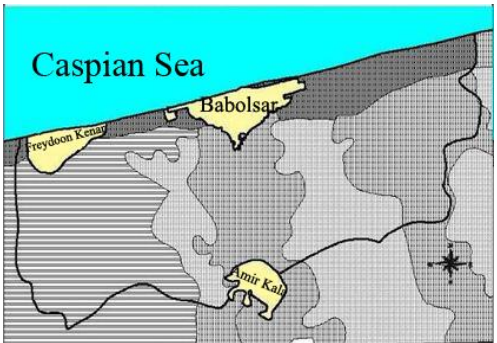
Fuzzy membership degree	Regional vegetation	Legend
-5	out of wighting	
0.3	high density	
0.6	med density	
0.9	low density	

Fig. 1: Vegetation zone and determination of the fuzzy membership degree



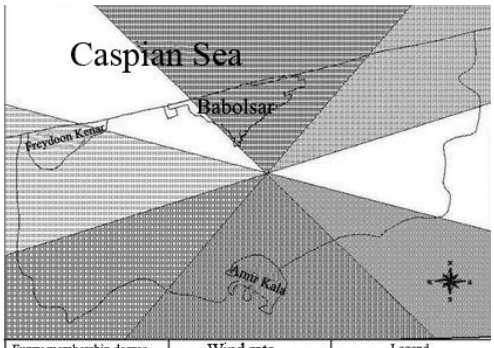
Fuzzy membership degree	Main limitation of Region	Legend
-5	out of wighting	
0.57	Underground water	
0.71	Unstable soil-wetland	
0.86	Flood	

Fig. 2: The main limitations of the area and determination of the fuzzy membership degree



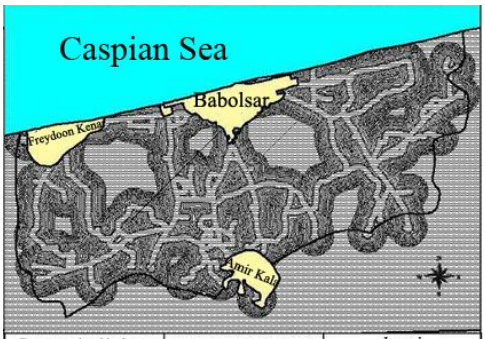
Fuzzy membership degree	Main limitation of Region	Legend
-5	out of wighting	
0.57	Underground water	
0.71	Unstable soil-wetland	
0.86	Flood	

Fig. 3: The Regional Geology in terms of Cultivation and determination of the fuzzy membership degree



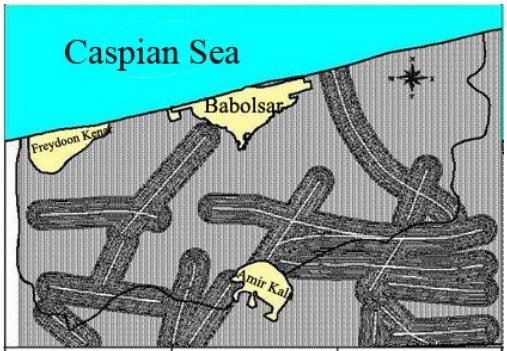
Fuzzy membership degree	Wind rate	Legend
0.745	11.375	
0.830	5.875	
0.833	7.063	
0.878	5.438	
0.905	4.25	
0.910	4	
0.930	3.125	
0.950	2.25	

Fig. 4: Regional Winds affecting on construction



Fuzzy membership degree	Distance from comunication network	Legend
0	more than 1100 m	
1	100-200 m	
0.9	200-300 m	
0.8	300-400 m	
0.7	400-500 m	
0.6	500-600 m	
0.5	600-700 m	
0.4	700-800 m	
0.3	800-900 m	
0.2	900-1000 m	
0.1	1000-1100 m	

Fig. 5: Distance from communication networks and determination of the fuzzy membership degree



Fuzzy membership degree	Distance from current faults	Legend
-5	Out of weighting	
0.1	100-200 m	
0.2	200-300 m	
0.3	300-400 m	
0.4	400-500 m	
0.5	500-600 m	
0.6	600-700 m	
0.7	700-800 m	
0.8	800-900 m	
0.9	900-1000m	
1	more than 1000 m	

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Fig. 6: Distance from faults and determination of the fuzzy membership degree

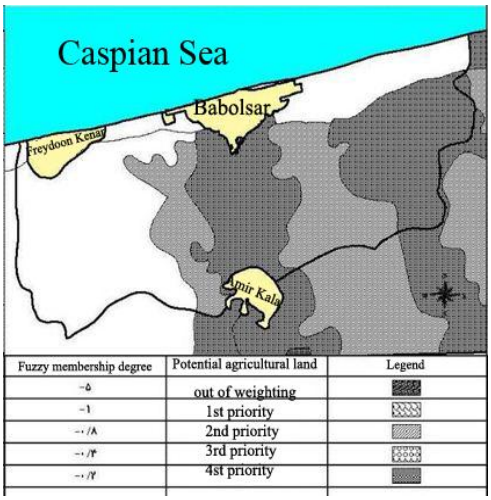


Fig. 7: Regional agriculture capability and determination of the fuzzy membership degree

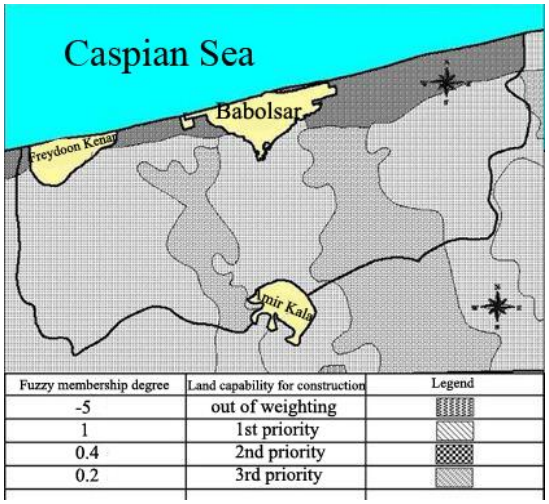


Fig. 8: Land capability for construction and determination of the fuzzy membership degree

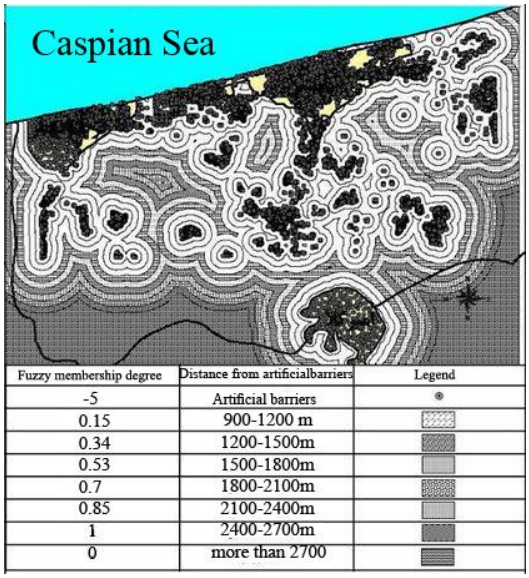
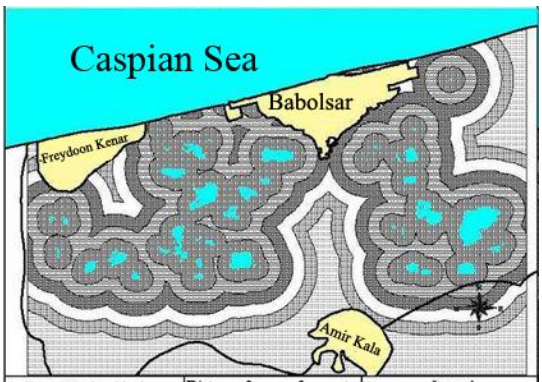
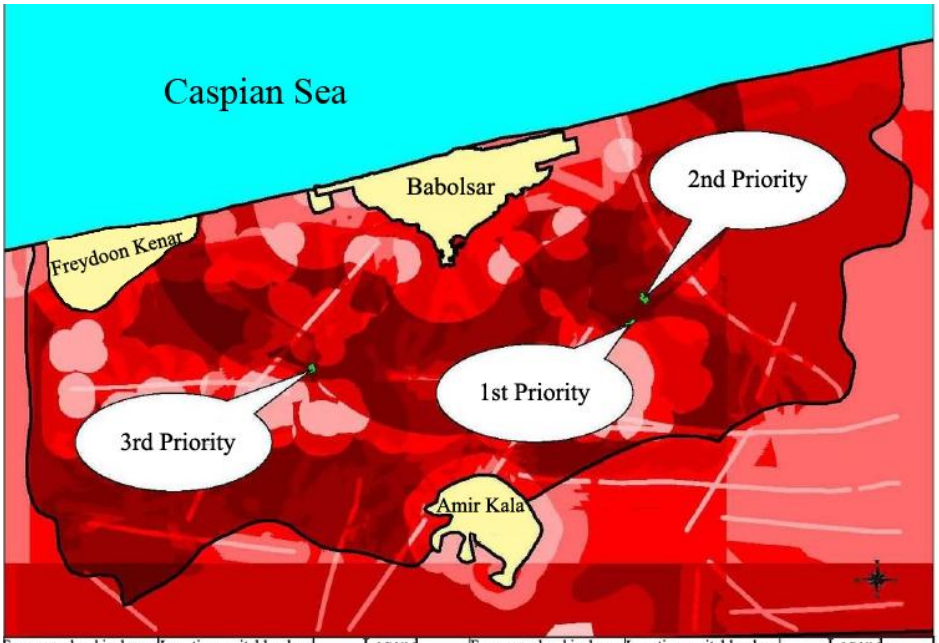


Fig. 9: Distance from artificial objects and determination of the fuzzy membership degree



Fuzzy membership degree	Distance from surface water	Legend
-5	surface water	
-5	out of weighting	
0.2	600-1200 m	
0.4	1200-1800 m	
0.6	1800-2400 m	
0.8	2400-3000 m	
1	more than 3000m	

Fig. 10: Distance from surface water and determination of the fuzzy membership degree



Fuzzy membership degree	Locatimg suitable place	Legend	Fuzzy membership degree	Locatimg suitable place	Legend
	اولویت ششم			Located points	
	اولویت هفتم			1st Priority	
	اولویت هشتم			2nd Priority	
	اولویت نهم			3rd Priority	
	اولویت دهم			4st Priority	
				5st Priority	

Fig. 11: Distance from artifical barriers in the case study and fuzzy membership degree

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reviewed paper

Explore the Effect of Urban Flood with the Integration of Spatial Analysis Technique

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1 ABSTRACT

This study discusses the urban flood prevention spatial planning by utilizing the spatial analysis technique to investigate urban environmental feature and different urban flood issues happened in different location while facing the complicated coexistent relationship between urban flood. Typhoon Morakot in Tainan will be the case study. This study utilizes the Geographically Weighted Regression (GWR) to explore the variables of urban environment. The outcome may serve as basis for establishing future land-use indicators and as decision-making reference for concerned government agencies.

Key Words: Urban Flood, Geographically Weighted Regression , Land use plan

2 INTRODUCTION

In 2005, the World Bank issued Natural Disaster Hotspots – A Global Risk Analysis which indicted that Taiwan may be the most vulnerable to natural hazards place on earth, with 73 percent of population exposed to three or more hazards. Urban flood is a major compound disaster world-wide that causes serious loss to economic activities and impacts on urban activities severely. This study focuses on establishing flood index to explore the variables of urban environment that was considered as one of the most important aspects in regional flood-risk management.

Flood is among the most severe risks on human lives and properties, and has become more frequent and severe along with local economical development. As the Taiwan's city has been compact rapidly and more stress is put on the land to support the increased population. In turn, floods that once occurred infrequently during pre-development periods have now become more frequent and more severe due to the transformation of the watershed from rural to urban land uses and urbaniziation phenomenon is one of the main research topics in the last decade. A comprehensive plan addressing flood hazard management is therefore, necessary. This plan should combine land use strategies for each zone with the careful consideration of certain structural controls. This can be achieved by the minimal disruption of natural environments. These strategies could serve as basic components in a comprehensive flood management plan in Taiwan.

Therefore, the important issue is integrating spatial analysis technique to investigate urban environmental feature and different compound disaster issues happened in different location with complicated coexistent relationship between urban and disaster. The GWR Model was a popular method that applied to modify the flood problem (Brunsdon et al., 1996; Fotheringham et al., 1998; Platt, 2004; Zhang et al., 2004; 2005; Kupfer and Farris, 2007). Although this approach can incorporate more factors as the predictors and improve the statistical significance of the fitting model, it also increases the difficulty of date collecting for predictors to predict the damage in the future. Since flood damage is affected by many factors, some multiple regression models to incorporate such factors were also proposed.

This paper begins by reviewing pertinent literature regarding spatial pattern in assessing urban flood. Next, a GIS flood grade system integrates into the research to enhance the effectiveness and precision of measurements. Thus, the aim of this study is to establish the flood for flood shape area by using the smallest possible number of independent variables, while considering the spatial variation and solving the problem of spatial autocorrelation in residuals.

3 METHOD

The following equation expresses the relationship of the flood spatial autocorrelation, geographically weighted regression, and data from study area:

3.1 Spatial Autocorrelation

Similar objects in proximity to one another are positively spatially auto correlated, and vice versa, zero autocorrelation occurs when attributes are distributed independently in space. Moran's I, as expressed in equation 4, 5.

$$I(d) = \sum_{i} \sum_{l} w_{il} z_i z_l / S_0 m_2 \quad (1)$$

Where

$$S_0 = \sum_{i} \sum_{l} w_{il}, \quad m_2 = \sum_{i} z_i^2 / I, \quad z_i = x_i - \bar{x} \quad (2)$$

A weight matrix has elements representing the connections in a set of spatial unit . The may assume any value, but in this paper we shall confine ourselves to a binary weight matrix consisting of ones (connected) and zeros (not connected). The diagonal elements of are zero. The variable is mapped onto the spatial units. The spatial autocorrelation analysis coefficient, Moran's I, is is the value of equity for each zone. i =1,2,. . ., I .

3.2 Geographically Weighted Regression

If the residual has spatial autocorrelation, then GWR can be utilised to modify the OLS regression to solve the problem (Brunsdon et al., 1996; Fotheringham et al., 1998; Platt, 2004; Zhang et al., 2004; 2005; Kupfer and Farris, 2007; Chang, 2008). If the spatially varied characteristics in flood are taken into account, equation 6 can be modified as:

$$y_i = b_0(\mathrm{u_i},\mathrm{v_i}) + \sum_{k=1}^{n} b_k(u_i, v_i) \cdot X_{ik} + \varepsilon_i \quad (3)$$

where: y_i is the flood of point i; x_i is the flood shape area of point i ; u_i, v_i is the coordinates of the $\boldsymbol{i}$ point in space; b_0 (u_i, v_i), b_k (u_i, v_i) is the realization of the continuous function at point $\boldsymbol{i}$; ε_1 is the residual of point (u_i, v_i).

3.3 Data and study area

Located in the southeastern corner of Eurasia Taiwan sits in the middle of the Western Pacific festoon of islands. It faces the East China Sea to the north (600 km from the Ryukyu archipelago), the Bashi Channel to the south (350 km from the Philippines), the Taiwan Strait to the west (averaging 200 km from the Chinese mainland), and the Pacific Ocean to the east. Situated at the western rim of the Pacific Basin, the island plays an important role as an East Asian crossroad.These study area Tainan is the forth-grade city in Taiwan, but it's the oldest city which has abundant cultural heritage, as the cultural style presented. The methodology will now be described in greater detail, taking as an example its pilot application for Tainan in Taiwan, which is a town in which there is present risk from flood hazard. The extent of the flooding suffered by the inhabitants of Tainan in 2009 is illustrated in Fig. 2.

Fig. 2. Tainan, Taiwan, in the floods of Auguster 2009(source: http://www.flickr.com/photos/kyo4890x115/3807860280/)

4 RESULTS

4.1 Explore spatial data analysis of flood area

This paper through a cases studies in where natural hazard happened areas and the analysis used the data from Tainan in 2009. The method integrates GIS techniques, spatial autocorrelation analysis (SAA) and local indicators of spatial association (LISA) to analyze the process of disaster scale and decision making is guided by examination which may vary from large regions. The disasters mapping of locations with significant LISA statistics, together with an indication of the type of local spatial association as given by the quadrants in the Moran scatter plot, provide the basis for a substantive interpretation of spatial clusters or spatial outliers. Show in figure 3.

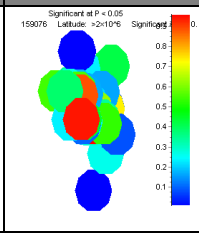
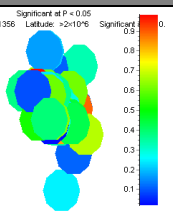
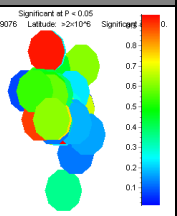
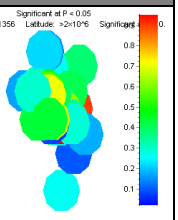
Flood Area	A	B	C	D	E
Explore spatial data analysis					

Fig.3 The SAA and LISA analysis

The result of the SAA analysis on Tainan the value of Moran's I is positive 0.52, and refers to the random and independent distribution in region. LISA provides information on the relative important of four types of spatial association: (1) high–high, high values (above the mean) associated with high risk values such as A, B D areas; (2) low–low, low values (below the mean) associated with low risk values; (3) low–high, low values associated with high risk values; and (4) high–low, high values associated with low risk values. In the future, the land use planning suggests strengthening prevention such as Yong Kang district, Sinying district and Madou district.

4.2 GWR model

The GWR model results were more closely examined in this study to develop fur¬ther knowledge for later use in modifying the traditional OLS regression model. The regression result is shown in Table 2.

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Effective Number of Parameters	Correlation Coefficient (r)	Coefficient of Determination (r^2)	Adjusted r-square (r^2 Adj)	P-valu
7.39	0.33	0.109	0.109	0.046(*p<0.05)

TABLE 2 Global regression parameter estimates (nis37)

The coefficient of determination is 0.109 while the residuals plot is shown as in Fig. 2. The application of GWR model improved the increased from 0.36, demonstrating that GWR provides a better interpreting ability than OLS. As shown in Fig. 4, the histogram of intercept estimates displays three obvious groups. Figure 6 depicts the spatial distribution of these three groups. There is a significant clustered pattern indicating that basic flood shape area increase gradually from west to southwest corner in the study region shown in fig.5. These parameter estimates indicate the change of the flood with the flood shape area, and are increased gradually from west to northwest in the study area.

4.3 Land use and flood analysis

The analyses of land using and flood herein cover comparisons of area size and land using category in Tainan City. In addition to interpreting the results of previous analyses of land using and flood in broad views, we predict that land using under limited control resources has some impacts to the flood.

Flood	Land Using Category	Total area(ha)	Number	Mean	S. dev.
High	Agriculture	1,254.6	729	1.72	5.61
	Building Area	1,40.2	1,290	0.10	0.71
	Green Space and Park	9.9	30	0.33	0.63
Medium	Agriculture	5,572.6	7,680	0.72	2.49
	Building Area	1,017	9,223	0.11	0.66
	Green Space and Park	4,549.7	193	0.23	0.76
Low	Agriculture	514.9	1,324	0.38	1.67
	Building Area	713.9	7,296	0.09	0.58
	Green Space and Park	128.5	233	0.55	1.25

TABLE 3 The descriptive statistic of flood

In Tainan City, 1,254.6 hectares of agriculture area were damaged because of high flood. Green space and park were not enough to absorptive capacity in the high flood area over 9.9 hectares. The highest capacity which green space and park can be absorptive in the Medium flood area is about 5,572.6 hectares. In the past, land use and flood analyses have been used to represent the size qualities of land use category. The land use and flood are affected by population, land using construction, and local differences. The construction of land using is often related to the geographic environment and urban development that mainly influences urban flood intensity.

5 CONCLUSTION

The paper proposed an approach that not only uses the smallest numbers of explained variables to establish the flood functions for flood shape area, but also solves the problem in traditional regression models by overlooking the spatial variations with flooding loss characteristics.

The introduction of the GWR model improved the coefficient of determination from 0.36 in the original OLS to 0.109. The GWR model corrects the spatial autocorrelation problems in residuals with some drawbacks still. It produces a different set of estimates for the regression parameters at each sample points. On the other hand, the results of flood and land use analyses indicate the three level risk of flood within land using situation, taken the urban flood characteristics of spatial pattern into consideration to improve green space and urban park area, and land using capacity that supplements urban environment safety and sustainable development.

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🏆 *reviewed paper*

Fill in the Blanks: Challenging the Modernism, Satisfying the Users' Needs?

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1 ABSTRACT

The contemporary transformations, caused by frictions between local and global forces, have to provide comprehensive answers to numerous questions – from urban efficiency, environmental challenges, social (in)equality, to urban history, identity and future sustainability. However, the processes which shape our environment sometimes do not respond to actual needs of users, creating a gap between ambitious visions of professionals and politicians and our everyday life patterns.

Considering all recent challenges the paper will analyze the case of New Belgrade and its current urban metamorphosis which has an impact on the character of open public spaces. The focus of the research will be Block 21, which was built during the 1970s and 1980s, after the national architectural competition. Following the guidelines of the Master plan it was conceived as a mono-functional residential block, but its reconstruction, conducted in two phases (during the 1990s and 2000s), instigated some typological changes. New functions were added (for ex. commercial and office spaces), as well as new residential structures, which were quite different from existing ones. Open community spaces were also transposed to another type, different in size, function, pattern of communication and accessibility.

Following the thesis that successful public spaces should be responsive to the needs of their users, the paper will present a research which has been done on needs and conflicts in open space. Based on a survey and interviews of end users, along with observation and behavior mapping of activities, this paper should provide answers on how recent changes of Block 21 meet users' needs and to what extent they collide with the original modernist outline.

2 INTRODUCTION

The iconic modernist structures of New Belgrade have always been a symbol and a testimony of all ideological shifts in Yugoslav and Serbian society. More then 60 years of its urban existence has brought numerous adjustment and changes in its economic, social and functional structure, but its rigid and over-scaled urban matrix has mostly remained untouched. However, during the 1990s the process of a specific urban reconstruction started, tackling the sensitive issues of modernist architectural legacy, challenging the purity of original conception and introducing some new patterns of behavior and urban needs.

Since then, open public spaces in New Belgrade have been influenced by socio-economic turbulence on local and global level and included into an inevitable transformation of urban tissue. Their identity and role in everyday life of the local community have been redefined, tracing a new path for emerging models of urban life. The scale, as well as the spatial and functional concepts of these spaces have been questioned and exposed to professional criticism, while the upgrading and adjustment to contemporary demands and standards have become an imperative of further development of New Belgrade.

The old framework has been tested and modified, the questions of environmental quality have been raised, but the reality of open public spaces still has to be synchronized with identified needs of users. Therefore, the research presented in this paper underlines the importance of several important factors which have to be considered in every process of regeneration and renewal in order to provide a flexible and satisfying urban setting. The increased speed of global flows certainly requires immediate solutions, but they should provide a long-term sustainability and not just another instant remedy with numerous contraindications.

3 BEING MODERN?

3.1 The origin

After the end of the WWII, New Belgrade was conceived as a new administrative center of the state, reflecting ideological and technological aspirations of the recently established socialist society. Its unique

position in the topology of Belgrade enabled its total modern design based on a grid which followed ideas of Le Corbusier (Fig. 1).

Composed of nine mega-blocks the new urban space provided mainly residential and administrative activities, without necessary adjustments to the real needs of inhabitants. The public space of urban blocks was not articulated enough, which caused its inappropriate and uncontrolled use. Since the first generation of inhabitants came mostly from rural areas, they 'cultivated' this space in their own way – creating a semi-rural ambiance of gardens and small orchards around new buildings. Simultaneously, a traditional places for social interaction – streets and squares – were substituted with over-sized communal spaces which only stimulated alienation of potential users. However, there were some additional problems detected during the 1970s and 1980s such as a high density of mega-blocks, height of the buildings, quality of construction, monotony of urban blocks, lack of user-friendly public spaces and lack of facilities and services (Zivković, 1975).

Figure 1: Belgrade vs. New Belgrade – competitive scales and design.

3.2 Facing the changes

The 21st century has brought significant changes in the physical and functional structure of New Belgrade. The density has increased, new commercial activities have been introduced and it has become one of the major construction sites in Belgrade. The original typology of mega-blocks has been modified with new buildings positioned along the existing boulevards and the previous character of public spaces has been changed. Nowadays, the open modernist mono-functional assemblies are upgraded into a mixed-use development but some green spaces disappeared under hundreds of thousands of new square meters. Considering the number of inhabitants (about 300.000), their new social structure, a new profile of space users/consumers and their contemporary needs, it was necessary to focus attention to the quality of open/public spaces. Therefore, during the last decade, a process of revitalization and rehabilitation has started, (re)shaping the existing urban environment and inserting some new facilities (Figure 2).

Figure 2. New structures – mixed-use development, built during the last decade.

Various planning documents (from the Master plan of Belgrade 2021, district regulation plans and municipality programs) certainly provide a good foundation for action, but a survey about real users' needs had not been conducted before the beginning of the rehabilitation process. Therefore, this paper will present findings of a research done in 2011 which could guide some future interventions in the public space of New Belgrade mega-blocks, define updated requirements/standards and influence a process of evaluation – due to newly established criteria.

4 TOWARDS A NEW SOCIAL INTERACTION

4.1 Selecting the research polygon

The conducted part of research was limited to a selected case study - Block 21, representing one of the oldest mega-blocks in the Municipality of New Belgrade (Fig.3).

The main idea was to create recommendations for rehabilitation of public spaces which would be adjusted to the needs of all users and would be able to achieve a new level of general attractiveness and utilization. There were two basic research scopes – related to urban hardware (physical qualities of open urban spaces) and software (needs of users, especially within mega-blocks and their public spaces).

It was also important to distinguish two main groups of inhabitants, according to their place of origin, unique urban identity and attitude towards the surrounding. The first one consists of young people born in New Belgrade, with strong preferences toward the existing urban environment. The second one represents newcomers (from other towns or rural areas) who have (had) difficulties to adjust to a different scale and spatial concept, as well as to accept new habits. Consequently, the first group totally identifies with their residential background and the second group denies an imposed spatial framework, consciously or unconsciously fighting against its rules and limitations (Savic, 2000). However, in order to define total scale of users'needs, to determine a set of quality standards and to conduct comprehensive process of evaluation of public spaces, both groups were considered.

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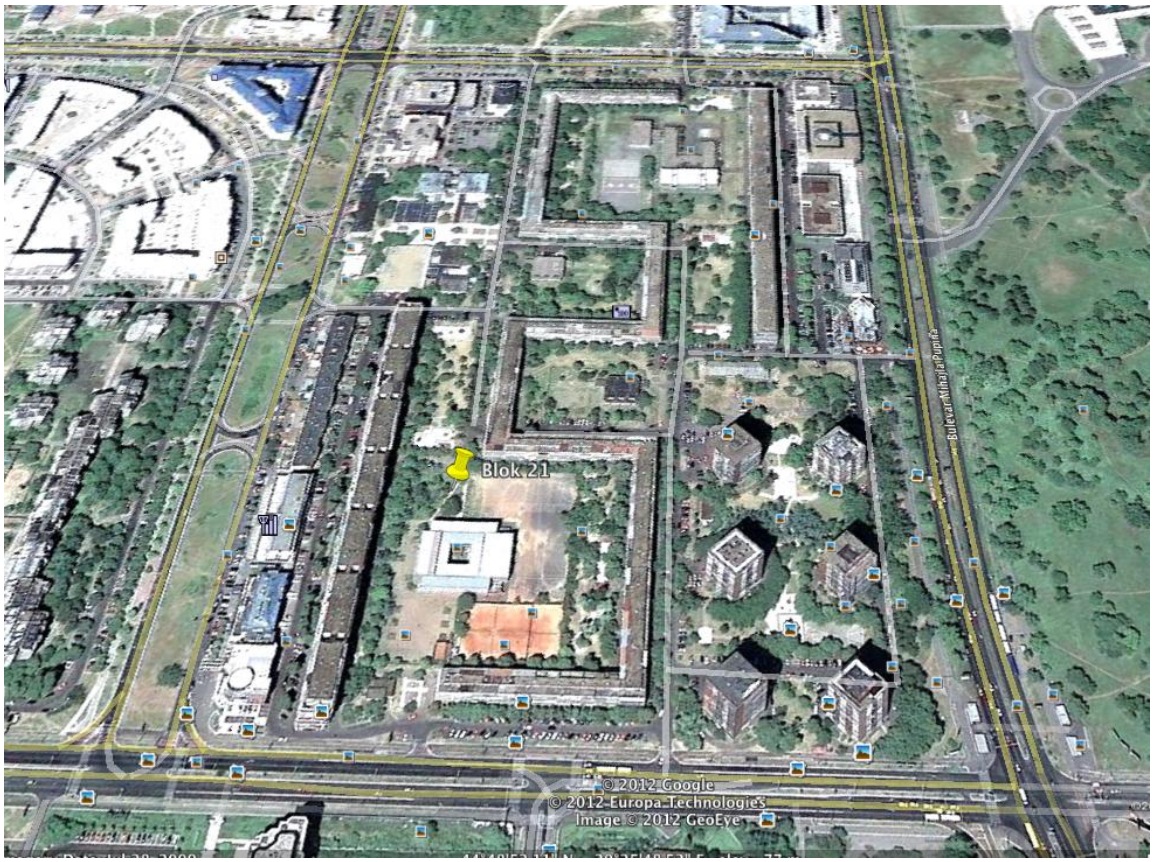

Figure 3: Block 21

The analysis of physical qualities of open spaces was enabled through a method of direct population survey which included 200 inhabitants of New Belgrade. The socio-demographic structure of the group was similar to the structure of the inhabitants, both in the Municipality of New Belgrade and Block 21, while the survey covered 2% of residents of Block 21 (Fig. 4).

The questionnaire was structured around five sections/thematic entities i.e. elements of mental maps defined by Kevin Lynch (1960) – paths, edges, districts, nodes and landmarks. The outcome of the survey revealed that the urbanscape(s) of New Belgrade and Block 21 have a potential to become local centers/focal points of social interaction, easily recognizable by their inhabitants.

The second part of the research, which underlined specific urban needs, provided an evaluation of open public spaces in Block 21. The survey was based on six main criteria, reflecting current state of the built environment and emphasizing issues of safety, equipment, accessibility, comfort, capacity and diversity of urban activities.

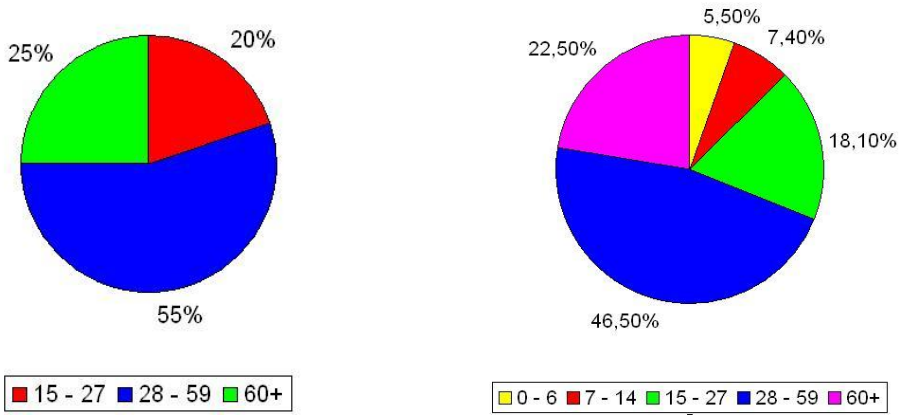

Figure 4: 4a/The age structure of the selected group of respondents vs. 4b/The age structure of population of New Belgrade.

4.2 Mapping the perception

The first part of the research was based on everyday observations of urban environment of Block 21 and the already mentioned basic elements - paths, edges, districts, nodes and landmarks. Analyzing the role and significance of paths/directions in the selected mega-block it was evident that the most important directions are Mihajlo Pupin Boulevard, Zoran Djindjic Boulevard and Milentija Popovica street. These corridors, which are essential parts of the rigid modernist grid, either connect or represent the tangent lines to the main landmark of New Belgrade - Business center Usce (Fig. 5).

Figure 5 The urban landmark - Business center Usce.

The next part of the questionnaire was related to identification and role of edges, which, according to Lynch, represent linear elements of urban space and act as boundaries or gaps (Jordan, 2003). The survey showed that some of the main paths/directions are also perceived as spatial boundaries (due to very intensive traffic), but some other streets (for ex. Proleterske solidarnosti str.) are identified as gaps in the continuity of urban space.

The role of the next spatial element – district – was analyzed on two levels: external and internal. The first one is related to the possible presence of landmark(s) which could be noticed from a distance, while the second one describes the uniqueness and specific atmosphere of an urban area. According to the survey, block 21 has three distinctive districts/areas – the assembly of six high-rise residential buildings (called 'Six Soldiers') (Figure 6), the area outlined with a long residential building in a meander-like form and the recently built area along Zoran Djindjic Boulevard. Furthermore, the respondents identified several nodes – as important points of arrival or departure within the block. Some of them are related to recreational activities (the inner courtyard of a high school and children playground) and to an interesting mixture of social interaction/entertainment and food and grocery shopping (open green market and McDonald's restaurant).

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Figure 6. The district landmark - "Six soldiers".

The most important landmark and a focal point which directs movement (and different activities) is the business and shopping center Usce (Figure 5). It is in a close proximity of the selected block 21 but it also represents both local and city landmark. However, there are some other buildings which are identified as landmarks - due to their height, form, urban role or materialization (for ex. hotel Hyatt, Sava Center, '6 soldiers' and Arena) but their perception and visual significance are mostly related to local/New Belgrade scale.

4.3 Evaluating the public space

The second part of the research was oriented toward the open public spaces of block 21. They were analyzed and evaluated according to a matrix composed of six basic aspects/criteria which provided information about safety, accessibility, legibility, comfort, attractiveness and livability of the block (Fig. 7). The method of survey was used again and it gave an insight into actual needs of users. The results indicated that one of the main problems is subjective feeling of unsafety (mostly during the night), which is cased by insufficient public lighting and over-scaled public space. Furthermore, the respondents criticized some elements of the environmental comfort, especially during the summer (67%). The lack of green spaces was emphasized (98%), as well as the insufficient capacity of existing parking and garage places (92%). However, the maintenance of green public spaces was perceived ambiguously because 58% of respondents have a positive opinion about its general quality. It is also interesting to underline some other needs – for ex. to separate facilities by different groups of users (58%) or to increase the capacity and variety of sports facilities (42%).

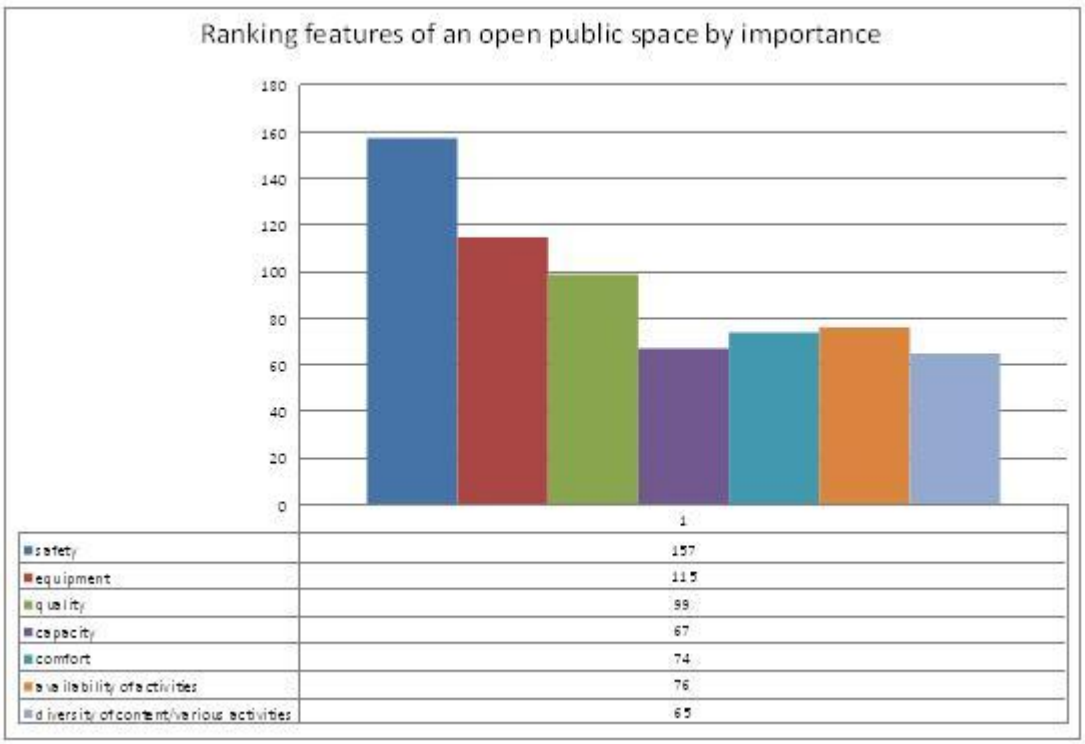

Figure 7: The results of evaluation.

According to the presented results (Fig. 8) the general opinion of inhabitants is not so positive. The majority of them think that the open public spaces of block 21 do not fulfill some of the selected criteria – safety (more than 80%), equipment and general quality of pavement and facilities (50%-60%), accessibility and comfort (37%) and livability (i.e. capacity and diverse of activities) - 30%. These identified problems should be used as initial points for further improvement of open spaces and according to them a list of priorities related to revitalization and redesign should be created (Fig. 9) – for ex. designing more children playgrounds (66%), increasing the number of parking lots (60%), increasing the number and quality of green spaces and improving the quality of the public space equipment/urban mobiliary (54%). However, the issues of accessibility and inclusive design were not so important for the current users (45%), as well as the introduction of new activities in the block (37%).

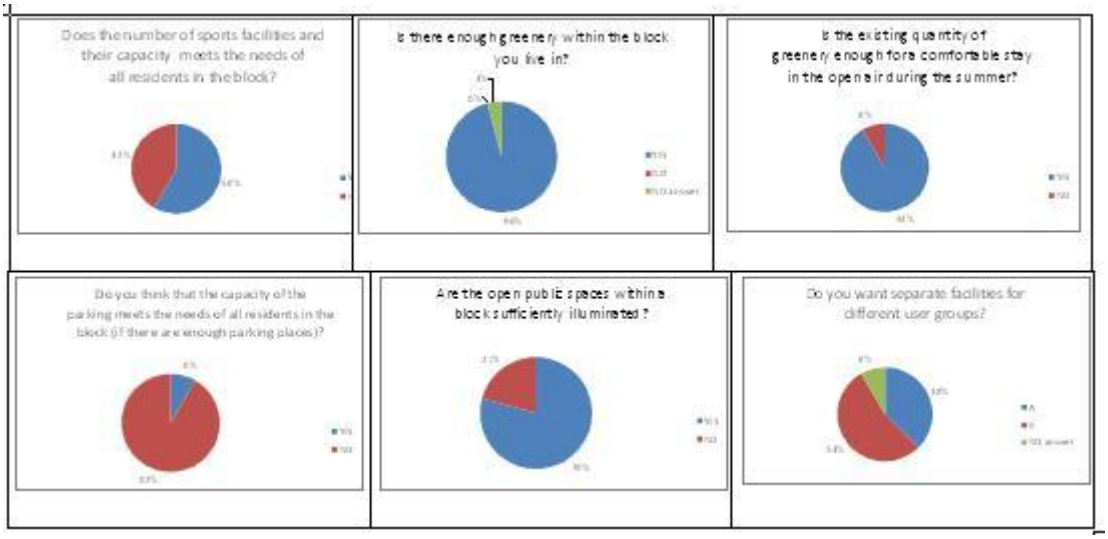

Figure 8. The survey results

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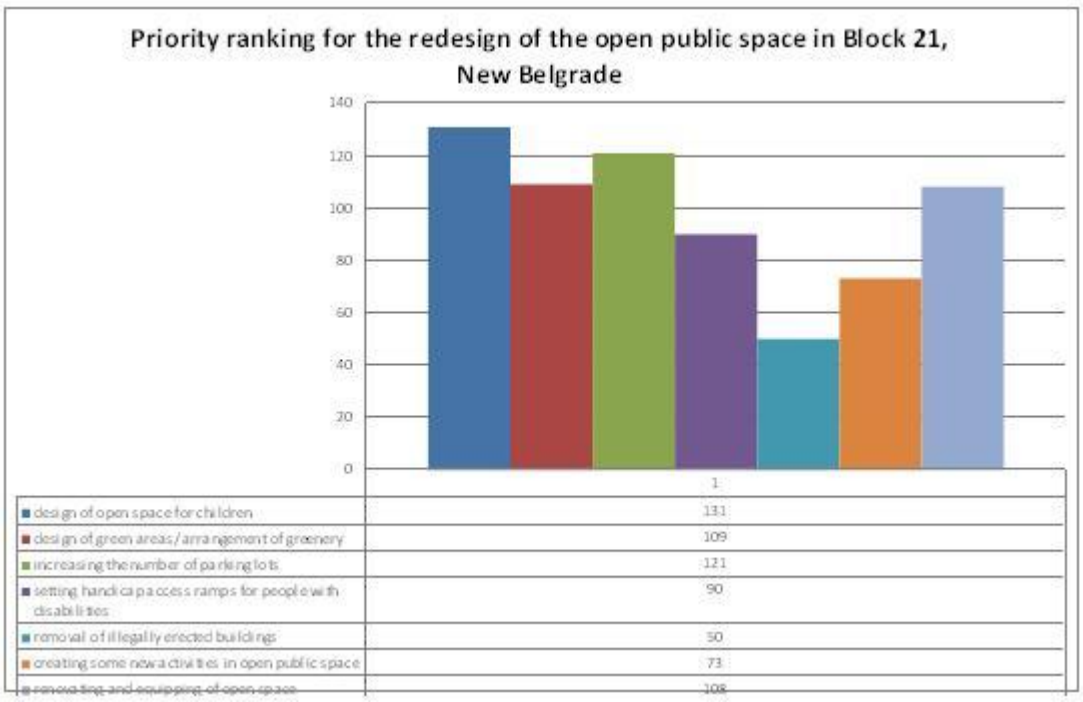

Figure 9. The survey results - evaluation of priorities for redesign of open public spaces.

4.4 Environmental challenges

The block 21 was built in the early 1970's and the buildings were designed without consideration of energy demands and consumption (Krstic-Furudzic, Djukic, 2007). Almost 90% of building stock was residential, with a few public buildings built in the late 1970's (kindergarten, elementary school, high school and district center). Before the regeneration, at the beginning of the 21st century, the block was mono-functional, with low density and large open spaces between buildings, but with good access to public transportation (the distance from buildings to bus and train stops is less than 500m).

After the reconstruction, block 21 became multifunctional, with commercial and business activities, which cut the number of journeys by car per day (everyday shopping, going to bank or etc.). New bicycle lines provide "green way of transport" (Djukic, Vukmirovic, 2011). With new development, spacing between buildings is reduced, density is increased and a better climate comfort is provided – especially during hot summers or cold and windy winter days.

Finally, in order to insure future sustainability of public spaces, it is necessary to apply some new elements of urban design - for ex. intensive greenery and flat green roofs wherever possible, water scenes, covering of open spaces with pergola, tent and vegetation which allow shade in the summer and solar radiation in the winter, the use of non-slip materials which decrease heat radiation during the summer and the improvement of visual identity of open spaces.

5 CONCLUSION: IMPROVING THE QUALITY

The research conducted in block 21 in New Belgrade indicates that recent processes of regeneration in mega-block have influenced some changes in public spaces within urban blocks, although with different effects. According to the data provided by the survey, the perception of paths/directions and edges/boundaries is clear, the existing landmarks are sufficient and easily readable and recognizable, but the position of nodes and their connections are not highly graded by the users. Furthermore, the evaluation of the open public spaces in the block, which was based on six selected criteria, opens some questions and traces new directions for the future planning/design process. The important design parameters are identified, the hierarchy of users' needs and detected problems is established and the issues of safety and overall environmental quality are emphasized. The redesign of children playgrounds, as well as the increased number of parking lots are underlined as the highest priority.

The identified problems and challenges could present an important input for every plan and action in public space. They reflect real needs of different groups of users, provide data for basic guidelines, define types and

scales of physical and functional transformations and influence the selection of planning instruments and tools. The research described in this paper highlights the importance of continuous adjustments and upgrading of public spaces, especially in a specific urban environment which is exposed to contemporary currents and trends, but also to some degree restricted by its rigid matrix and previous ideological labels. Therefore, the comprehensive process of urban regeneration of New Belgrade should also be one of strategic aims which trace further urban revival of this area. The Master Plan of Belgrade 2021 also emphasizes some priorities related to this issue – from the recovery of damaged urbanity, redesign and modernization of public spaces and their equipment, construction of a new and recognizable urban identity to the permanent education of inhabitants oriented towards the understanding of numerous benefits driven by urban renewal and regeneration.

Obviously, the period of transition demands integral approach which combines physical, functional, social and environmental solutions, raising the responsibilities for both citizens and city governments. Open public spaces in mega-blocks have always had a problem of scale and critical mass, but intensification of certain activities (especially recreation and leisure) could provide a necessary magnet on a local level, which should reinforce their role as gathering points. Additionally, the upgrading of spatial elements and their modernization in accordance with the demands of contemporary culture should enable a new, attractive setting for urban life and induce a re-symbolization of old patterns and structures. Establishing balance between needs of users and expected (and planned) sustainability of public spaces is not an easy task, but a high level of adaptability should be required and included in all plans and projects.

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Geographic Views on Regional Planning and Development of Bosnia and Herzegovina

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1 ABSTRACT

Geographic views on regional planning as an indicator of differences in regional development of Bosnia and Herzegovina are studied in the paper. In this regard, economic development, socio-economic transformation and regional development in Bosnia and Herzegovina have been considered. With evaluation of relevant parameters, ranking of developmental centres according to order of development has been performed, and typology of regional development of macroregions was built. The expressed differences in development were completed by corresponding structural characteristics of the observed spatial units.

2 INTRODUCTION

Over the past few decades in the world, problems of regional planning and development became evident. They are discussed at national, continental and world level. Regi¬onal developmental problems particularly gained in importance in Europe as a consequence of integration processes within the European Union. General socio-economic development of Bosnia and Herzegovina as a factor of regional development at the beginning of 1990s has been marked by several important events, which reflected intensly on its regional development.

Regional planning has geographic, temporal, functional and institutional outspread. Temporal outspread originates from orientation of planning to the future. From the past it takes the elements and factors that are of fundamental importance for analysing the existing conditions of the future development, respectively for determining the potential and desired changes, and the ways to them (Friedman, 1987).

Spatial planning deals with the issues of spatial setting the development based on a significant cognition that the space has limited abilities for development and growth setting, not on its general hinderances. It would be very uncertain if spatial planning separated, respectively, moved from developmental interests. In contemporary regional economic development of Bosnia and Herzegovina the greatest disputes are related to natural and social factors of spatial planning and regional development. Regardless these differences, it is quite certain that natural components of the space largely define the economic system of many contemporary societies and economic spaces, accordingly the regional development of Bosnia and Herzegovina as well.

Connection between space and regional development should be observed in the dialectical unity. There is no influence of space on development without its retroactivity on the space itself. Thus, space appears at the same time as factor, but also as the object of development. Namely, it is known that development affects essentially the condition and quality of natural space components. That influence reflects in the level of economic development of single activities in Bosnia and Herzegovina. .

3 REGIONAL DEVELOPMENTAL DIFFERENCES

Regionally, developmental differences are the problem of the whole world (Lorber 2003). Despite the efforts toward more balanced regional development, differences are increasing to a certain extent in more developed countries as well, and exertion gets one of the major issues of today's world. The European countries are also differently developed, and developmental differences between different regions are even more expressed.

Although regional developmental differences are dependant on a series of factors, natural condition, geographic position, political causes and inherited economic conditions are regarded as major ones. The mentioned factors are the determining factors in economic and regional development of Bosnia and Herzegovina in the regional aspect. As a rule, regional development is a product of the number of factors. In Bosnia and Herzegovina, in cities, suburbanized areas, and other suburbian settlements and industrial settlements, even 95% of all jobs are present. On the other hand, less developed areas cannot follow such development and leg behind.

The European Commision presented its vision of regional development through spatial plans in Bosnia and Herzegovina, on the basis of five regions, as follows: Sarajevo economic region (about thirty municipalities),

Northeast Bosnia (about forty municipalities), Northwest Bosnia (about thirty municipalities), Central Bosnia (about twenty municipalities) and Southeast Bosnia (about thirty municipalities). Sarajevo city is a regional and economic centre of the economic region of Sarajevo, a centre of Norteast Bosnia is in Tuzla, of Central Bosnia in Zenica, of Southeast Bosnia in Mostar and of Northwest Bosnia in Banja Luka.

With regard to size of territory of Bosnia and Herzegovina, population density, communicativeness of space, level of economic development and distribution of larger urban centres, it has been estimated that optimum spatial size of one macroregion ranges between 10 to 15 thousand km2. With such size of one macroregion the average maximum distance of marginal parts of one macroregion from its centre would range bewteen 56 to 69 km. It is being aimed therewith that the maximum distance of marginal areas from the basic centre be up to 100 km and only in situations when altenative divisons are not possible, that distance would be somewhat more than 100 km (Nurković 2005).

The objective of the European Union regional policy tends to a decrease in regional developmental differences. This includes a provision of financial resources for development of the less developed countries and the border areas within the programme „INTERREG“, which is intended for support of economic participation among the regions.

Such allocated financial aid would contribute structurally to weak border areas, improving living conditions in a province, assisting in putting an end to problems during integration of the countries into EU, and contribute economically to other participations and connecting with both sides.

With spreading the economic participation and assistance in the border areas, strong globalization influences are always in the fisrt plan, which primarily use cheap raw materials, market, undamaged natural environment, available space, localities for recreation, cheap labour force in industrial facilities and in cross-border employment etc (Christensen 1985).

There is much of such cross-border participation in different forms on the border between Bosnia and Herzegovina and Croatia: in 2001, about 14.000 inhabitants of Bosnia and Herzegovina travelled for work to Croatia, Serbia and Montenegro on daily basis, thereof about 8.000 to Croatia and about 6.000 to Serbia and Montenegro. Such participation and connecting means a determining overall expansion, not only economic expansion of the centres of power to the border and other regions and their influence on economic and regional development. This is particularly important for tourism, which is the most dominant in border regions (Pak 2003).

With regard to natural, social and economic factors, differently developed border regions of Bosnia and Herzegovina are classified into three groups:

- Border areas with a high level of urbanisation and a cross-border connection of the population and economy, eg. between Brčko and Gunja;
- The second group is represented by the border areas between Serbia and Montenegro, which are very far from larger developmental centres or, simply said, those areas that border with the less developed border areas in both neighboring countries;
- The third group comprises the border areas on Croatian-Hungarian border, which include, to a larger extent, traditionally less developed areas. (Osmanković, 2001).

Bosnia and Herzegovina belongs to mountainous European countries. In particular, its border areas are dominantly hilly. Since the relief definitely affects the population, traffic passability and a series of other developmental elements, it affects for the most part the development of border areas. So, dominatly mountainous border area at the farthest border of Bosnia and Herzegovina and Croatia is divided on several different parts with the broad valleys in Bosanska krajina, wide open against the closer million agglomerations of Zagreb and Belgrade. In every place the border areas on Bosnia and Herzegovina-Croatia border are mixed. c

Problems with which the planners from Bosnia and Herzegovina encountered seem to be similar to those in other countries. Most of the problems have been solved in a similar manner as in other countries, but the errors in planning and implementation of the plans were not avoided as it has been expected. The urbanised population in the whole period has had rather high growth rates.The achieved level of urbanisation in 2011 (according to criterion by which inhabitants of settlements bigger than 2.000 inhabitants are regarded as

urbanised) of 49,5% indicates that Bosnia and Herzegovina lined up to the countries having medium urbanisation level.

The highest growth of the number of settlements was achieved in a group of the settlements with 2.000-10.000 inhabitants, and the highest demographic growth had the settlements in group of 50.000 -100.000 inhabitants. Spatial arrangement of the settlemets with more than 2.000 inhabitants, respectively 10.000 inhabitants, with basic road infrastructure and directions of concentration of population and activities is seen on Map 1. Some sociologic researches indicate that in such rapid quantitative changes of the size of cities one should seek also a significant incapability of adjusting the settled population to urban conditions, intolerance, agressiveness and alike. Many pople see it as the urban-rural conflict.

In expert works of Vresk, Nurković and Rebernik, urban geographers and planners, the German geographer Auerbach, who indicated to certain dependence between the size and number of the cities in the region even at the beginning of the 20th century, is often applied for analysis of hierarchic dimension of the urban systems. In the simplest form of the rank-size rule it is expected to have a city in series of cities in the country or the region, which are distributed by size, respectively the number of inhabitants of the largest city is divided by ordinal numeral of that city. It can be demonstrated by the formula: $Pk = \frac{P1}{k}$ with P1 the largest city and Pk a city with ordinal numeral k.

Table 1, of 15 selected cities in Bosnia and Herzegovina, based on application of the rank-size rule, indicates that Sarajevo is the largest city, and the next group of cities is a group of approximately equal cities (Fig.1). Frequency distributions of cities according to the rank-size rule have shown that the population of Bosnia and Herzegovina prefers living in larger cities. From the aspect of industrialisation and urbanisation, it is a consequence of deagrarisation and demand for jobs in secondary, tertiary and quaternary activities in the city.

City	Population		Position		Real order	Population
	1981	1991	1981	1991	-	2010
Sarajevo	448.519	527.049	1	1	1	750.000
Banja Luka	183.618	195.692	2	2	2,7	225.000
Tuzla	121.717	131.618	3	3	4,0	174.000
Mostar	110.377	126.628	4	4	4,2	112.000
Bihać	65.544	70.732	10	11	7,5	63.000
Doboj	99.548	102.549	6	6	5,1	80.000
Prijedor	108.868	112.543	5	5	4,7	95.000
Goražde	36.924	37.573	15	15	14,0	17.000
Bijeljina	92.808	96.988	7	7	5,4	100.000
Brčko	82.768	87.627	8	8	6,0	100.000
Zenica	132.733	145.517	3	3	4,1	127.105

Table 1: Cities of Bosnia and Herzegovina according to the rank-size rule,1981-2010. Source: Statistical Office of Bosnia and Herzegovina, 1981-2010.

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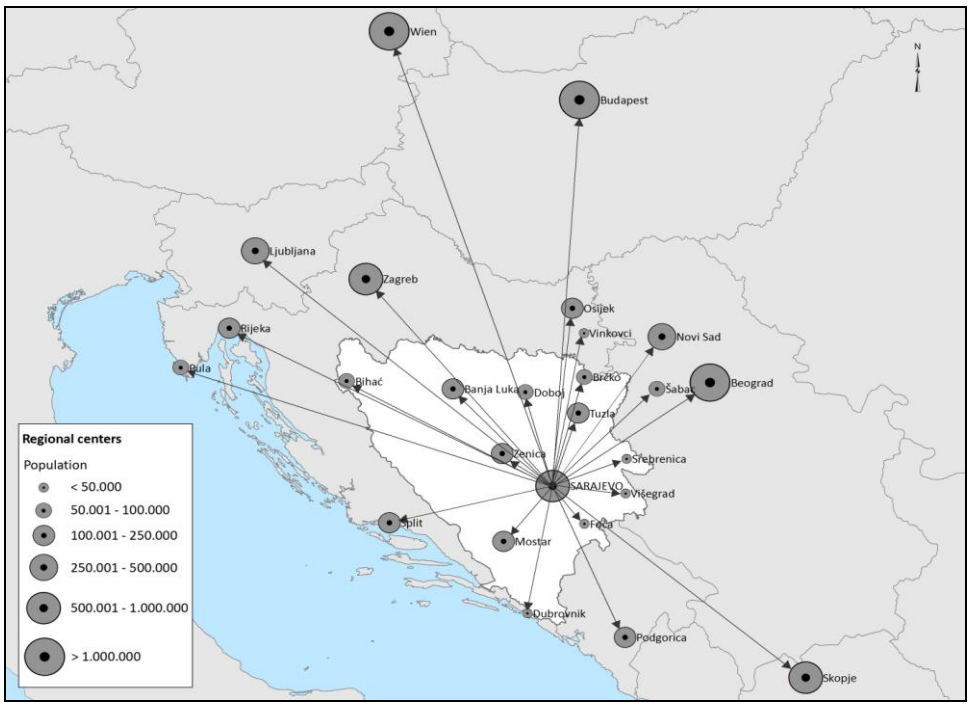

Fig. 1: Network of developmental centres in Bosnia and Herzegovina, in 2010 Author: Nurkovic, 2011

4 BASIC DIRECTIONS OF DEVELOPMENT OF SPATIAL PLANNING IN BOSNIA AND HERZGOVINA

Upon creating the Spatial Plan of Bosnia and Herzegovina a very broad process of preparation of spatial plans of municipalities has been open, and a certain number of spatial plans of special areas were performed. Preparation of spatial plans of municipalities was based mainly on methodology and experiences gained on the preparation of the spatial plan of Bosnia and Herzegovina. For these needs no particular researches were done. The basic approach at the preparation of municipal plans was based on polycentric development, respectively on development of secondary municipal centres and centres of cummunity of villages, as well as on decrease of the present process of population concentration in the municipal centres.

Orientation was also on the protection of agricultural and forest soil, sources of drinking water and valuable natural and hystorical areas. Spatial plans of the municipalities became a very significant instrument of protection and arrangement of space, although they had some defficiencies such as imprecise data bases, insufficient knowledge of local circumstances by planners, insufficient inclusion of local communities in plan preparation and alike (Nurković 2003).

Demands for integration with EU emphasize the problems of preservation and further development of national identity, as well as the requirements that are in sense of competitiveness placed by urban system of Europe (Černe 2005). Urban areas of Bosnia and Herzegovina will integrate into the urban network of Europe (Euro-regions) through regional cooperation, by forming the network of urban centres and by development of multimodal transport corridors.

It is estimated that this concept corresponds to a new urbanisation process, which is characteristic of polycentric urbanised regional space, strong communication corridors, regional division of work, as well as various privileges related to living environment. Ideas of understanding the new conurbations as competitive parts of the European urban system may be applied on already formed agglomerations of Bihać, Banja Luka, Tuzla, Zenica, Sarajevo and Mostar. The area of Sarajevo should be treated as a metropolitan region, which will be formed as one of significant urban centres of southeast Europe.

For urban continuity and cultural iden¬tity of Bosnia and Herzegovina historical inheritance has a particular importance, so it is indispensable to provide its renewal and inclusion into the development, as part of the European cultural inheritance. With spatial plan of Bosnia and Herzegovina the planned area of natural values (about 16% of area of Bosnia and Herzegovina) should be protected by special plans (spatial plans of special areas) and included into natural inheritance of Europe and the world (UNESCO). Cities of Bosnia and Herzegovina have great importance as developmental centres and generators of development, which

makes them nodal points in area planning, and regional development and regional development on the whole.

It is necessary to organize institutions for spatial planning and regional development on regional level (Klemenčić 2005). At the state level it is obvious that a research also needs to be organised through an adequate institute for spatial planning. Economic and interdisciplinary researches of regional inequalities have shown that they are mostly a result of economic reasons (general economic policy, employment and pricing policy, balance of payments etc.), and other factors such as natural-geographic conditions, historical inheritage, traffic-geographic possibilities etc.

It is important to say that an explanation for the mentioned regional inequalities in Bosnia and Herzegovina is found mainly in traffic-geographic separation of some areas in relation to nationalor broader regional centre. That problem of separation, in essence, is reduced to a question of traffic accessibility. It can be said that, unlike more accessible regions of Bosnia and Herzegovina, regarding a kind and number of traffic connections, time of travelling and travel expenses, less accessible regions separated, burdened with serious developmental difficulties.

In the mentioned research of regional development and regional inequalities application of model centre-periphery represents a significant methodologic innovation. Bosnia and Herzegovina is faced with a problem of regional inequalities. They were particularly expressed in the past twenty years, which caused implementation of adequate policy of re-gional development. These inequlities were intensified due to war cirumstances after 1990 and need to be considered in the future as well. However, within its territory Bosnia and Herzegovina has a core region and peripheral and undeveloped regions as well. Therefore, certain considerations of relation centre –periphery, on the basis of traffic role, respectively traffic accessibility, may serve as a foundation for realising the issues of regional development of Bosnia and Herzegovina.

5 CONCLUSION

In contemporary regional economic development of Bosnia and Herzegovina the biggest disputes are related to natural and social factors of spatial planning and regional development. Regardless these differences, it is quite certain that natural components of space largely determine the economic system of many contemporary societies and economic spaces, and accordingly the regional development of Bosnia and Herzegovina as well. Connection between space and regional dvelopment should be observed in the dialectical unity. This is also proved by experience of Bosnia and Herzegovina and involvement of the international community in the regional development and forming the regions in Bosnia and Herzegovina.

Recommendations for Bosnia and Herzegovina from the European Union, on the basis of knowledge of quality spatial plans and national characteristics, and additionaly by realising different succesful examples, would be oriented toward the regional development. It seems that all potentials of adequate regionalisations and regional development have not been fully recognized yet. The authors from Bosnia and Herzegovina have recognized four, respectively five basic macroregions in the area of Bosnia and Herzegovina with centres in Sarajevo, Mostar, Zenica, Tuzla and Banjaluka. These regions have scientific, expert, empirical, historical and every other foundation.

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Geschlechterverhältnisse und Mobilität–Welchen Beitrag leisten Mobilitätserhebungen?

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1 ABSTRACT

Mobilität ist eingebettet in bestehende Geschlechterverhältnisse unserer Gesellschaft, wobei sowohl das biologische als auch das soziale Geschlecht (sex/gender) von Bedeutung sind. Die Genderperspektive in der Mobilitätsforschung zu berücksichtigen bedeutet, sie durch geschlechtsspezifische Datenerhebungen und –auswertungen zu thematisieren. Es wurde ein erweiterter Genderbegriff im Zusammenhang mit Mobilitätsuntersuchungen entwickelt und darauf aufbauend die Erhebungsdesigns der großen Mobilitätserhebungen in Deutschland analysiert. Festgestellt werden konnte, dass in den verschiedenen Erhebungen Genderaspekte wie beispielsweise Betreuung, Pflege und Begleitung von Kindern und Angehörigen zwar erfasst werden, diese in den Analysen und Veröffentlichungen bislang jedoch nur wenig Berücksichtigung finden. Vor diesem Hintergrund werden insbesondere die Daten zur Mobilität in Deutschland (MID 2008) im Sinne des Gender Mainstreaming ausgewertet.

2 PROBLEMAUFRISS

Mobilität und Verkehrshandeln sind eingebettet in bestehende gesellschaftliche Strukturen und Geschlechterverhältnisse unserer Gesellschaft. Tägliche Wege zur Arbeit, zum Einkaufen, die Begleitung von Kindern oder alten Menschen bestimmen unseren Alltag. Es sind immer Frauen und Männer, Kinder und Ältere, Mobilitätseingeschränkte, Menschen mit Migrationshintergrund, die diese Wege zurücklegen, also Menschen mit einem biologischen (sex) und einem sozialen Geschlecht (gender).

Die Berücksichtigung der Genderperspektive in der Mobilitätsforschung bedeutet einerseits Geschlechterverhältnisse zu thematisieren (geschlechtsspezifische Datenerhebungen und -auswertungen), andererseits gilt es, einen Perspektivenwechsel vorzunehmen und die Blicke zu schärfen auf unterschiedliche Lebenslagen, Lebensstile und Strategien zur Alltagsbewältigung, die sich nicht mehr ausschließlich am biologischen Geschlecht bzw. den tradierten Rollenzuschreibungen festmachen.

Zur Erhebung des Verkehrsverhaltens werden in der Verkehrsplanung Mobilitätserhebungen (Beobachtungen oder Befragungen) durchgeführt, wobei Befragungen zusätzlich zum individuellen Verkehrsverhalten auch Bestimmungsgründe und subjektive Motive des Verhaltens erfassen lassen. Mobilitäts- und Verkehrserhebungen liefern Informationen zur Soziodemografie von Personen und Haushalten sowie deren Wege (z. B. Führerscheinbesitz, Pkw-Verfügbarkeit, Wegezweck und Verkehrsmittelnutzung).

Mobilitätserhebungen in Form von Haushaltsbefragungen in Kommunen und Regionen orientieren sich häufig am so genannten „Kontiv-Design“ (Haushaltsbogen, Personenbogen, Wegeprotokolle). Das (biologische) Geschlecht wird bei allen großen Studien sowie bei kommunalen Mobilitätserhebungen, ebenso wie Genderaspekte (z. B. Betreuung, Pflege und Begleitung von Kindern und Angehörigen) in der Regel zwar erfasst, in den Auswertungen, Analysen und Veröffentlichungen finden diese Aspekte bislang nur unzureichend Berücksichtigung.

Hier gilt es, Kriterien für gendersensible Mobilitätserhebungen zu entwickeln sowie Hinweise zur Modifikation und Ergänzung der traditionellen Erhebungsdesigns und ihrer Auswertung und Interpretation zu entwickeln. Dies mit dem Ziel, letztendlich zu mehr Geschlechtergerechtigkeit in der Mobilitätsforschung beizutragen.

Eine erfolgreiche Umsetzung von Gender Mainstreaming im Verkehrsbereich ist besonders in einer Zeit der immer weiteren Differenzierung von Haushaltsstrukturen und Lebensstilen ein Qualitätsmerkmal von Planung und Politik und bei der Entwicklung konkreter Handlungsansätze unverzichtbar.

3 BEGRIFFE UND INDIKATOREN MIT GENDERBEZUG

3.1 Gender

Gender - das bedeutet, nicht stereotyp "die Frauen" oder auch "die Männer" in den Blick zu nehmen, sondern Menschen in ihrer Unterschiedlichkeit und Vielfalt zu berücksichtigen. Niemand ist nur männlich oder nur weiblich, aber wir leben in einer Welt, die maßgeblich durch die Zuweisung von Geschlechterrollen geprägt ist. Durch die Verwendung des Begriffs „Gender“ oder „soziales Geschlecht“ werden die Geschlechter und deren Verhältnisse zueinander stärker in den Blick gerückt, es werden die sozialen Unterschiede oder Rollen beschrieben, die Frauen und Männer in Abhängigkeit ihrer sozialen Situation bzw. Lebenssituation in unserer Gesellschaft haben.

Der Begriff Gender ...

... verweist auf die ökonomischen, sozialen und kulturellen Zuschreibungen und Chancen die damit verbunden sind, männlich oder weiblich zu sein. In fast allen Gesellschaften unterscheiden sich Männer und Frauen im Hinblick auf ihre Aktivitäten, im Zugang zu und Kontrolle über Ressourcen und auf die Teilhabe an Entscheidungsprozessen. Die Geschlechterdefinition – was es heißt, männlich oder weiblich zu sein – variiert zwischen den Kulturen und ändert sich mit der Zeit. (Quelle: Leitfaden EU Gender Mainstreaming 2005 / EQUAL Program)

3.2 Gender Mainstreaming

Gender Mainstreaming verfolgt das Ziel der Geschlechtergerechtigkeit und bedeutet, bei allen Planungen und Entscheidungen, Verordnungen oder Gesetzen von Anfang an daran zu denken, dass sie sich unterschiedlich auf Frauen und Männer auswirken könnten, da es keine geschlechts-neutrale Wirklichkeit gibt.

Die Genderperspektive besagt, dass Frauen und Männer, aber auch Kinder/Jugendliche, Mobilitätseingeschränkte, Ältere, Menschen mit Migrationshintergrund in der Gesellschaft unterschiedliche Lebensbedingungen und Chancen vorfinden. Sie alle entwickeln aufgrund geschlechtsspezifischer, sozialer bzw. ethnisch-kultureller Sozialisation und unterschiedler Lebenssituationen spezifische Interessen und Bedürfnisse. Sie sind von gesellschaftlichen Prozessen und deren Auswirkungen unterschiedlich betroffen.

Der so erweiterte Genderbegriff bezieht die genannten Gendergruppen mit ein, wobei jeweils noch nach Geschlecht und Alter differenziert werden sollte. Der erweiterte Genderbegriff umfasst auch die baulich-räumlichen Strukturen, das heißt die Betrachtung der Siedlungsstruktur. Die Lebensverhältnisse der Bevölkerung variieren nicht nur in Abhängigkeit vom regionalen Kontext, sondern zusätzlich nach dem Geschlecht, d. h. die Situation von Frauen und Männern unterscheidet sich zwischen Kernstädten, Umlandkreisen, ländlichen Kreisen und/oder dem ländlichen Raum (unterschiedliche Verfügbarkeit von Öffentlichen Verkehrsmitteln, unterschiedliche Vielfalt und Nähe von Infrastruktureinrichtungen, Entfernung der Orte des täglichen Lebens).

3.3 Indikatoren mit Genderbezug [1]

Indikatoren zeigen etwas an, Ausgangspunkt der Erstellung von Indikatoren ist ausdrücklich oder implizit die Definition eines Ziels, in dessen Richtung sich die Wirklichkeit verändern soll. Die Entwicklung von Indikatorensystemen ist somit nicht wertfrei.

Bei Indikatorensystemen mit Genderbezug im internationalen Kontext ist Verkehr bzw. Mobilität (noch) kein Thema, im nationalen Kontext gibt es erste Ansätze, von Bedeutung sind hier der Gender-Index und der bundesweite Gleichstellungsatlas.

Jedes Jahr veröffentlicht das Entwicklungsprogramm der Vereinten Nationen (UNDP) den Bericht über die menschliche Entwicklung. Dabei wird jährlich der Index für menschliche Entwicklung berechnet, bekannt unter der Abkürzung HDI (Human Development Index). Darüber hinaus seit 1995 der geschlechterbezogene Entwicklungsindex (gender-related development Index), kurz GDI [2] . Auf nationaler Ebene sind in erster

[1] Vgl. ausführlicher KRAUSE, 2011.

[2] Seiner Bedeutung liegen dieselben Variablen zugrunde wie der des HDI. Der Gender Empowerment Measure (GEM). „Empowerment“ (oder Ermächtigung) steht für die Stärkung der Rolle der Frauen und die Förderung der Teilhabe an politischen und gesellschaftlichen Entscheidungsprozessen.

Linie die zahlreichen Indikatorensysteme zum Themenfeld „Nachhaltigkeit“ zu nennen. Diese sollen helfen, notwendige Prozesse hin zu einer nachhaltigen Entwicklung zu steuern, Grundlage ist die Agenda 21.

Die Nationale Nachhaltigkeitsstrategie „Perspektiven für Deutschland: Unsere Strategie für eine nachhaltige Entwicklung“ legt 21 Indikatorenbereiche vor (Stand Fortschrittsbericht 2008). Diese Indikatoren sind vier Bereichen zugeordnet. Im Bereich Lebensqualität ist der Indikatorenbereich „Mobilität“ mit dem Nachhaltigkeitspostulat „Mobilität sichern – Umwelt schonen“ jedoch lediglich durch Indikatoren wie Güter- bzw. Personentransportintensität oder Anteil des Schienenverkehrs an der Güterbeförderungsleistung dargestellt.

Der Gender-Index [3] ist ein Instrument, welches die Chancengleichheit oder auch -ungleichheit zwischen den Geschlechtern indizieren, darstellen und zwischen den Regionen vergleichbar machen soll. Er ist das erste bundesweite Messinstrument zum regionalen Vergleich der Gleichstellung von Frauen und Männern. Für 19 Indikatoren aus den Bereichen Ausbildung, Erwerbsleben und Partizipation werden die relativen Abweichungen der Indikatorenausprägung für Frauen und für Männer berechnet. Der Gender-Index ist der Mittelwert dieser 19 relativen Geschlechterdifferenzen [4]. Gestützt auf das räumliche Informationssystem, die Laufende Raumbeobachtung des BBSR, werden erstmals bundesweit flächendeckend, systematisch und umfassend die regionalen Lebensverhältnisse von Frauen und von Männern in diesen drei Bereichen Ausbildung, Erwerbsleben und Partizipation bewertend im Gender-Index zusammengefasst. Ziel ist es, den komplexen Sachverhalt der Gendergerechtigkeit sichtbar zu machen und dadurch die zentralen Handlungsfelder für mehr Chancengleichheit in den verschiedenen Regionen zu veranschaulichen (vgl. www.gender-index.de). Mobilität und Verkehr sind jedoch (bislang) kein Thema.

Der Atlas zur Gleichstellung von Frauen und Männern in Deutschland (Gleichstellungsatlas) ist eine erste Standortbestimmung der Gleichstellungssituation nach Bundesländern anhand von 30 Indikatoren. Interessant für die Untersuchungsfragestellung ist die Kategorie Lebenswelt mit den beiden Indikatoren „Ältere Menschen in Einpersonenhaushalten“ und „Lebenserwartung“. Bei beiden Indikatoren zeigen sich deutliche geschlechtsspezifische Unterschiede (BMFSFJ, 2009).

Die regelmäßige Berücksichtigung zentraler Kenngrößen aus dem Mobilitätsbereich – wie beispielsweise die (geschlechtsspezifische) Betrachtung der Wegezwecke oder die Erreichbarkeit unterschiedlicher Ziele – könnte dazu beitragen, die Chancengleichheit bzw. geschlechtsspezifische Unterschiede aufgrund gesellschaftlicher Rahmenbedingungen, Einstellungen und Gewohnheiten aufzuzeigen. Eine gute Datengrundlage bieten die regelmäßigen Erhebungen zum Mobilitätsverhalten der Bevölkerung.

4 LANDESWEITE EHEBUNGEN ZUM MOBILITÄTSVERHALTEN

Die drei bundesweiten Erhebungen zum Verkehrsverhalten der Bevölkerung in Deutschland sind Mobilität in Deutschland (MID), Mobilität in Städten (SrV) sowie das Deutsche Mobilitätspanel (MOP). Diese Erhebungen dienen auch als empirische (Kalibrierungs)Grundlagen für Verkehrsmodelle und damit auch gesamtstädtischen oder regionalen Verkehrsplanungen.

Mobilität in Deutschland (MID) ist die bundesweite Haushaltsbefragung [5] zum Verkehrsverhalten. Hierbei werden die außerhäuslichen Aktivitäten und Wege aller im Haushalt lebenden Personen von ausgewählten Stichprobenhaushalten in einem bestimmten Stichtag mittels eines standardisierten Fragebogens erfasst. Die erste bundesweite, umfassende Erhebung des Verkehrsverhaltens der Bevölkerung wurde 1976 im Rahmen der KONTIV – Kontinuierliche Erhebung zum Verkehrsverhalten durchgeführt, diese wurde mit jeweils ähnlichem Design in den Jahren 1982 und 1989 wiederholt. Im Jahr 2002 erfolgte die Untersuchung erstmals als gesamtdeutsches Projekt unter dem Namen Mobilität in Deutschland (MiD). Im Rahmen von MiD 2008

[3] www.gender-index.de

[4] Die Formel zur Berechnung des Gender-Index lehnt sich dem schwedischen Jäm-Index (auch als Gender Equality Index bezeichnet) an. Statistische Tests unterstützen den Gender-Index als geeignetes Messinstrument der regionalen Gleichstellung von Frauen und Männern.

[5] Bei Haushaltsbefragungen zum Verkehrsverhalten werden die außerhäuslichen Aktivitäten und Wege aller im Haushalt lebenden Personen von ausgewählten Stichprobenhaushalten in der Regel an einem Stichtag mittels eines standardisierten Fragebogens erfasst. Im Regelfall werden Daten und Informationen zum werktäglichen und sonntäglichen Verkehrsverhalten erhoben. Die Erhebungseinheit ist der Haushalt, d. h. die Befragungsunterlagen werden an die Haushaltsadresse für alle Haushaltsmitglieder verschickt. Untersuchungseinheit ist die individuelle Person.

erfolgt eine Stichtagserhebung über 12 Monate in 25.000 Haushalten mit 62.000 Personen. Im Rahmen von regionalen Aufstockungen sind weitere Gemeinden hinzugekommen. Bei der Auswertung werden die BBR-Siedlungstypen berücksichtigt (vgl. MEYER/ MILBERT et al., 2007). Im Gegensatz zur MiD 2002 ist in der MiD 2008 die Staatsangehörigkeit (Bezug zu Migrationshintergrund) nicht mehr erfragt worden.

Das System repräsentativer Verkehrsbefragungen (SrV) erhebt Daten zur Alltagsmobilität von Personen auf der Grundlage von Haushaltsbefragungen in Städten. Das SrV wurde an der TU Dresden zur Gewinnung von Daten zum städtischen Personenverkehr in der DDR entwickelt. Die erste der als Haushaltsbefragung durchgeführten Erhebungen hat 1972 stattgefunden. Im Rahmen der SrV werden Daten für so genannte mittlere Werktage (Dienstag bis Donnerstag) erhoben Die SrV-Ergebnisse werden sowohl für jede beteiligte Stadt (Stichprobenumfang pro Stadt mindestens 1.000 Personen) als auch abstrahiert für verschiedene Stadtgrößen ausgewertet. Auftraggeber sind Kommunen, Länder sowie Verkehrsunternehmen. Der Untersuchungsraum des SrV 2008 umfasst 76 Städte, Gemeinden und Verwaltungsgemeinschaften auf dem Gebiet der Bundesrepublik Deutschland.

Das Deutsche Mobilitätspanel (MOP) ist eine als Panel angelegte Längsschnittstudie zum Mobilitätsverhalten. Die Personen derselben Haushalte werden über insgesamt drei Jahre hinweg einmal pro Jahr zu ihrem Mobilitätsverhalten befragt. Jeweils im Herbst werden die Teilnehmenden gebeten, eine Woche lang ein Wegetagebuch zu führen. Befragt werden alle Haushaltsmitglieder ab einem Alter von 10 Jahren. Die Stichprobe besteht jährlich aus ca. 1.500 Personen (750 Haushalte), von denen zwei Drittel „Wiederholer“ der Befragung sind, das andere Drittel wird neu für das Panel angeworben.

Bislang werden explizit „Genderfragen“ in der Mobilitätsforschung kaum angesprochen. Zwar gibt es eine Reihe von Studien, die immer wieder belegen, dass sich Frauen und Männer außer Haus unterschiedlich bewegen (Verkehrsmittelnutzung, Wegezwecke etc.). So werden Indikatoren wie Pkw-Verfügbarkeit, Führerscheinbesitz, Verkehrsmittelwahl und Wegezwecke geschlechtsspezifisch und häufig auch nach Altersgruppen ausgewertet. Eine Differenzierung zwischen sex und gender ist bislang jedoch kaum zu finden.

Im Kontext dieser Untersuchung wird im Schwerpunkt auf die bundesweite Mobilitätserhebung Mobilität in Deutschland (MID) eingegangen.

5 GENDERASPEKTE IN DER MID

Voraussetzung für eine Chancengleichheit ist - unabhängig vom Geschlecht – eine soziale Teilhabe am gesellschaftlichen Leben. Diese wird wesentlich auch durch die Mobilitätsmöglichkeiten bestimmt; wichtig ist eine gute Erreichbarkeit von Wohn- und Arbeitsorten, Versorgungs-, Bildungs- und Kultureinrichtungen. Dass Frauen und Männer unterschiedlich mobil sind, zeigt sich in allen Lebensphasen. Nur eine gender-differenzierte Analyse des Verkehrsverhaltens zeigt ein realistisches Bild der gesellschaftlichen, sozialen und räumlichen Rahmenbedingungen für Mobilität. (vgl. STIEWE/ KELP-SIEKMANN, 2010)

5.1 Referenzgruppen als Grundlage für eine gendergerechte Auswertung

Bei der Bildung von Referenzgruppen (so genannte Gendergruppen, z. B. Ältere Menschen, Alleinlebende, Mobilitätseingeschränkte, Menschen in Familienhaushalten, Menschen mit Migrationshintergrund) wird davon ausgegangen, dass bei diesen Gruppen das Mobilitäts- bzw. Verkehrsverhalten aufgrund bestimmter Rahmenbedingungen und ähnlicher Bedürfnisse „verhaltenshomogen“ ist. Der Begriff Referenzgruppen wurde aus den Bezeichnungen Lebensphase (MiD), Lebensstile/Mobilitätsstile und Haushaltstypen (MiD), verkehrssoziologische Personengruppen (SrV) sowie Untersuchungen zum Verkehrsverhalten verhaltenshomogener Gruppen bzw. zur Lebenssituation bzw. zum Mobilitätsverhalten von Frauen abgeleitet. Gebräuchliche Kriterien zur Bildung dieser Gruppen sind die Berufstätigkeit (Stellung im Erwerbsprozess), die Stellung im Beruf, das Geschlecht, das Alter, die Pkw-Verfügbarkeit, die Anwesenheit von Kindern im Haushalt (vgl. HOLZ-RAU, 1990).

Im Rahmen des Projektes wurden anhand einer umfassenden Literaturrecherche bedeutende Indikatoren zur Bildung von Referenzgruppen aus der Genderperspektive und Bezug zum Mobilitätsverhalten ermittelt (Abb. 1). Als zentrale Faktoren zur Bestimmung des Mobilitätsverhaltens von Gendergruppen haben sich die soziale Situation (Single, alleinerziehend, Partner/in), die Erwerbstätigkeit und das Vorhandensein von Kindern im Haushalt (Versorgungsarbeit, Begleitmobilität) herauskristallisiert. Weitere bedeutende

Indikatoren sind Alter, Geschlecht, Lebensphase, Haushaltstyp, ökonomischer Status, PKW-Verfügbarkeit, Regionstyp [6].

Fig. 1: Indikatoren zur Bildung der Referenzgruppen

Als Ergebnis lassen sich folgende Referenzgruppen mit Genderbezug ableiten: Kinder und Jugendliche,

Menschen mit Migrationshintergrund, Mobilitätseingeschränkte Personen, Menschen in bestimmten Lebenssituationen; Alleinerziehende, Ältere Menschen, Alleinlebende.

Bei der nachstehenden Betrachtung wird aus den Daten der MID 2008 als erster Schritt das Mobilitätsverhalten der Referenzgruppe „Menschen in bestimmten Lebenssituationen“ analysiert: Alleinerziehende (1 Erwachsene/r und mind. 1 Kind unter 18 Jahren) , Einpersonenhaushalte (Menschen bis einschl. 64 Jahre), Familienhaushalte (2 Erwachsene und mind. 1 Kind unter 18 Jahren), Ältere Menschen (ab 65 Jahre), wobei jeweils nach Geschlecht differenziert wird.

Die Gruppe der Alleinerziehenden zeichnet sich durch einen sehr hohen Frauenanteil (88%) aus, der Altersdurchschnitt liegt hier bei 42,2 Jahren. Über ein Viertel (26%) der Haushalte in dieser Gruppe besitzt kein Auto. Die Gruppe der Älteren Menschen sticht mit einem Frauenanteil von 55% heraus, was sich durch die höhere Lebenserwartung von Frauen erklärt. Auffällig an dieser Gruppe ist, dass auch hier knapp ein Viertel keinen Pkw besitzt. Familienhaushalte dagegen sind nur zu 2,4% ohne Auto, 38% der Haushalte besitzen ein Auto, 50% besitzen zwei Pkw. Mit 40,0 Jahren haben Personen aus Familienhaushalten den niedrigsten Altersdurchschnitt unter den Referenzgruppen. Die Alleinlebenden haben - die Gruppe der Älteren Menschen ab 65 Jahren ausgeklammert – mit 46,6 Jahren den höchsten Altersdurchschnitt. Bei Betrachtung der Altersgruppen fällt auf, dass sich 58% der männlichen Alleinlebenden in den Altersklassen 30 bis 59 konzentrieren, während bei den Frauen über alle Altersgruppen eine relativ ausgeglichene Verteilung zu beobachten ist, sich jedoch im Vergleich zu den Männern in der Altersklasse 60 bis 64 deutlich mehr Frauen befinden. In dieser Gruppe liegt der Anteil der Haushalte, die kein Fahrzeug besitzen bei 29%.

6 UNTERSCHIEDE IM VERKEHRSHANDELN EINIGE ERGEBNISSE AUS DER MID

Im Hinblick auf Unterschiede in der Lebenssituation der Geschlechter, der Ethnie, der Herkunft und der Sozialisation ist zwar in vielen Bereichen eine Tendenz zur Angleichung erkennbar. Dennoch sind Frauen nach wie vor in vielen gesellschaftlichen Bereichen strukturell benachteiligt u. a. hinsichtlich Einkommen, Arbeitsbedingungen oder Vermögen. Zudem sind sie, unabhängig von der Berufstätigkeit, immer noch mehrheitlich zuständig für den Hauptteil der Reproduktionsarbeit (Kindererziehung, Pflege von Angehörigen, Haushaltsführung, etc.). Zur Erfüllung dieser Aufgaben legen sie zusätzliche Wege zurück, sind anders mobil (mehr zu Fuß und mit öffentlichen Verkehrsmitteln) und heben sich somit vom durchschnittlichen Mobilitätsverhalten der Männer ab.

[6] Die siedlungsstrukturelle Typisierung des BBSR gliedert Deutschland in drei Regionstypen und neun Kreistypen) nach den Merkmalen Bevölkerungsdichte sowie der Größe und zentralörtlichen Funktion der Kernstädte der Regionen (MEYER/ MILBERT et al., 2007).

So legen statistisch betrachtet beispielsweise berufstätige Mütter in Deutschland 4,3 Wege pro Tag zurück; im Gesamtdurchschnitt werden in Deutschland 3,4 Wege pro Tag zurückgelegt (MiD 2008). Eine Zunahme der Berufstätigkeit von Frauen – insbesondere von Müttern – führt nicht jedoch zu Gleichheit, sondern zur Doppelbelastung der Frauen bei eher gleichbleibenden Verhältnissen für die Männer. Im Alter bis 30 Jahre hingegen gibt es – betrachtet man nur das Geschlecht, unabhängig von der Lebenssituation – keine signifikanten Unterschiede.

Im Folgenden werden einige ausgewählte Ergebnisse der Auswertung der MiD vorgestellt; berücksichtigt wurden dabei alle Personen ab 18 Jahren.

6.1 Führerscheinbesitz

Eine zentrale Kenngröße der Mobilitätsvoraussetzung ist der Führerscheinbesitz. Insgesamt verfügen 93% der Männer und 83% der Frauen über einen Führerschein. In den letzten Jahren ist der Anteil der Personen, die einen Führerschein besitzen kontinuierlich gewachsen. Betrachtet man die steigenden Führerscheinzahlen jedoch altersgruppenspezifisch, so ist bei den jungen Erwachsenen ein leicht rückläufiger Trend zu erkennen; 87% der Frauen und 85% der Männer besitzen einen Führerschein, dies ist auch die einzige Altersgruppe in der der Anteil der Personen, die einen Führerschein besitzen bei den Frauen größer ist als bei den Männern. Insgesamt holen Frauen in allen Altersklassen beim Führerscheinbesitz auf, dennoch verfügen in der Altersgruppe über 74-Jährigen nur 49% über einen Führerschein.

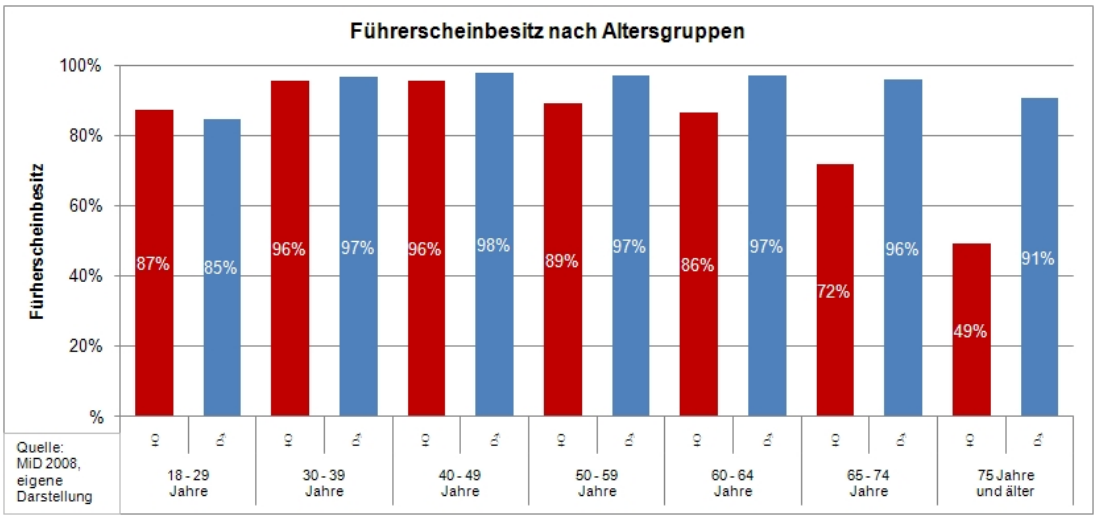

Fig. 2: Führerscheinbesitz nach Altersgruppen

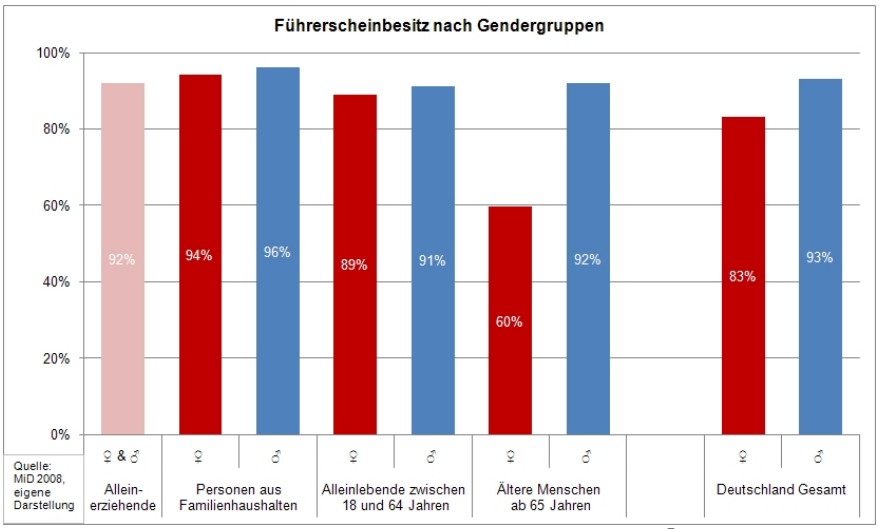

Fig. 3: Führerscheinbesitz nach Gendergruppen [7]

[7] Zwischen der Gruppe der Älteren Menschen und der Alleinerziehenden (=7 Fälle)sowie zwischen den Älteren Menschen und den Personen aus Familienhaushalten (=210 Fälle) ergaben sich Überschneidungen. Die betroffenen Fälle wurden der Gruppe der Älteren Menschen zugeordnet.

Unterschiede im Führerscheinbesitz zeigen sich auch ganz deutlich in Abhängigkeit der Lebenssituation. In Familienhaushalten ist der Führerscheinbesitz sowohl bei den Männern als auch bei den Frauen am höchsten. Auch die Alleinerziehenden [8] (88% Frauen) verfügen zu 92 % - und damit überdurchschnittlich häufig - über einen Führerschein.

6.2 Pkw-Verfügbarkeit

Entscheidend neben dem Führerscheinbesitz ist für das Mobilitätsverhalten die Pkw-Verfügbarkeit. Junge Frauen haben zwar häufiger einen Führerschein als Männer in der gleichen Altersgruppe, können aber seltener über einen Pkw verfügen. Insgesamt geben 83% der Männer aber nur 72% der Frauen an, jederzeit über einen Pkw verfügen zu können. Dass der Führerscheinbesitz nicht mit der Pkw-Verfügbarkeit einhergeht zeigt sich insbesondere in der Gruppe der jungen Erwachsenen. Über alle Altersgruppen können Männer eher über einen Pkw verfügen als Frauen. Wenn Frauen über ein Auto verfügen können, sind sie häufig aber nicht Besitzerin des „verfügbaren Pkw“; dies erklärt sich dadurch, dass der Fahrzeughalter – insbesondere des Erstwagen – häufig der Mann ist. Es ist zu vermuten, dass Frauen immer noch häufiger auf die Pkw-Nutzung verzichten müssen, wenn mehr Personen mit Führerschein im Haushalt leben als Pkw vorhanden sind.

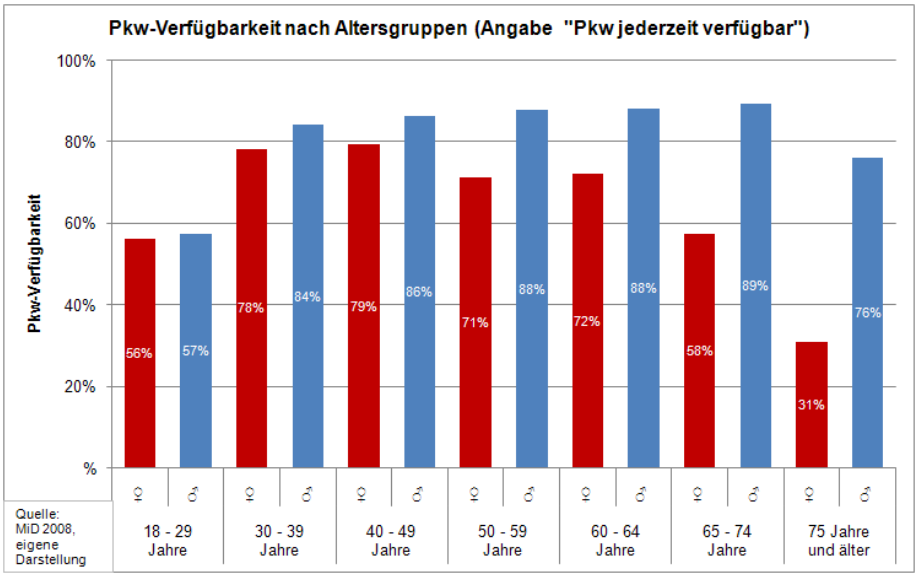

Fig. 4: Pkw-Verfügbarkeit nach Altersgruppen

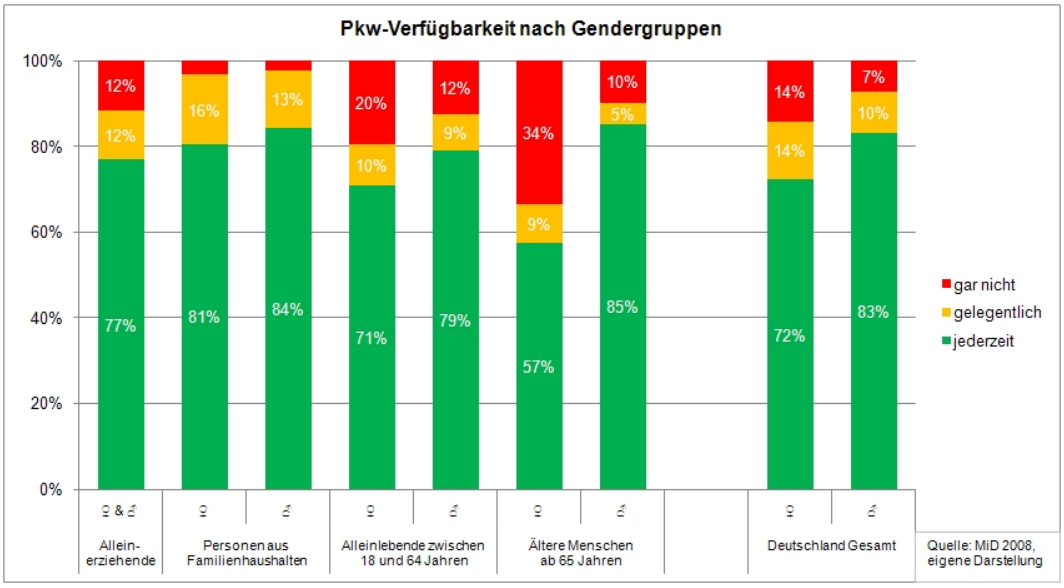

Fig. 5: Pkw-Verfügbakeit nach Gendergruppen

[8] Da der Anteil der Männer bei den Alleinerziehenden nur 12 % (=54 Befragte) beträgt, wurde auf eine geschlechterdifferenzierte Darstellung an dieser Stelle verzichtet.

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Editors: Manfred SCHRENK, Vasily V. POPOVICH, Peter ZEILE, Pietro ELISEI

Bezieht man das Einkommen mit in die Betrachtung ein, so wird deutlich, dass weit über die Hälfte der Haushalte mit geringem Haushaltseinkommen keinen Pkw besitzt und auch nicht darüber verfügen kann. Hierbei handelt sich vor allem um Rentnerhaushalte und Haushalte ohne Kinder. Eine Ausnahme stellen die Alleinerziehenden dar, sie verfügen trotz geringen Einkommens häufiger über einen Pkw, wohl auch um die vielfältigen Mobilitätsbedürfnisse und -zwänge realisieren zu können. Es zeigt sich also, dass uneingeschränkte Zugang zum Pkw längst nicht die Regel ist sondern es in Bezug auf das Alter und die jeweilige Lebenssituation durchaus Unterschiede gibt.

6.3 Verkehrsmittelnutzung

Frauen legen deutlich mehr Wege zu Fuß zurück als Männer; dies zeigt sich über alle Altersgruppen und auch in den verschiedenen Lebenssituationen. Bei der Nutzung der Öffentlichen Verkehrsmittel ist über alle Wege betrachtet kaum ein Unterschied zwischen den Geschlechtern festzustellen; lediglich die älteren Frauen nutzen öffentliche Verkehrsmittel deutlich häufiger als die Männer, was auch auf die fehlenden Führerscheine zurückzuführen ist. Die meisten Wege mit dem Pkw werden von Männern aus Familienhaushalten zurückgelegt. Insgesamt lässt sich sagen, dass Auto bis ins Alter hinein das am häufigsten genutzte Verkehrsmittel ist und das Unterwegssein bei den Männern eher durch die Autonutzung geprägt ist als bei den Frauen. Bestimmt wird die Autonutzung in hohem Maße auch die Pkw-Verfügbarkeit; steht ein Pkw zur Verfügung, wird dieser auch genutzt.

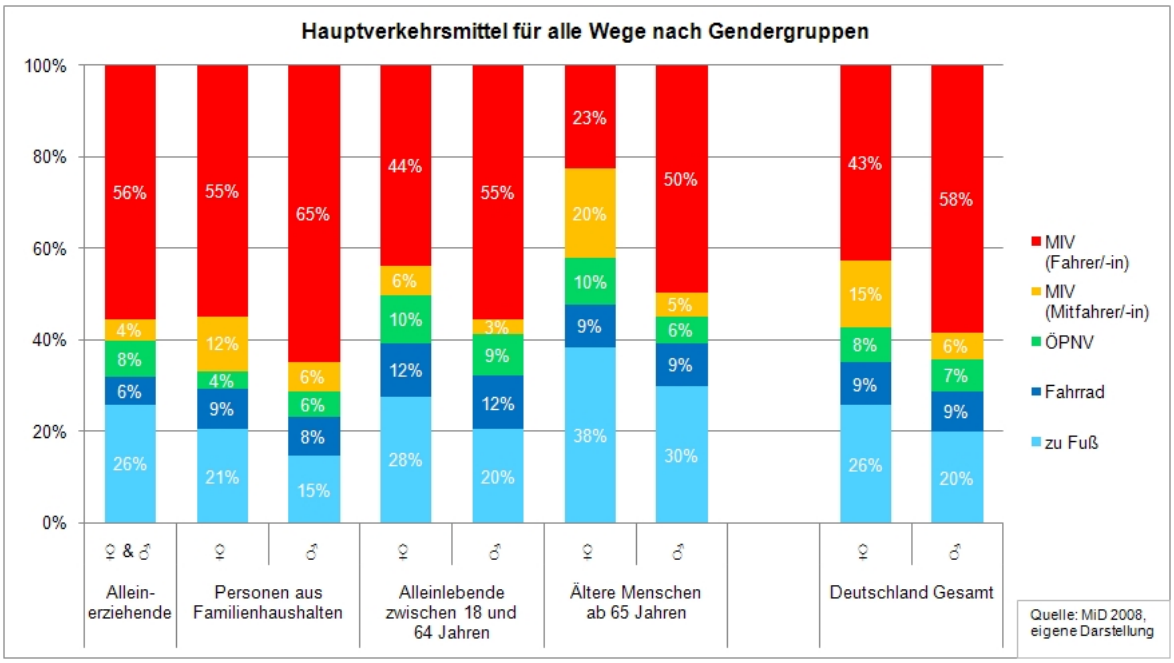

Fig. 6: Modal Split nach Gendergruppen

6.4 Wegezwecke

Während sich die Anzahl der Wege zwischen Frauen und Männern insgesamt nur wenig unterscheidet, zeigen sich im Hinblick auf die Wegezwecke deutliche Unterschiede zwischen den Geschlechtern und der Lebenssituation – auch das Alter spielt hier einen entscheidende Rolle. So ist der Anteil der Begleitwege bei Alleinerziehenden und Frauen aus Familienhaushalten mit 18% bzw. 20% deutlich größer als in den anderen Gruppen. Auch der Anteil der Einkaufswege ist mit 23% bei den Frauen aus den Familienhaushalten deutlich höher als der der Männer (15%). Gleichzeitig ist der Anteil der Arbeitswege und der dienstlichen Wege deutlich geringer als bei den Männern derselben Gruppe. Dies deutet auf eine traditionelle Arbeitsteilung hin. Der Wegezweck Freizeit hat den geringsten Anteil in der Gruppe der Frauen aus Familienhaushalten mit 26% und bei den Alleinerziehenden mit 28% aller Wege.

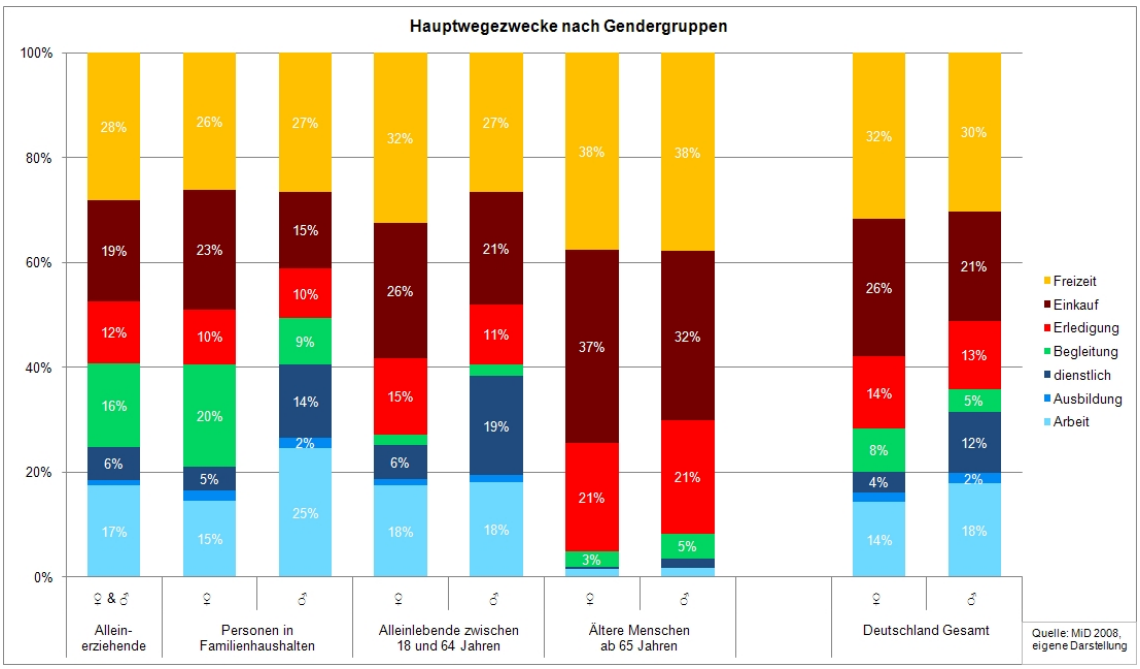

Fig. 7: Hauptwegezwecke nach Gendergruppen

6.5 Wegenanzahl, Unterwegszeiten und Distanzen

Bei den zentralen Mobilitätskenngrößen „Mobil am Stichtag“, Wegeanzahl, tägliche Unterwegszeit und zurückgelegter Distanz zeigen sich zwischen den Referenzgruppen deutliche Unterschiede. Zwar unterscheidet sich die Zahl der täglich zurückgelegten Wege zwischen Männern und Frauen insgesamt kaum, doch zeigen sich je nach Lebenssituation deutliche Unterschiede. So legen Alleinerziehende mit 4,2 Wegen pro Tag die größte Anzahl zurück; ältere Frauen hingegen legen nur 2,6 Wege zurück. 95,5% der Alleinerziehenden waren am Stichtag unterwegs, sie weisen mit knapp 100 Minuten am Tag auch die größte Unterwegszeit auf. Die durchschnittliche Wegelänge ist dabei mit gut 10 km dabei deutlich kürzer als die der Männer aus Familienhaushalten, die durchschnittlich 16 km pro Weg zurücklegen. Der Alltag der Alleinerziehenden, aber auch der Frauen aus Familienhaushalten ist durch eine Vielzahl an Versorgungs- und Begleitwegen geprägt, die häufig zu Fuß zurückgelegt werden und mit einem entsprechenden Zeitaufwand einhergehen. Die geringste Mobilitätsquote weisen die älteren Frauen auf; 20 % von ihnen waren am Stichtag gar nicht unterwegs, sie legen durchschnittlich 2,6 Wege am Tag zurück und sind ca. 64 Minuten unterwegs. Ein Großteil der Wege wird von ihnen zu Fuß zurückgelegt.

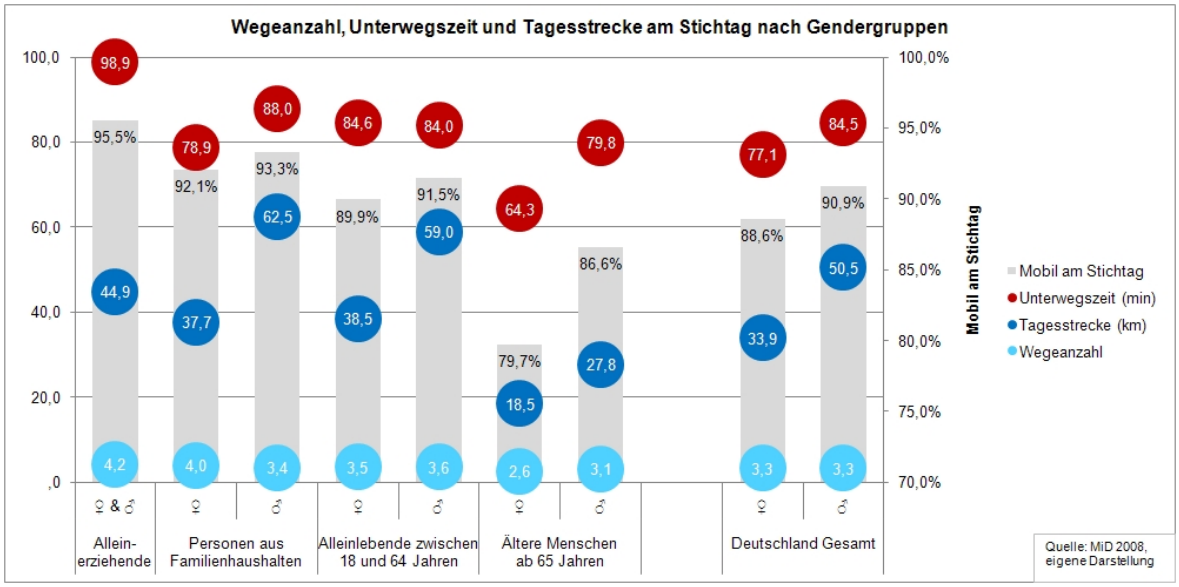

Fig. 8: Wegeanzahl, Unterwegszeit und Tagesstrecke am Stichtag sowie Anteil mobiler Personen nach Gendergruppen

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7 FAZIT

Die Analyse der Erhebungsdesigns großer Mobilitätserhebungen hat gezeigt, dass in verschiedenen Erhebungen durchaus Genderaspekte erfasst werden, diese in den Auswertungen und Veröffentlichungen bislang nur in geringem Maße thematisiert werden.

Auswertungen der vorliegenden Daten zeigen, dass Unterschiede in den Mobilitätsvoraussetzungen sowie im Verkehrshandeln zwischen den Geschlechtern vorliegen.

Es sind also immer noch Maßnahmen notwendig, die Gerechtigkeit zwischen den Geschlechtern herzustellen, eine zentrale Voraussetzung ist es aber zunächst den Status quo sichtbar zu machen und die vorliegenden Erhebungsdaten im Sinne des Gender Mainstreaming auszuwerten.

Geschlechtergerechtigkeit lässt sich aber auch nicht ohne Berücksichtigung von Migrationsaspekten herstellen. Mit Gender Mainstreaming wird damit der Blick einerseits auf diese strukturellen Unterschiede gelenkt, andererseits aber auch für die unterschiedlichen Bedürfnisse, Interessen und Anforderungen auch innerhalb der Gruppen (in Abhängigkeit von der Lebenssituation) der Männer und Frauen geschärft. Damit geraten z.B. die soziale Lage, das Alter aber auch der ethnische Hintergrund in den Blickpunkt. Dies setzt jedoch voraus, dass entsprechende Daten auch erhoben werden. So gibt es beispielsweise bislang nur wenig Kenntnis (und kaum Daten) über das Mobilitätsverhalten von Menschen mit Migrationshintergrund. Erste Hinweise kann hierzu das aktuelle Forschungsprojekt des ILS „Mobilität von Menschen mit Migrationshintergrund und soziale Benachteiligung durch ungleiche Mobilitätschancen liefern“.

Auch wenn Bund, Länder und Kommunen zur Umsetzung des Gender Mainstreaming und damit auch zu einem Gender-Monitoring verpflichtet sind, zeigt sich, dass gerade im Mobilitätsbereicht wenige Genderindikatoren und im Sinne des Gender Mainstreaming analysierte Daten vorliegen.

Die bundesweiten Verkehrserhebungen wie MiD, SRV und MOP aber auch die auf kommunaler oder Kreisebene durchgeführten Mobilitätserhebungen bieten jedoch bereits eine gute geschlechterdifferenzierte Datengrundlage für ein Gender-Monitoring, die es auch in der Planungspraxis zu nutzen gilt.

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Gesunde Kommune – Chancen für eine nachhaltige Stadtentwicklung durch Sport und Bewegung

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1 ABSTRACT

Städte und Dörfer in Deutschland müssen die sich aus gesamtgesellschaftlichen Entwicklungen ergebenden Probleme, wie Alterung und Schrumpfung der Bevölkerung, sozialer Wandel sowie abnehmende öffentliche Mittel, bewältigen. Dies betrifft auch das sich zunehmend wandelnde Sportverhalten mit einer geänderten Nachfragesituation und wirkt sich auf die Sportorganisation und die Sporträume im kommunalen Wirkungskreis aus. Die sich daraus ergebenden notwendigen Anpassungsstrategien und Maßnahmen stellen die Städte und Dörfer vor neue Herausforderungen.

Sport und Bewegung leisten einen wichtigen gesellschaftlichen Beitrag, der sich vor allem in den Bereichen Gesundheit, Soziales, Ökonomie und Ökologie widerspiegelt. Sport kann damit als integrativer Bestandteil der kommunalen Daseinsvorsorge verstanden werden. Der sich vollziehende Wandel sollte von den Kommunen als Chance begriffen werden, die Sportentwicklung als wesentlichen Faktor der nachhaltigen Ortsentwicklung zu verstehen und aktiv zu gestalten. Aufgrund der hohen Raumwirksamkeit von Sport und Bewegung betrifft dies vor allem auch die Stadtplanung, die diesen Bereich zunehmend in ihre konzeptionellen Ansätze integrieren sollte.

Der Beitrag „Gesunde Kommune – Chancen für eine nachhaltige Stadtentwicklung durch Sport und Bewegung“ analysiert die Zusammenhänge zwischen Raum und Sport sowie die aktuellen Entwicklungstendenzen von Sport und Bewegung und deren räumliche Auswirkungen. Vor dem Hintergrund des strukturellen, gesellschaftlichen und demographischen Wandels werden Konsequenzen für eine nachhaltige Ortsentwicklung abgeleitet und zukünftige neue Lösungsansätze für die Raumentwicklung zur Stabilisierung und Stärkung der Sport- und Bewegungsangebote zur Diskussion gestellt. Als Grundlage dienen die Ergebnisse aus Projektphase 1 des im Jahr 2011 von der Entwicklungsagentur Rheinland-Pfalz e.V. beauftragten und vom Lehrstuhl Stadtplanung in Kooperation mit dem Lehrgebiet Sportwissenschaft der TU Kaiserslautern begonnenen Forschungsprojektes „Gesunde Kommune – Sport und Bewegung als Faktor der Stadt- und Raumentwicklung“. Im Rahmen des Projektes wurde dazu eine Bevölkerungsbefragung in sechs Untersuchungsgemeinden in Rheinland-Pfalz durchgeführt.

2 AUSGANGSSITUATION

Gesellschaftliche Veränderungen (vgl. dazu Abschnitt 5.1 und 5.2) erzeugen wesentliche Auswirkungen auf das Sportverhalten der Bevölkerung, die sich auch maßgeblich auf die Nachfragesituation im Bereich von Sport und Bewegung niederschlagen. Neben der weiteren Ausdifferenzierung der Nachfrage nach „klassischen“ Sportarten (Fußball, Handball, etc.) nehmen informelle, selbstorganisierte Formen (Joggen, Nordic Walking, etc.) von Sport und Bewegung zu.

Dabei haben Sport und Bewegung – neben der sozialen Funktion – im Siedlungsbild als sichtbare bauliche Anlagen hohe Bedeutung. Zu nennen sind nicht nur „klassische“ Sportstätten, sondern zunehmend auch „Ermöglichungsräume“ für Sport und Bewegung, die aufgrund ihrer multifunktionalen Nutzbarkeit zum freien Sporttreiben anregen. Für die Kommunen stellt sich aufgrund den Anforderungen des Wandels und der Tatsache, dass Stadt- und Sportentwicklung in der Vergangenheit häufig getrennt voneinander betrachtet wurden, die Aufgabe, eine integrierte Planung dieser Flächen und Räume zu betreiben, um nachhaltige, nutzungsgemischte Stadt- und Ortsstrukturen zu schaffen.

Da die Chancen von Sport und Bewegung als Beitrag zur Bewältigung des Wandels bislang kaum öffentlich wahrgenommen und diskutiert werden, soll der vorliegende Artikel auch dazu beitragen, für diese Thematik in der (Fach-)Öffentlichkeit zu sensibilisieren.

3 BEDEUTUNG VON SPORT UND BEWEGUNG

Neben gesundheitlichen und sozialen Leistungen haben Sport und Bewegung ökonomische und ökologische Effekte (vgl. Abb. 1). Somit leisten Sport und Bewegung unterschiedliche Beiträge im räumlichen, sozialen und gesundheitlichen Bezug.

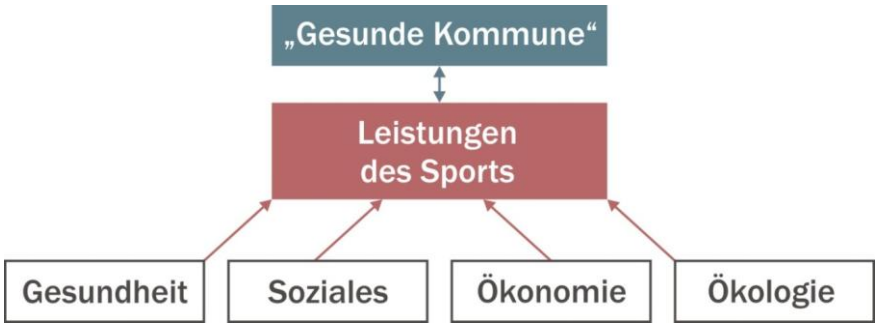

Abb. 1: Leistungen des Sports (eigene Darstellung).

3.1 Gesundheit

Untersuchungen belegen, dass u.a. durch Bewegungsmangel gesundheitliche Beeinträchtigungen, wie Übergewicht, Haltungsschäden und Gefäßkrankheiten, in der Bevölkerung auftreten können. Im Umkehrschluss können Sport und Bewegung zu einem gesunden Lebenstil des Einzelnen sowie der gesamten Gesellschaft beitragen. Besondere Bedeutung erlangen Sport und Bewegung dabei in den Altersgruppen der Älteren sowie der Kinder und Jugendlichen. Aufgrund der Alterung der Bevölkerung kommt dem Sport eine wesentliche Rolle zu, da die Ausübung von Bewegung und körperlichem Training zur (dauerhaften) körperlichen und geistigen Leistungsfähigkeit beiträgt und gleichzeitig den Erhalt einer selbständigen Lebensführung und Gemeinschaft im Alter fördert. [1] Vor dem Hintergrund des medial bestimmten Freizeitverhaltens (Fernsehen, Internet) von Kindern und Jugendlichen und dem daraus resultierenden Mangel an Bewegung gewinnen sportliche Aktivitäten in dieser Altersgruppe ebenfalls zunehmend an Bedeutung und können präventiv dazu beitragen, langfristige körperliche und geistige Entwicklungsprobleme zu verhindern. [2] Neben positiven Auswirkungen auf die körperliche Gesundheit in allen Altersgruppen leisten Sport und Bewegung auch einen erheblichen positiven Beitrag zur psychischen Gesundheit, beispielsweise durch die Minimierung von Angstzuständen und Depressionen sowie eine insgesamt verbesserte Stressregulation und Stimmung.[3]

3.2 Soziales

Sport und Bewegung bewirken verschiedene soziale Effekte, die sich u.a. in der Integrationsfunktion niederschlägt: „Sport eröffnet die Möglichkeit, die soziale Distanz zwischen Personen zu verringern, indem er Gefühle wie Gemeinschaft, Kameradschaft, Zugehörigkeit und Gleichheit von Personen aus unterschiedlichen sozialen Schichten oder verschiedener ethnischer Herkunft vermittelt.“ [4] Somit können sich durch die Ausübung von Sport und Bewegung soziale Kontakte ergeben, die zu einer intensiven Kommunikation, Kontaktpflege und sozialer Anerkennung auch außerhalb des Sports führen und bis in den sozialen Nahbereich ausstrahlen können. „Grundlage für die Kommunikation ist das gemeinsame Tun bzw. das gemeinsame Erleben des Sports.“ [5] Zudem können durch die Teilnahme an sportlichen Betätigungen soziale Spannungen und Aggressionen – gerade auch im Wohnungsnahbereich – abgebaut werden. [6] Das führt auch dazu, dass Sport- und Bewegungsangebote als Mittel in der Drogen- und Kriminalitätsprävention

[1] Vgl. Institut für Landes- und Stadtentwicklungsforschung des Landes Nordrhein-Westfalen (ILS) (Hrsg.) (2001): Bewegung in der Stadt – Bewegung, Spiel und Sport im Wohnungsnahbereich, Dortmund, S. 24.
[2] Vgl. a.a.O., S. 16ff.
[3] Vgl. Wagner, Petra (2006): Effekte des Ausdauersports auf die physische Gesundheit, Vortrag im Rahmen des Sportsmedizinischen/ Sportwissenschaftlichen Seminars in Landau/ Pfalz am 04. November 2006.
[4] Gans, Paul; Horn; Michael; Zemann, Christian (2003): Sportgroßveranstaltungen – ökonomische, ökologische und soziale Wirkungen, Ein Bewertungsverfahren zur Entscheidungsvorbereitung und Erfolgskontrolle, Schriftenreihe des Bundesinstituts für Sportwissenschaft, Band 112, Bonn, Schorndorf, S. 97.
[5] Institut für Landes- und Stadtentwicklungsforschung des Landes Nordrhein-Westfalen (ILS) (Hrsg.) (2001): Bewegung in der Stadt – Bewegung, Spiel und Sport im Wohnungsnahbereich, Dortmund, S. 27.
[6] Vgl. a.a.O., S. 25.

eingesetzt werden. Daneben können die Durchführung von sportlichen Veranstaltungen und die Existenz erfolgreicher Sportvereine in einer Region als identitätsstiftende Merkmale für die lokale und regionale Bevölkerung gelten, die bestehende strukturelle Defizite, wie z.B. eine hohe Arbeitslosenquote, zumindest ansatzweise überstrahlen können. [7] Somit lässt sich festhalten, dass das Motiv, Sport und Bewegung auszuüben, meist nicht nur durch gesundheitliche Aspekte bestimmt wird, sondern, dass „Sport (…) häufig nur Mittel zum Zweck (ist), um Eingang in bestimmte Gemeinschaften zu finden und sich in sozialen Beziehungen zu integrieren." [8]

3.3 Ökonomie

Ökonomische Effekte durch den Sport sind in ihrer vollständigen Bandbreite schwer zu erfassen; genaue Aussagen über monetäre Auswirkungen sind nur begrenzt zu treffen. Es ist aber davon auszugehen, dass Sport und Bewegung direkte wirtschaftliche Effekte auslösen und einen bedeutenden Wirtschaftszweig darstellen. [9] Auf der kommunalen Ebene sind die Durchführung von Sportveranstaltungen [10] mit zahlreichen Folgeeffekten, aber auch der Sporttourismus [11] zu nennen. Aufgrund eines beobachtbaren steigenden Gesundheits- und Körperbewusstseins in der Bevölkerung ist auch weiterhin von dynamisch wachsenden Beschäftigungs- und sonstigen ökonomischen Effekten in diesem Wirtschaftszweig auszugehen. [12]

3.4 Ökologie

Sport und Bewegung haben auch Auswirkungen im Themenbereich Ökologie, allerdings weniger offensichtlich als in den vorher genannten Dimensionen. Zwar können „klassische" Sportstätten und für sportliche Betätigungen genutzte Freiräume einen Beitrag zur Durchmischung und Durchgrünung der Siedlungsstruktur leisten und stellen nicht selten ein wichtiges Gestaltungselement dar, welches auch positive Auswirkungen auf die Siedlungsökologie (Lebensraum für einheimische Tiere und Pflanzen, etc.) haben kann. Andererseits führt der Bau und Betrieb von Sportstätten (Landschaftsverbrauch, Flächenversiegelung) sowie die Nutzung des anlagen- sowie naturgebundenen Raums durch körperliche Aktivitäten immer auch zu einer Beeinträchtigung von Natur und Landschaft, die durch eine zunehmende Mobilität zur Anreise zu den Sportstätten oder -räumen noch verstärkt werden kann. [13] Bei einer maßvollen Ausgestaltung der sport- und bewegungsfreundlichen Aktivitäten ist es jedoch möglich, solche negativen Wirkungen zu minimieren.

4 RAUMWIRKSAMKEIT UND -BEDEUTSAMKEIT VON SPORT UND BEWEGUNG

Im Unterschied zu anderen gesundheitsfördernden Maßnahmen (z.B. gesunde Ernährung, Verzicht auf Genussmittel) sind Sport und Bewegung raumbedeutsame Faktoren der individuellen Gesundheit. Sport und Bewegung werden in bestimmten Räumen ausgeübt – die Auswahl des Raumes erfolgt dabei nach

[7] Vgl. Gans, Paul; Horn; Michael; Zemann, Christian (2003): Sportgroßveranstaltungen – ökonomische, ökologische und soziale Wirkungen, Ein Bewertungsverfahren zur Entscheidungsvorbereitung und Erfolgskontrolle, Schriftenreihe des Bundesinstituts für Sportwissenschaft, Band 112, Bonn, Schorndorf, S. 99.

[8] Institut für Landes- und Stadtentwicklungsforschung des Landes Nordrhein-Westfalen (ILS) (Hrsg.) (2001): Bewegung in der Stadt – Bewegung, Spiel und Sport im Wohnungsnahbereich, Dortmund, S. 27.

[9] Vgl. dazu u.a.: Büch, Martin Peter (1999): Sportökonomische Ansätze zur Erklärung sportlicher Sachverhalte, in: Bundesinstitut für Sportwissenschaften (1999): BISp-Jahrbuch 1999, Bonn; Klages, Andreas (2008): Politikfeld Sport, Die gesellschaftspolitische Bedeutung des gemeinwohlorientierten Sports, in: von Winter, Thomas; Mittendorf, Volker (Hrsg.) (2008): Perspektiven der politischen Soziologie im Wandel von Gesellschaft und Staatlichkeit, Wiesbaden und SportsEconAustria (SpEA) (2006): Sport und Ökonomie in Europa – Ein Tour d`Horizon, Studie im Auftrag des Bundeskanzleramts, Sektion Sport, Wien.

[10] Vgl. dazu u.a.: Gans, Paul; Horn; Michael; Zemann, Christian (2003): Sportgroßveranstaltungen – ökonomische, ökologische und soziale Wirkungen, Ein Bewertungsverfahren zur Entscheidungsvorbereitung und Erfolgskontrolle, Schriftenreihe des Bundesinstituts für Sportwissenschaft, Band 112, Bonn, Schorndorf und Gans, Paul; Horn; Michael; Zemann, Christian (2001): Wirtschaftliche Wirkungen von Sportgroßveranstaltungen, in: Bundesinstitut für Sportwissenschaften (2001): BISp-Jahrbuch 2001, Bonn.

[11] Vgl. dazu u.a.: SportsEconAustria (SpEA) (2006): Sport und Ökonomie in Europa – Ein Tour d`Horizon, Studie im Auftrag des Bundeskanzleramts, Sektion Sport, Wien.

[12] Vgl. a.a.O., S. 18.

[13] Vgl. dazu u.a.: Gans, Paul; Horn; Michael; Zemann, Christian (2003): Sportgroßveranstaltungen – ökonomische, ökologische und soziale Wirkungen, Ein Bewertungsverfahren zur Entscheidungsvorbereitung und Erfolgskontrolle, Schriftenreihe des Bundesinstituts für Sportwissenschaft, Band 112, Bonn, Schorndorf.

verschiedenen Kriterien (beispielsweise nach der Organisation des Sporttreibens – vereinsgebunden oder selbstorganisiert, der ausgeübten Sportart, den persönlichen Interessen der sportlich aktiven Personen sowie der Jahreszeit).

Generell kann dabei zwischen normierten Sportstätten (z.B. Sporthallen, -plätze, Schwimmbäder), die sich i.d.R. in öffentlicher bzw. vereinsbezogener Trägerschaft befinden, Ermöglichungsräumen für Sport und Bewegung (z.B. öffentliche Flächen wie Plätze, Straßen, Parks und Wiesen, aber auch private Räume wie Wohnung, Garten) sowie kommerziell betriebenen Sportstätten (z.B. Fitnessstudios, Yogaschulen) unterschieden werden. Die Ausweisung und Gestaltung von normierten Sportstätten und Ermöglichungsräumen sind durch planerische Maßnahmen steuerbar. Je nach Größe der Kommune, den Finanzierungsmöglichkeiten sowie der Anzahl der sporttreibenden Bevölkerung bestehen jedoch Unterschiede hinsichtlich der Anzahl und Ausstattung der normierten Sportstätten. Um eine gute Erreichbarkeit der Sportstätten für alle Bevölkerungsteile zu ermöglichen, sollten sich die Sportstätten im Idealfall dezentral an gut zugänglichen Standorten im Siedlungskörper einer Kommune befinden. Dennoch ist bei größeren Distanzen oftmals der Rückgriff auf den motorisierten Individualverkehr bzw. den öffentlichen Personennahverkehr notwendig. Durch ihre Lage im direkten Wohnumfeld bieten Ermöglichungsräume eine schnelle, (barrierefreie) Erreichbarkeit zu Fuß oder per Fahrrad, was gerade für mobilitätseingeschränktere Bevölkerungsteile (Kinder und Jugendliche, Ältere) für die Ausübung von Sport und Bewegung maßgeblich ist. Somit tragen ein vielseitig nutzbares Wohnumfeld aus Grün- und Freiflächen, das zur freien Ausübung von Sport und Bewegung anregt, sowie das Vorhandensein normierter Sportstätten im räumlichen Bezug auch entscheidend zur Attraktivität eines Wohnstandortes sowie der Vermeidung der Nutzung des motorisierten Freizeitindividualverkehrs durch die Bevölkerung bei.

5 SPORT UND BEWEGUNG IM WANDEL

5.1 Auswirkungen des demographischen Wandels auf Sport und Bewegung

Die sich zukünftig verstärkende Alterung und Schrumpfung der Bevölkerung in Deutschland und in den einzelnen Bundesländern stellen neue Herausforderungen für das Sport- und Bewegungsangebot dar. So ist einerseits damit zu rechnen, dass sich mittel- bis langfristig die Anzahl (vereinsgebundener) Sporttreibender verringert und andererseits eine alternde Gesellschaft zu einer Verschiebung der Nachfrage nach bestimmten Sport- und Bewegungsangeboten führen kann.

Für das im Südwesten Deutschlands gelegene und in weiten Teilen ländlich, d.h. durch eine geringe Bevölkerungs- und Siedlungsdichte, geprägte Bundesland Rheinland-Pfalz, wird laut Bevölkerungsvorausberechnung [14] des Statistischen Landesamtes nach der „mittleren Variante“ für den Zeitraum von 2006 bis 2020 ein Rückgang der Bevölkerung um ca. 128.000 Personen (-3,2 %) auf rund 3,9 Mio. Einwohner sowie bis zum Jahr 2050 ein Rückgang der Bevölkerung um ca. 603.000 Personen (-14,9 %) auf rund 3,45 Mio. Einwohner vorausberechnet. Bis 2020 wird nach Erhebungen des Statistischen Landesamtes gleichzeitig mit einem erheblichen Rückgang der Anzahl der Sportvereinsmitglieder zu rechnen sein (Rückgang von rund 20.000 Mitglieder im Organisationsbereich des Sportbundes Pfalz). Bis 2050 wird sich diese Entwicklung allein in der Region Rheinpfalz (Rückgang um ca. 42.800 Mitglieder) und in der Region Westpfalz (Rückgang um ca. 48.300 Mitglieder) im Vergleich zu den Mitgliedszahlen im Jahr 2006 (beide Regionen: 537.837 Mitglieder) massiv verstärken. [15] Untersuchungen belegen, dass schon jetzt rund 45 % der Vereine in Deutschland vom demographischen Wandel betroffen sind (Rheinland-Pfalz: 40,2 %). 1,7 % aller deutschen Sportvereine sind demnach durch die demographische Entwicklung in ihrer Existenz bedroht, in Rheinland-Pfalz betrifft dies 0,8 % der Sportvereine. [16]

[14] Eigene Berechnungen auf Grundlage von: Statistisches Landesamt Rheinland-Pfalz (2007): Rheinland-Pfalz 2050, zweite regionalisierte Bevölkerungsvorausberechnung (Basisjahr 2006), statistische Analysen Nr. 7, 2007, Bad Ems, S. 134.

[15] Vgl. Statistisches Landesamt Rheinland-Pfalz (Hrsg.) (2006): Bevölkerungsentwicklung in der Vorder- und der Westpfalz, Vortrag von Dr. Ludwig Böckmann anlässlich der Vortragsreihe „Zukunftsbausteine“ des Sportbundes Pfalz am 18. September 2008 in Kaiserslautern.

[16] Vgl. Breuer, Christoph et al (2006): Sportentwicklungsbericht 2005/ 2006 – Analyse zur Situation des Sports in Deutschland, Sportvereine und demographischer Wandel, Köln, S. 6 und 12.

Neben der quantitativen Nachfrage nach Sport- und Bewegungsangeboten wird sich aufgrund des demographischen Wandels zukünftig verstärkt die qualitative Nachfrage verschieben, da nicht nur der prozentuale, sondern auch der absolute Anteil der Senioren in den Sportvereinen erkennbar ansteigen wird. So ist beispielsweise schon für den Zeitraum 1986 bis 2006 im Organisationsbereich des Sportbundes Pfalz ein erheblicher Anstieg des Anteils der Senioren (ab 61 Jahren) als organisierte Sportvereinsmitglieder feststellbar (1986: über 25.500, 1996: über 50.000, 2006: knapp 84.000). [17]

Der demographische Wandel hat somit aktuell und zukünftig tiefgreifende Veränderungen in der Sportlandschaft zur Folge, auf welche zunächst die Sportvereine durch Anpassung der Sportangebotsstruktur, damit einhergehend auch die Gemeinden in Bezug auf das räumliche Angebot reagieren müssen.

5.2 Auswirkungen der Individualisierung und Pluralisierung der Gesellschaft auf Sport und Bewegung

Die Individualisierung der Gesellschaft (Selbstbestimmung und Emanzipation) sowie die Pluralisierung der Lebensstile (Ausdifferenzierung und Vervielfältigung der Lebensformen) führen im Bereich von Sport und Bewegung zu einer stark veränderten Nachfragesituation. Damit einher gehen gesunkene Arbeitszeiten, ein höher Anspruch in der Freizeitgestaltung bei gleichzeitiger Flexibilität und erhöhter Mobilität des Einzelnen. Dadurch ist eine stärkere Differenzierung der Nachfrage nach bestimmten Sportangeboten zu beobachten; individuelle Angebote gewinnen an Bedeutung. Sichtbar wird dies u.a. in der seit einigen Jahrzehnten feststellbaren Ausdifferenzierung der Sportlandschaft. Während in den 1960er Jahren nur etwa 30 verschiedene Sportarten gezählt wurden, waren es Anfang des 21. Jahrhunderts bereits rund 240. [18] Gleichzeitig steigt die Anzahl der Sportvereine in Deutschland und Rheinland-Pfalz langsam an: Während 1990 5.688 Sportvereine in Rheinland-Pfalz existierten, stieg diese Zahl bis zum Jahr 2008 auf 6.298 Vereine an. [19] Zudem differenziert sich das Angebot an verschiedenen Trend- und Nischensportarten immer stärker aus.

Die Organisationen des Sports, hauptsächlich die Sportbünde und -vereine, stehen somit, ähnlich wie bei den Anpassungen im demographischen Wandel, vor der Herausforderung, ein entsprechendes Sportangebot zu schaffen und dies an die aktuellen und zukünftigen Bedürfnisse anzupassen. Ebenso wichtig ist es aber in diesem Zusammenhang, entsprechende und dauerhaft finanzierbare Infrastrukturen sowie an sich veränderndende Bedürfnisse angepasste Sportstätten in die querschnittsorientierte Stadt- und Ortsplanung einzubeziehen.

5.3 Auswirkungen der Finanzkrise der öffentlichen Haushalte auf Sport und Bewegung

Die angespannte Haushaltslage vieler Kommunen und öffentlicher Träger als hauptsächlicher Betreiber von Sportanlagen hat erhebliche Auswirkungen auf die Situation von Sport und Bewegung. So ist absehbar, dass Investitionen in Planung, Bau und Betrieb (inkl. Sanierung) von Sportstätten zurückgehen werden. Auch der organisierte Sport selbst, insbesondere die Sportvereine, werden Kürzungen der Fördermittel hinnehmen müssen. Dadurch wird es den Vereinen zunehmend erschwert, ihre organisatorische und bauliche Infrastruktur dauerhaft aufrechtzuerhalten. Ebenso werden sich Kommunen und Sportvereine durch die zunehmende Konkurrenz von privatwirtschaftlichen Anbietern im Bereich von Sport und Bewegung auf neue Organisations-, Entwicklungs- und Betreibermodelle einstellen müssen.

6 STATUS QUO AUF KOMMUNALER EBENE

6.1 Forschungsprojekt „Gesunde Kommune – Sport und Bewegung als Faktor der Stadt- und Raumentwicklung“

Das Forschungsprojekt „Gesunde Kommune“, das im Jahr 2011 vom Lehrstuhl Stadtplanung, Prof. Dr.-Ing. Gerhard Steinebach, in Kooperation mit dem Lehrgebiet Sportwissenschaft, Prof. Dr. Arne Güllich, der TU

[17] Vgl. Kaufmann, Asmus (2006): Mehr Vereine, weniger Mitglieder, in: pfalzsport, Zeitschrift des Sportbundes Pfalz, Ausgabe 07/ 2006, S. 5.
[18] Vgl. Institut für Landes- und Stadtentwicklungsforschung des Landes Nordrhein-Westfalen (ILS) (Hrsg.) (2001): Bewegung in der Stadt – Bewegung, Spiel und Sport im Wohnungsnahbereich, Dortmund, S. 30.
[19] Vgl. Statistisches Landesamt Rheinland-Pfalz (Hrsg.) (2009): Statistisches Jahrbuch 2009, Bad Ems, S. 113.

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Kaiserslautern im Auftrag der Entwicklungsagentur Rheinland-Pfalz e.V. begonnen wurde, hat aktuelle Fragen von Sport und Bewegung in Rheinland-Pfalz, deren Bedeutung für „gesunde Kommunen“ [20] sowie die Konsequenzen für die Stadt- und Ortsplanung behandelt. Ausgangspunkt der Überlegungen für das Projekt war die These, dass Sport und Bewegung gezielt für die Raumentwicklung genutzt werden sollten, um zur Bewältigung des strukturellen, gesellschaftlichen und demographischen Wandels neuartige Konzepte und Lösungsansätze entwickeln zu können.

Auf der Grundlage der erhobenen Ausgangssituation wurden die aktuelle Situation und Veränderungen sowohl in demographischer und räumlich-struktureller Hinsicht als auch von Sport und Bewegung in unterschiedlich großen und strukturierten Untersuchungsgemeinden [21] in Rheinland-Pfalz erfasst und analysiert. Mithilfe einer empirischen Grundlagenerhebung (Bevölkerungsbefragung, Expertengespräche mit kommunalen Vertretern) zu verschiedenen Themenkomplexen (Sportverhalten und -organisation, Mobilität, baulich-räumliche Situation/ Ökologie und Soziales), welche sowohl die aktuellen als auch in Teilen die retrospektiven Sport- und Bewegungsaktivitäten der Bevölkerung abbildete, konnte eine Analyse der qualitativen und quantitativen Sportnachfrage in den Untersuchungsräumen durchgeführt werden. Nachfolgend werden dazu ausgesuchte Befragungsergebnisse aus Projektphase 1 vorgestellt.

6.2 Ergebnisse des Forschungsprojektes

Für das Projekt wurden insgesamt 7.000 Fragebogen in den Untersuchungsgemeinden verteilt, davon wurden 578 beantwortet. Die Rücklaufquote beläuft sich demnach auf rund 8,3 %. Aufgelistet nach der Gemeindegröße stellen sich die Rücklaufquoten folgendermaßen dar: kleinere Kommunen (Ortsgemeinde Steinbach/ Donnersberg, Ortsgemeinde Höheinöd, Landkreis Cochem-Zell [22]) 10,2 %, mittlere Kommunen (Stadt Landstuhl, Stadt Cochem) 4,9 % und große Kommunen (Stadt Kaiserslautern) 9,2 %.

Zur Ermittlung des Grades der sportlichen Aktivität der Bevölkerung in den Untersuchungsgemeinden wurde die Frage gestellt, ob innerhalb der vergangenen zwölf Monaten aktiv Sport und Bewgeung getrieben wurde. Hierbei gaben 73 % an, im Laufe des vergangenen Jahres Sport ausgeübt zu haben. Bei Betrachung des Ergebnisses differenziert nach den jeweiligen Größenkategorien der Untersuchungsgemeinden, ergeben sich nur geringe Abweichungen: So beträgt der Anteil an sportlich Aktiven in den großen und kleinen Kommunen 72 %, während diese Quote in den mittleren Kommunen über dem Durchschnitt bei 79 % liegt.

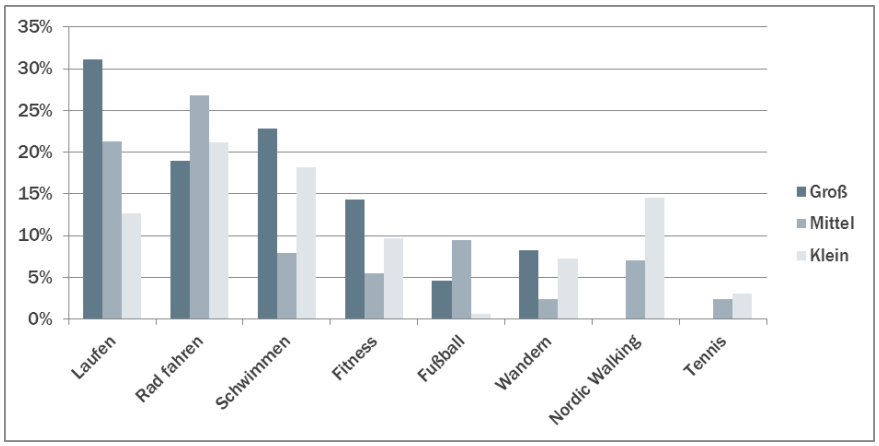

Abb. 2: Ausgeübte Sportarten im Sommer unterschieden nach großen, mittleren und kleinen Kommunen (eigene Darstellung).

[20] Im Rahmen des FuE-Projektes verdeutlichte dabei der Begriff „gesunde Kommune“ die Bedeutung von Sport und Bewegung im Raum und umfasst das weitreichende Verständnis der Leistungen von Sport und Bewegung in den Bereichen Gesundheit, Soziales, Ökonomie und Ökologie (vgl. dazu auch Abschnitt 3).

[21] Folgende Untersuchungsgemeinden wurden im Rahmen des Projektes betrachtet:

- Stadt Kaiserslautern (99.275 Einwohner, Stand: 31. Dezember 2010),
- Stadt Landstuhl (8.599 Einwohner, Stand: 31. Dezember 2010),
- Stadt Cochem (4.940 Eiwnohner, Stand: 31. Dezember 2010),
- Landkreis Cochem-Zell (63.884 Einwohner, Stand: 31. Dezember 2010),
- Ortsgemeinde Steinbach/ Donnersberg (786 Eiwnohner, Stand: 31. Dezember 2010) und
- Ortsgemeinde Höheinöd (1.205 Einwohner, Stand: 31. Dezember 2010).

[22] Da sich der Landkreis Cochem-Zell aus einer Vielzahl kleinerer Kommunen zusammensetzt, wird diese Gebietseinheit den kleinen Kommunen zugeordnet.

Neben Laufen (32 %) und Radfahren (22 %) zählt Schwimmen (16 %) zu den am häufigsten ausgeübten Sportarten im Sommer, wobei deutliche Unterschiede zwischen den Gemeindegrößen zu beobachten sind: Während Laufen und Schwimmen bei den Bewohnern der großen Kommunen einen hohen Stellenwert einnehmen, ist das Interesse an der Sportart Laufen in den kleinen Gemeinden geringer (13 %). Im Gegensatz dazu ist die Ausübung von Nordic Walking in den kleinen Kommunen am größten (15 %) (vgl. Abb. 2). Im Winter bevorzugen die Befragten Sportarten wie Fitness (23 %), Laufen (22 %) und Nordic Walking (12 %). Laufen ist somit sowohl im Sommer als auch im Winter eine beliebte Sportart. Auch kann festgestellt werden, dass im Sommer hauptsächlich Outdoor-Sportarten ausgeübt werden, währenddessen m Winter dem Indoor-Fitnesstraining mit 23 % der Nennungen eine wichtige Rolle zukommt.

Gefragt nach der Motivation zur Ausübung von Sport und Bewegung werden gesundheitliche Gründe genannt (25 %), das Erleben von Spaß und Freude (24 %) sowie das Bedürfnis nach Naturerlebnis (16 %). Auch das Pflegen von sozialen Kontakten und Ablenkung vom Alltag werden häufig von den Befragten angegeben. Der Leistungs- /Wettkampfgedanke steht hingegen nur bei 6 % der Befragten im Vordergrund. Die herausragende Bedeutung des Sporttreibens für das gesellschaftliche Zusammenleben in den Kommunen wird bei der Herausbildung von Freundschaften durch gemeinsames Sporttreiben deutlich: Über alle Altersgruppen hinweg zeigt sich, dass durch die Ausübung von Sport und Bewegung Freundschaften entstehen können (vgl. Abb. 3).

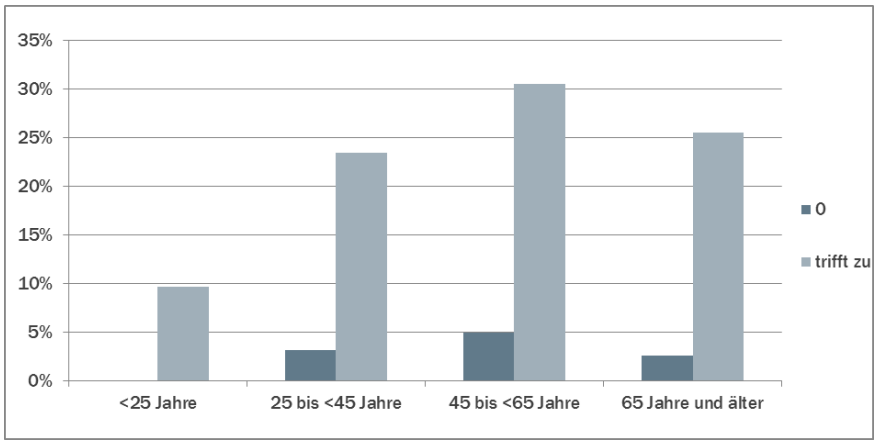

Abb. 3: Ergaben sich aus den von Ihnen betriebenen Sport- und sonstigen Freizeitaktivitäten Auswirkungen auf Ihr alltägliches Sozialleben im Sinne von Freundschaften? (eigene Darstellung)

Insgesamt 53 % der Befragten gaben bei der Frage nach der Organisationsform des Sports an, dass sie Sport entweder ausschließlich oder teilweise vereinsgebunden ausüben (17 % lediglich Ausübung von Sport im Verein, 36 % Ausübung von Sport im Verein sowie selbstorganisiert). Demgegenüber steht ein Anteil von 47 %, der nur selbstorganisierten Sport betreibt. Bei Betrachtung der einzelnen Größenkategorien der Untersuchungsgemeinden ergeben sich einige Unterschiede: Während mehr als die Hälfte der Befragten aus den großen Kommunen den Sport ausschließlich selbst organisieren, tun dies nur rund 42 % der sportlich Aktiven in den mittleren Kommunen. Letztere sind hingegen anteilig häufiger sowohl im Verein als auch selbst organisiert aktiv. Die Befragten in den Großstädten treiben im Vergleich am seltensten ausschließlich im Verein Sport. Zudem fällt auf, dass die aktuell nicht mehr aktiven Sportler früher deutlich häufiger in Vereinen Sport getrieben haben, als das bei den aktiven Sportlern der Fall ist. Damit ist eine höhere Bedeutung des Vereinssports in der Vergangenheit feststellbar und unterstreicht den zunehmenden Trend zur Individualisierung des Sporttreibens. Zusätzlich wurde die Frage nach passiver Mitgliedschaft in Sportvereinen gestellt. Dabei ist die Mehrheit der Mitglieder in einem Sportverein über alle Gemeindegrößen hinweg auch in diesem sportlich aktiv (77 %). Während rund 32 % der Befragten in kleinen Kommunen Mitglieder eines Sportvereins sind ohne selbst in diesem sportlich aktiv zu sein, sind dies in größeren Gemeinden nur ca. 16 %. Somit kann auf eine größere Bedeutung und Verbundenheit mit den Sportvereinen in kleinen Kommunen geschlossen werden.

Differenziert nach Sommer und Winter werden von den Befragten eine Vielzahl unterschiedlicher Sportstätten und -anlagen als Orte des Sporttreibens angegeben. Im Sommer werden hauptsächlich „andere Sportstätten“ (33 %) und von den „klassischen“ Sportstätten v.a. Sporthallen (19 %), Freibäder (14 %) sowie Sportplätze (10 %) genutzt. Insbesondere die Befragten der großen Gemeinden nutzen individuelle Orte zur

Sportausübung (40 %). Im Winter sind die Befragten sogar noch differenzierter hinsichtlich der Wahl der Sportstätte (44 % „andere Sportstätten“). Danach folgen die witterungsunabhängige Sporthalle und das Hallenbad mit jeweils 17 % sowie der Sportplatz mit 6 %. Auch im Winter nutzen hauptsächlich die Bewohner der großen Kommunen individuelle Sportstätten (rund 55 % „andere Sportstätten“).

Befragt nach der Lage des Orts der Sportausübung zum Wohnort geben 42 % der Befragten an, dass sie ihre am häufigsten ausgeübte Sportart im Sommer in ihrem unmittelbaren Wohnumfeld ausüben, während 20 % den Wohnort verlassen. Im Winter sind die Befragten hinsichtlich der Sportausübung weniger mobil als im Sommer: Knapp die Hälfte (46 %) treibt den ausgeübten Sport am Wohnort. Obwohl ein Großteil der Befragten ihren Sport am Wohnort ausüben, stellt der Pkw im Sommer das wichtigste Verkehrsmittel dar, um die jeweilige Sportstätte bzw. den Ermöglichungsraum für Sport und Bewegung zu erreichen. Gerade die Bewohner der mittelgroßen Gemeinden nutzen den Pkw zu diesem Zweck. Am zweithäufigsten gehen die Befragten zu Fuß zum Sport, am dritthäufigsten wird das Fahrrad genutzt (vgl. Abb. 4). Eine noch häufigere Nutzung des Pkws zum Erreichen der Sportstätte ist im Winter feststellbar, während witterungsbedingt das zu Fuß gehen sowie das Fahrradfahren an Bedeutung verlieren.

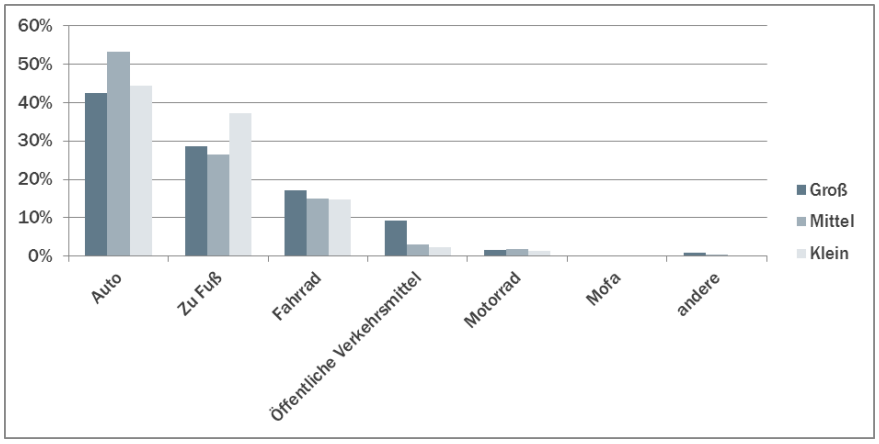

Abb. 4: Mit welchen Verkehrsmitteln erreichen Sie den Ort Ihrer sportlichen Aktivitäten in der Regel im Sommer? (eigene Darstellung)

Bezogen auf die Zufriedenheit mit dem Sportangebot der ortsansässigen Sportvereine äußerte sich die überwiegende Mehrheit der Befragten positiv (zufrieden: 55 %, sehr zufrieden 8 %). Nur 10 % gaben an, (sehr) unzufrieden zu sein. Insbesondere die Befragten aus den großen Kommunen sind zufrieden mit dem Sportangebot der ansässigen Sportvereine – hierbei kann vermutet werden, dass dies auf die größere Angebotsvielfalt in den großen Gemeinden zurückzuführen ist. Auch ist der Großteil der Befragten mit der Häufigkeit und der Spannbreite der Sportangebote überwiegend zufrieden. Lediglich bei den altersgruppenspezifischen Sportmöglichkeiten sehen insbesondere die Befragten in den mittleren und kleinen Kommunen Verbesserungsmöglichkeiten. Die Anzahl der Sportmöglichkeiten (Sporthallen, Sportplätze, Parkanlagen, etc.) im eigenen Ort wird von den Befragten in den einzelnen Gemeinden mehrheitlich (sehr) positiv eingeschätzt. Auch mit der Ausstattung der Sportmöglichkeiten im Wohnort sind die Befragten zufrieden, lediglich weniger als 15 % sehen Verbesserungsbedarf.

7 AUSBLICK UND ANPASSUNGSSTRATEGIEN

7.1 Zukünftige Rolle von Sport und Bewegung in der Stadt- und Raumentwicklung

Sport und Bewegung kommen bei der Schaffung nachhaltiger, nutzungsgemischter Stadt- und Ortsstrukturen eine hohe Bedeutung zu. Die Änderung der quantitativen und qualitativen Nachfrage nach organisierten und informellen Sport- und Bewegungsangeboten hat erhebliche räumliche Auswirkungen auf regionaler und kommunaler Ebene. Um ein der Nachfrage angepasstes Angebot für die Bevölkerung sichern zu können, bedarf es planerischer Konzepte und politischer Entscheidungen. Da Sport und Bewegung sehr unterschiedliche Bevölkerungsgruppen und sehr viele Menschen erreichen, kann damit ein wichtiger Beitrag zur kommunalen Entwicklung geleistet werden. Vom zukünftigen Handeln der Gemeinden und der sonstigen Planungsträger wird es abhängen, den Sport in die querschnittsorientierte räumliche Gesamtplanung zu integrieren und damit auch zur Bewältigung eigener Aufgaben zu qualifizieren.

7.2 Anpassungsstrategien und Handlungsempfehlungen

Aus den Ergebnissen der empirischen Grundlagenerhebung des Projektes „Gesunde Kommune“ wurden Strategieansätze und Handlungsempfehlungen zur bedarfsgerechten Anpassung der Sportinfrastrukturen an die sich ändernden Rahmenbedingungen sowie zur Schaffung von Ermöglichungsräumen für Sport und Bewegung auf verschiedenen Ebenen (Land, Region, Kommune) formuliert.

Ein wesentliches Aufgabenfeld bildet die Qualifizierung öffentlicher Räume zu multifunktional nutzbaren Standorten sowohl für informelle als auch vereinsgebundene Sport- und Bewegungsmöglichkeiten. Neben der Anpassung bestehender öffentlicher Räume ist die Um- und Neunutzung von Baulücken, Brachflächen oder Leerständen erforderlich. Um im Sinne „gesunder Kommunen“ Städte und Gemeinden baulich-räumlich weiterzuentwickeln, ist weiterhin eine funktionale Verknüpfung der „klassischen“ Sportstätten und -räume untereinander sowie mit unterschiedlichen Ermöglichungsräumen für Sport und Bewegung zu empfehlen. Die Schaffung dezentraler, wohnungsnaher Sport- und Bewegungsangebote durch Bestandsentwicklung und Nachverdichtung kann auch dazu beitragen, neue Grün-, Freiraum- und Erholungsangebote im unmittelbaren Wohnumfeld der Bevölkerung zu schaffen und stellt einen wichtigen Baustein auf dem Weg zu nachhaltigen Stadt- und Dorfstrukturen sowie zur Bewältigung der Herausforderungen des Stadtumbaus dar.

Wegen der sich ändernden Nachfrage nach Sport- und Bewegungsangeboten sowie der sich wandelnden Motive für das Sporttreiben sollten die normierten Sportstätten angepasst und bestehende Normen novelliert werden. Dabei sollten die Sportstätten weniger auf ihre Tauglichkeit für Wettkämpfe und den Leistungssport bewertet als vielmehr zur Eignung für die Sportausübung nach den Zielen der Gesundheitsvorsorge und der Freude an Sport und Bewegung verändert werden. Im Sinne demographie- und sozialgerechter Planung sollten gleichzeitig Strategien zur Mehrfachnutzung von Sportstätten durch möglichst breite Nutzergruppen sowie zur Vernetzung mit sonstigen Einrichtungen der sozialen Infrastruktur konzipiert werden.

Bei einer Neugestaltung der Sportstätten sollten auch die Möglichkeiten der Informations- und Kommunikationstechnologien verstärkt einfließen, um beispielsweise durch ein Monitoringsystem die tatsächlichen sportbezogenen Defizite und die Wirkungen im Raum zu erfassen.

Im Weiteren wird empfohlen, den Begriff „gesunde Kommune“ zu einem Markenzeichen weiterzuentwickeln und mit einem integrierten Entwicklungskonzept zu verbinden. Dazu gehören auch neue Formen der Kooperation mit denen Akteure aus den Bereichen Sport, Stadtplanung, Soziales und Umwelt – auch über die Kommunalgrenzen hinweg – dezentrale Strukturen stärken und institutionalisieren können.

Die im Projektjahr 2011 erarbeiteten Anpassungsstrategien und Handlungsempfehlungen für die Sportstättenplanung und die räumliche Planung sollen nun in einer weiteren Projektphase im Jahr 2012 in der rheinland-pfälzischen Praxis erprobt, auf ihre Wirksamkeit hin eruiert und ggf. angepasst werden.

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GIS for Urban Environmental Management Plan: Making it through the Crisis

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1 ABSTRACT

Ever increasing population on urban areas is the biggest concern in developing countries. With the increase in population and related activities, the demand for supportive services viz. transportation, water supply, drainage/sewerage, garbage collection and disposal etc. that are essential is far exceeding the supply of these services. Each developmental activity includes a land use and these land uses are likely to have impact on the environment. The environmentally relevant land uses are trade and industry, housing construction, transport facilities, utilities, refuse/hazardous waste and wastewater installations, quarrying/mining, power generation, recreation and tourism etc. While taking up developmental activities, the assimilative capacities of the environment to air or water or land pollution are rarely considered. Also, due to lack of proper land use controls, the developmental activities tend to be haphazard and uncontrolled thus leading to over use, congestion, poor land use compatibility etc. The environmental pollution problems in urban areas are becoming complex and are creating high risk environment. The solutions of pollution control in individual sectors viz. transport, industry etc. are not entirely solving the problems.

Conventionally, the environmental pollution problems are solved by introducing environmental management techniques such as control of pollution at source. Like the various causes of air pollution are particulate matter (e.g settling chambers, inertial separators, wet scrubbers spray scrubbers, fabric filters and electrostatic precipitators etc), gaseous emissions , fugitive emissions, odour and noise. These measures are proving to be inadequate because of the complexity associated with the urban dynamics. In large urban agglomerations, the problems cannot merely be solved by pollution control measures only.The consequences of neglecting environmental factors in planning are severe. They are felt as deterioration of the natural systems and likewise the socio-economic living conditions. The environmental problems of concern and increased environmental risks.

There is a need for safer, healthier and sustainable cities. The cause of the pollution problems is to be identified and solutions provided for short-term mitigation measures and long-term prevention measures. For this to be possible is for better understanding of the problems, collective efforts and improved approaches/techniques in planning practice. This may be done through environmental planning by preparing environmental management plans by using modern techniques. This includes mapping the characteristics and environmental profile of an urban area and to identify the environmental pollution hot spots; preparing an environmental management plan that includes rehabilitation and mitigation measures; and recommend guidelines for environmentally compatible land use planning.

Geographic Information System (GIS) is a technique which makes series of maps with one outcome. The comprehensive environmental management plan requires a series of maps to understand the area and to identify the trends to make way out the solution. GIS technique helps to prepare from reference map or base map to other theme maps which charecterise the urban area including land use, drainage, topography etc in one hand and specific environmental quality assessment like air pollution potential at source (domestic, industrial, traffic) in different grids (of 1 km X 1 km), water pollution potential, land pollution potential, garbage/solid waste/hazardous waste pollution potential area in other hand. This mapping technique is able to produce all the environmental hot spots due to air pollution, water pollution, solid waste disposal, land use incompatibility etc. and the sources for the same identified. Urban environmental magement plan includes mitigation measures and abatement infrastructure and land use controls of an urban premise. The areas of incompatible land uses could be easily identified through overlay analysis in GIS and accordingly planned for shifting either of the source or the receiver to make resilient city. The paper desribes the process how GIS can be used for pollution abatement and environmental management measure for making Sustainable City.

2 INTRODUCTION

Three fold increase of population in urban centres in India makes uncontrollable demand for basic needs. The demand for supportive services i.e water, electricity, solid waste disposal, drainage/sewerage line is

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accelarating day by day which is beyond the capacity of area services. This demand is not confined not only in one pklace but through spillover population forms new area as urban sprwal. This development activity has certain positive as well as negative environmental impact on landuse. The environmentally relevant land uses are mainly trade and industry, housing construction, transport facilities, utilities, refuse/hazardous waste and wastewater installations, quarrying/mining, power generation, recreation and tourism etc. While taking up developmental activities, the assimilative capacities of the base environment i.e. air or water or land pollution are rarely considered. Due to malpractice land use zonation and controls all the developmental activities tend to be haphazard and uncontrolled thus leading to congestion or over use or poor land use compatibility. The environmental pollution problems in urban areas are becoming complex and are creating high risk environment. Pollution abatement control for individual sectors for as an example Transportation or industry etc. are not entirely solving the problems.

According to 2011 census of India the total population of India is 1,210,193,422. The annual growth of population is 1.8%. The total urban population of India is 377,105,760 which is about 31.16% of the total population of India. The urban population of India has the annual growth rate of about 3.21%. As per 2011 India has 7935 town. The no of town grow over 2800 for last 10 years. The urbanization in India mainly is due rural to urban migration of population. The fast growth of urban population impose pressure on urban infrastructure, land, natural resource. The Indian cities are getting suffocated every day due to influx of population.

Sustainable city is the dream of every planner. The concept of sustainable city is thoroughly interconnected with environmental protection and economic development. The sustainable city can be defined as one which is able to support the basic need of the people along with the necessary infrastructure of civic amenities, health and medical care, housing, education, transportation, employment, good governance etc. The fundamental Characteristics of a sustainable city are as follows:

- Adequate governance set up which can meet the need of the population and ensure civic responsibilities, community participation, a sense of identity, transparency and equity in local institution.
- Planned housing system with sufficient infrastructural facility like local market school, medical facility, facility towards waste disposal etc.
- An appropriate transport system acts as the nervous system for any habitation it has also effect on the environment.
- Environmental consideration in the planning and effective environmental infrastructure for environmental monitoring and pollution control.

The success of sustainable city is entirely dependent upon monitoring and management of various aspects of urban and city life practically which is impossible without dynamic information system.

3 NEED OF THE STUDY

There is a need for safer, healthier and sustainable cities. The cause of pollution is to be identified and solutions provided for short term mitigation measures and long term prevention. For this can be possible through better understanding of the problems, collective efforts and improved approaches/techniques in planning practice. This may be done through environmental planning practice by preparing environmental management plans by using modern techniques. This includes mapping the characteristics, environmental profile of an urban area and identification of the environmental pollution hot spots; preparing a environmental management plan that includes rehabilitation and mitigation and recommend guidelines for environmentally compatible landuse planning.

Geographic Information System (GIS) is a technique which prepares series of maps with one result. The comprehensive environmental management plan requires a series of maps to understand the area characteristics, to identify the problems and to make way out the solution. GIS technique helps to prepare from reference map or base map to other thematic maps which charecterise the urban area including land use, drainage, topography etc in one hand and specific environmental quality assessment like air pollution potential at source (domestic, industrial, traffic) in different grids (of 1 km X 1 km), water pollution potential, land pollution potential, garbage/solid waste/hazardous waste pollution potential area in other

hand. It means this technique is eligible to prepare point data to areal data in one format. This mapping technique is able to produce all the environmental hot spots due to air pollution, water pollution, solid waste disposal, land use incompatibility etc. and the sources for the same identified. This techniques can analyse the impact of point data to areal impact. Urban environmental magement plan refers mitigation measures and abatement infrastructure and land use controls of an urban premise. The areas of incompatible land uses could be easily recognised through overlay analysis and accordingly planned for shifting either of the source or the receiver to make resilient city. The paper emphasises the process how GIS can be used for pollution abatement and environmental mangement measure for making Sustainable City.

4 AIM OF THE STUDY

The aim of the study is to develop a urban management information system that can act as one of the important input of information to the decision making authority and town planner with the help of which they would be able to regulate the utilization of natural resources, development and expansion of the city, development of infrastructure facility, monitoring of environmental quality and pollution control.

5 OBJECTIVE

- To understand the characteristics of the information input required for urban environmental planning and management.
- To develop a overall architecture for urban information management system
- To develop a module based information system.

6 URBAN ENVIRONMENTAL MANAGEMENT INFORMATION SYSTEM

In the 21st century Indian cities are growing at a very fast rate in terms of its population size and geographical area. The main area of concern for any town planner is that the basic nature of distribution of development in India is regional imbalance. The primacy of the metropolitan towns are acting as magnetic force for pulling the population and it is the major cause for the rural to urban and urban to urban migration of population. There is always a gap between urban resource, infrastructure supply and demand for the same. Under this circumstances society demands for the development and management of a urban planning and management mechanism based on latest updated spatial information fully and reasonably, will have the capability to provide information system for urban planning management, decision making urban planning administration, development of new developmental and pollution monitoring and control mechanism. The uniqueness of GIS technology lies in its basic capability like data capturing, presentation, categorization, data synthesis, simulation of spatial data, easy updation of data spatial analysis.

Basically GIS is a tool towards automation of regional and urban planning department, up to date development and management mechanism and dynamic scientific policy making system. The basic system architecture towards urban management information system is given in fig – 1

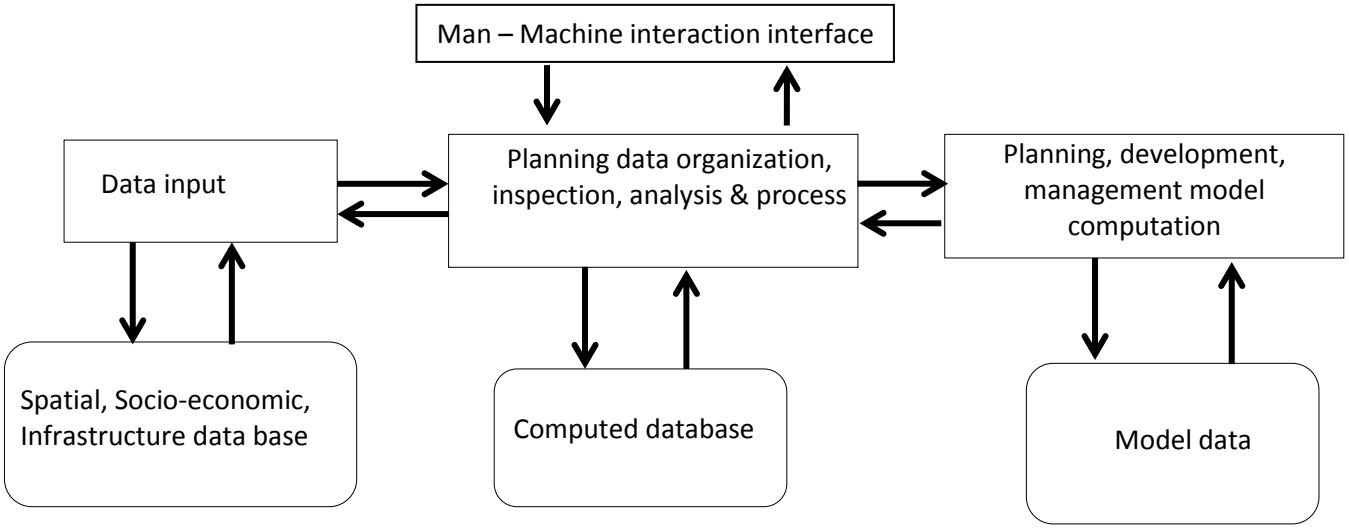

Fig 1: Basic system architecture towards urban environmental management information system

7 DATA MODULES FOR URBAN ENVIRONMENTAL MANAGEMENT INFORMATION SYSTEM

The data and information for urban planning and management information system is basically very complex, multi-disciplinary, and dynamic by nature. The layers of information are spatially and temporally braided. It has spatial data of various natural resources, attribute data to the spatial information, socio economic information, infrastructural information, government policy and planning initiatives. The scale of representing the attribute data should be different at different level . The figure 2 represent interrelationship of various data modules for urban information management system.

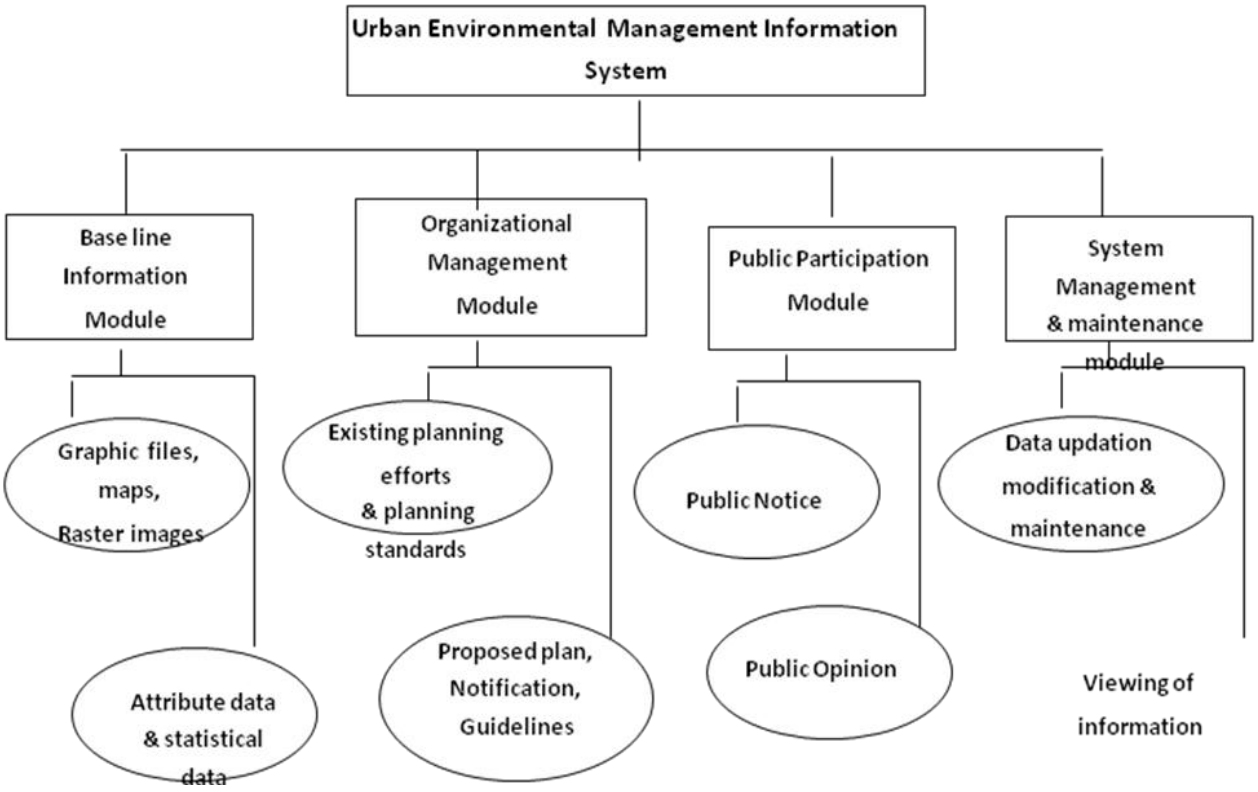

Figure 2 : Data modules for Urban Environmental Management Information System.

(1) Base line information Module:

The base line information module basically comprise of map, graphic, raster image, base line information , attribute data related to spatial information. The module will have the have capabilities of querying building, presentation of the result of the query in both graphical and tabular presentation. The information system will have zooming facilities starting from 1:1or 2 million scale and zooming up to 1: 1000 scale depending upon the resolution of the input map imagery and the level of study (Figure :3)

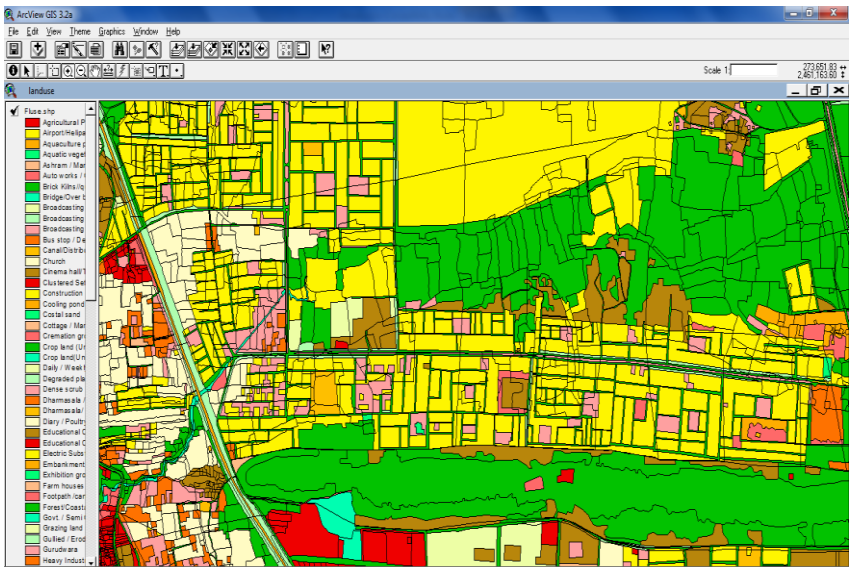

Figure :3 Graphic view of landuse of urban area

The information content of this module will be regional setting, physiography, Demography, Climate , Soil, Drainage system, Landuse, Physical and Social infrastructure, location of Industrial sites, industrial cluster, housing, open areas, natural vegetation, transportation (road, rail, waterways), utilities (water supply, electricity), hot spots, location of monuments, polluted stretch, problem areas, tourist spots, pilgrim areas, tribal settlement , earth quack prone areas and environmental status etc. The statistical information like census information industrial year book, gazetteers etc. information will be the part of this module (Figure: 4)

(2) Organizational Management module :

Broadly speaking in Indian scenario the development, management and decision making bodies are Town and Country planning Organization, Developmental Authority, Municipality, Municipal corporation etc. This module will have three sub modules like basic for Existing developmental plan , Master Plan, Basic Development , planning directives norms, decision towards future development which will help the urban planner and decision makers to carry out the future planning exercise , comparative study for future development, proposal for planning, phasing of development. This module will contain text, and data, map and graphic files with spatio- temporal evaluation characteristics. The basic booklet to be incorporated in thin module will be Master plan, Basic development plan, Building By Law, Environmental Standards, Government notifications, Planning norms, infrastructure development standards various gazetteer, notifications , guidelines and directions published by Government.

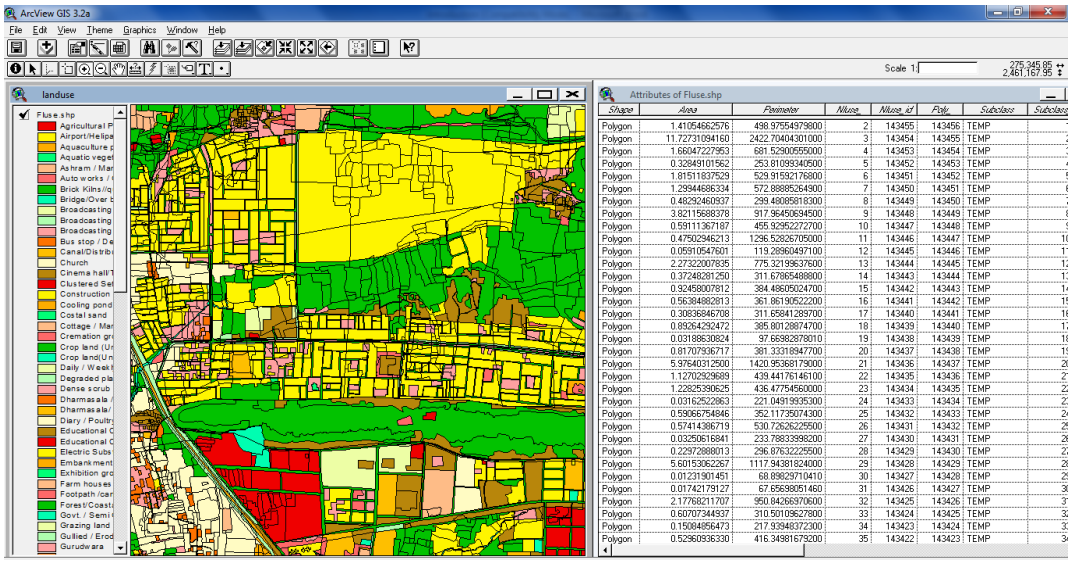

Figure: 4 Attribute Data Ppresentation

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(3) Public Participation Module:

The module will act as a platform for comparing the state physical, social , economic and environmental development of the particular town with the other town, with the developmental standards, Government notice for public opinion for and proposed development and public complaints, suggestion and opinion for the town , and city development. The features of this module will be GDP, total industrial input and out values, industrial emission, vehicular pollution, waste water discharge, waste generation, infrastructure developmental status, landuse change.

(4) The system management and maintenance module:

The module deals with the maintenance and management of the Urban planning and management information system itself. It is basically a user management module. It deals with the various authorization for access, viewing, updation, modification of data , information etc. The user management function may add and delete users for the system and moreover the module-wise authorization will also vary. The data , graphic and map updation may authorized to different user to update the baseline and other information. The average users will only be able to use data , analyse and compare the data but could not be able to revise , add, delete , modify the data .

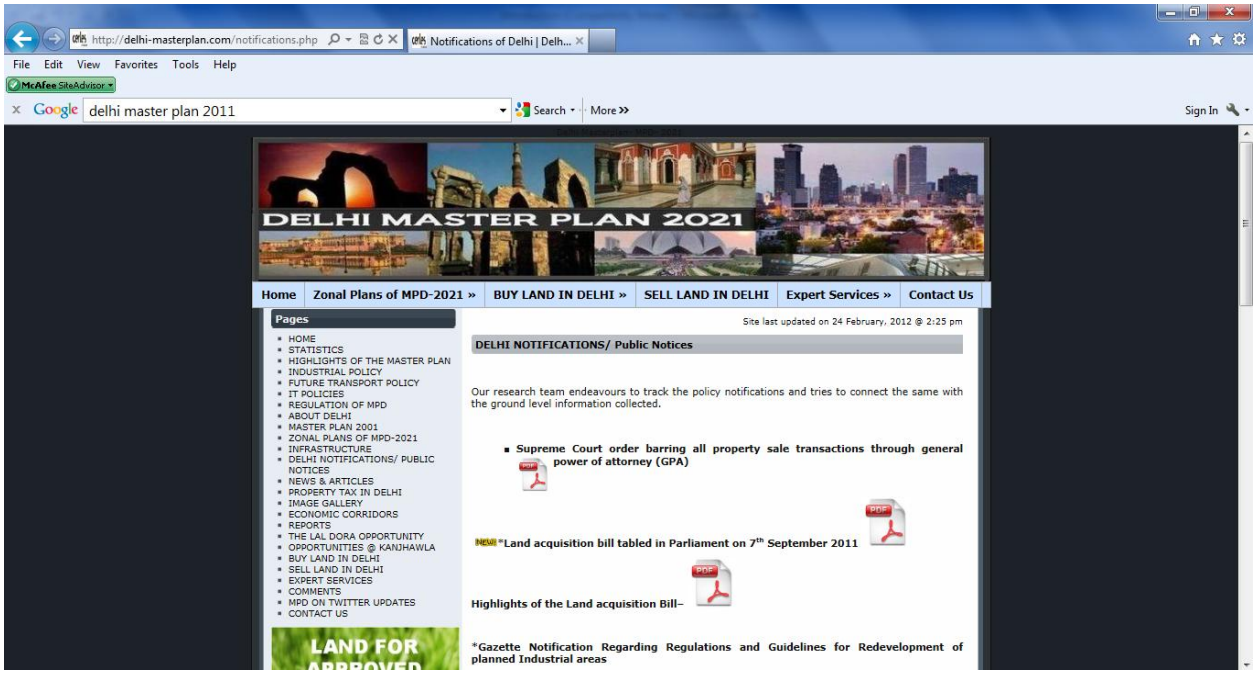

Figure 5: Public Notice

8 OUTCOME OF THE URBAN PLANNING MANAGEMENT INFORMATION SYSTEM:

- A gateway to dynamic planning: A developing country like India which is in the transition stage of office automation this information system will act as platform of integration of traditional data and information system and the modern and dynamic GIS based information system. GIS will not only help in storing, updating, analyzing and presenting the information but also support the information system to connect the site/location specific information with the day to day decision making process.
- Efficient data management : Planning exercise needs a wide range of data and information. In GIS platform every data and information are stored in different coverage, It helps in integration and differentiation of graphic and data base information. This information system will give the capability of comparing the change in landuse pattern, Population density at the national level as well as at the city level. At the city level it can go upto the details of house hold details, location of municipal waste storage point, distribution of power grid, Gas pipelines etc. All these information are to represented and compared graphically and with the data table and text.
- Tools for data analysis: This information system has the capability of performing the user - based data query. The types of data analysis used by the planners, developer, decision maker will be

different from the academician, general public. Ever user will retrieve, plot, analyze the data as per the requirement.

- Transparent planning: The information system will represent the information related to the existing status of infrastructure facility, population density, pollution status , status of solid waste management , status of effluent discharge in one hand and the government proposal, action , plan on the other hand. With the dynamic nature of the information flow the planning, monitoring and management exercise will be more transparent.
- Active public participation in planning: the proposed information system will be web based and it would not be software biased. IT could be opened with any operating system. As all the information are easily available the people will be able to take active participation in the planning and developmental activity.

9 CONCLUSION:

Modern GIS integrates various kinds of advanced, dynamic, multi-layered , time series data and graphical information which transform the tedious data analysis job to a faster, dynamic and realistic planning exercise. Regular updation of information makes the monitoring and management of urban space more transparent and realistic approach towards development . This information system can be used as a tool for urban environmental management as well as it can also be a useful support system for property tax collection, land value evaluation etc.

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🏆 *reviewed paper*

High Building Density around Subway Stations, Policies and Solutions

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1 ABSTRACT

Building density is an index for controlling population density. Building at higher densities not only makes more efficient of land but can also deliver high quality. Nowadays by the reason of rapid and sprawl growth of cities and increasing urban services costs a decision should be made to decrease these costs by the means of building density. Also the efficient use of land is an important objective in making development more sustainable. It is embedded in government policy. Compact development not only uses less land, but it also has the potential to create efficiencies in the use of other resources, including energy supply and transportation. Basically public transportation stations and specially subway stations are well proper potential for urban developments because of high level of services of these places. Increasing building density around subway stations is acceptable but just when it doesn't decline the efficiency of urban equipment, facilities and services and also life quality. This paper investigates new faces, approaches and ideas of increasing building density around subway stations and offers polices and solutions to increase building density in low-building density areas around subway stations.

2 INTRODUCTION

Recent moves towards the creation of more sustainable towns and cities that offer a high quality of life whilst minimizing resource consumption (such as energy, land and water), have reawakened interest in the concept of density. The benefits of seeking higher density levels in overall terms are well-recognized-especially in the context of delivering mixed use development where a minimum housing density is required to sustain non-residential uses. Some people continue to equate higher densities with poor urban quality, such as overcrowding and reduced space standards. This misses a fundamental point. Density is only a measure. It is a product of design, not a determinant of it. The aim should therefore be not to achieve a given residential density, but to generate a critical mass of people able to support urban services such as public transport, local shops and schools.

Higher densities focused on urban centers ensure that they remain lively, with local facilities close at hand. Giving people the choice to use public transport, by sitting bus/tram stops or railway stations within walking distance also helps underpin viability by significantly increasing potential custom. This not only applies to residential uses, but to industry, commerce and shopping. The better served and connected a site or development is, the stronger the case for considering higher densities and lower car parking provision.

Building at higher densities not only makes more efficient use of land but can also deliver higher quality. Decisions on what density levels are appropriate for a location can be biased by negative perceptions. Some people imagine high density as being tall building crammed with small apartments which fail to relate to the local context but in fact high density and specially building density can help to the sustainable development. A greater understanding is required of how, with careful planning and good design, higher density schemes can create successful places with a range of housing types, good space standards and an attractive public realm. The efficient use of land is an important objective in making development more sustainable. It is embedded in government policy.

Compact development not only uses less land, but it also has the potential to create efficiencies in the use of other resources, including energy supply and transportation.

From a social perspective, studies have tested the implications of tall residential buildings for the daily functioning of their user-groups, the relationships that exist among the residents and the suitability of high-rise buildings as a living place for different population groups (for example, the studies of Appleyard and Fishman, 1977, and Dornbusch and Gelb, 1977, both of San Francisco; Yeung, 1977, in Singapore; and Ginsberg and Churchman, 1984, 1985, in Israel). The findings point to the importance of investigating the increase in high-rise building.

With respect to location, high-rise buildings in large cities such as New York, Chicago, Philadelphia, Boston, San Francisco, London, Tokyo and Hong Kong were built adjacent to the city centre or subway stations. The

need to locate in proximity to partners and competitors, along with the high consumption of building areas required by the accompanying services sector, attracted economic activities to the city centre. The high price of land, high demand and the characteristics of the consumers combined to motivate developers to build tall buildings (Lim, 1988; Polledri, 1990)

In this paper we will review that how we can promote building density around sub way stations.

3 LITRATURE

3.1 Compact City

The idea of 'Compact City' refers to medieval city or XIXth century city. The Compact City strategy focuses on the form of the city and the efficiency of the distribution of human activities within it, making optimal use of the infrastructure of the city, particularly transport infrastructure, through compact, mixed-use and dense settlement structures enabling effective use of public transport and non car-based movement systems (EUEG, 2004). Benefits of the compact city are cited as: less car dependency, low emissions, reduced energy consumption, better public transportation services, increased overall accessibility, re-use of previous developed land, high quality of life, preservation of green space (Thomas, Cousins in Jenks et al., 1996). Examples of Amsterdam, the pioneer in compact city policies, Hamburg or Copenhagen provide enough evidence for compact development (Sheurer, 2007).

Some advocates of the compact city see its potential in increasing housing density in new mixed use developments. Yet density is not the only measure of a compact city. If we are to achieve the right balance of quality and quantity there must be a limit to the densities in a compact city. That capacity varies from place to place and depends on local requirements, climate conditions and the existing built environment. The aim is to generate a critical mass of people able to support urban services such as public transport, local shops and schools (Llewelyn Davies, 2003). Increasing density requires improving the quality of urban areas to attract people to live and work. Provision of urban open space is necessary for high quality urban environment and may be a source of Environmental, social and economic benefits (CABE, 2001). Especially the economic benefits seem to be interesting, since they might be better arguments than any other in the era of consumption. New tools and methodologies have been developed for better understanding of importance of urban open spaces and the activities that occur in such spaces. Nice view on green and proximity to the park may result in higher real estate prices (CABE, 2005) and in most cases that also results in higher property taxes. Good urban design can also contribute to better, more frequent use of urban open space. In conclusion urban open spaces may contribute to more compact cities for both private and public space-estate owners.

3.2 Transit Oriented Development (TOD)

Transit Oriented Developments (TODs) are higher density mixed use residential and commercial developments set within walking distance of key transit nodes such as rail or bus stations or around activity centres such as major shopping centres/offices. While higher densities are promoted closer to the transit nodes, lower density development is allowed farther away from the transit nodes. TODs aim to encourage increased ridership in public transport, to efficiently integrate land use and transport, and to create integrated liveable communities (Calthorpe and Fulton, 2001; Bernick and Cervero, 1996, Kaufman and Morris, 1995). Cervero suggests that transit oriented development requires the three dimensions of Density, Diversity and Design (3Ds) to make the concept work (Tumlin and Millard-Ball, 2003). In the context of USA, Garde comments of new urbanists projects which are very similar to TOD, pointing out that existing zoning ordinances and subdivision regulations are one of the major barriers to implementing new urbanist projects (Garde, 2004).

For example, in the case of redevelopment projects requiring land assembly, public redevelopment agencies can use the power of eminent domain to acquire the land, bearing initial development costs, to attract private developers. Tax increment funding (TIF) can be used as a tool to support infrastructure and land cost subsidies. Under this arrangement, local governments can use the future potential increases in property tax revenues in the TOD district to invest in infrastructure improvements and issue bonds against future property tax increases (Boarnet and Compin, 1999).

Also, zoning around transit nodes can be used to provide incentive for developing higher density mixed use project as a matter of right or requiring minimum review procedures.

Another form of incentive is the provision of grants to support TOD. For example, the 'Transportation for Livable Communities' program in San Francisco provides small grants to community oriented transportation projects that support walkability, transit use and compact development patterns.

The shift to a more compact form of development will be achieved through increasing the net residential density of major new urban development and on focusing higher density residential development within and around regional activity centers and public transport nodes and corridors.

3.3 Relationship between building density and public transportation

Empirical evidence and the results of a large number of studies suggest that there is strong positive correlation between population density and transit use. The higher the density, the higher the transits use. However, variables other than density – culture, household income, the design and location of transit lines, the management efficiency of transport companies, government transport policies, including subsidies – certainly also influence transit use. The correlation does not imply causality. The relationship between density and transit use in various cities of the world has been documented by Newman and Kenworthy (1989) and Kenworthy and Laube (1999).

Kenworthy established that there is a strong positive correlation between density and transit use among world cities and a strong negative correlation between auto travel per capita and density. But the correlation does not imply that in a given city an increase in density would necessarily result in an increase in transit use or that an increase in transit supply would increase density and transit use. A significant increase in average density in built-up areas is a phenomenon which has yet to be observed in large cities, looking back over the past 50 years.

The correlation between population density and transit use is often difficult to measure because the lack of comparable data across metropolitan areas for density and for transit use and because factors others than density that might influence transit use might be difficult to measure. We compare density in the built-up areas with two types of variable: transit trips per capita and passengers per mile of metro line. These variables are somewhat more abstract than the percentage of transit trips over all trips, but they have the merit of being more accurate.

If we compare population density in the built-up area and transit trips per capita per year globally, we find that low density cities (below 30 people per hectare) have a very low demand for transit (below 70 trips per year or about 7 percent of all trips). Atlanta with about 40 trips per year per capita shows a relatively high demand given its very low density. This would suggest that transit trips in Atlanta are unlikely to increase much in the future as the transit system seems to have already attracted the maximum number of transit passenger compatible with its current densities. The under-utilization of the existing transit network in low density cities suggests that low density might be associated with low demand. In other words, there may be a density below which transit becomes impractical for most travelers compared to alternative means of transportation. Cities with low average densities (below 30 people per hectare [p/ha]) have low transit use, i.e. in these cities transit trip represents less than 10% of all trips. By contrast, cities with densities above 30 people per hectare tend to have higher transit use. For example, a very high density city like Hong Kong (370 p/ha) has a very high transit use: 85% of all trips are made by transit. It is no accident that one of the densest cities in the world is the only one to have been able to develop and operate its metro without subsidies.

While empirical evidence shows a strong correlation between density and transit use, it is important to know whether causality exists and why there might be a density threshold below which transit is ineffective. If a city's density is below this threshold, it could not hope to increase the share of transit trips significantly without first increasing its density.

Population density is not the only factor affecting transit operation; the spatial concentration of jobs and people is certainly as important in determining the viability of transit. The city centre of traditional European and Asian cities is usually the place where the major number of jobs, retail space and cultural amenities are found. The steep density gradients of European and Asian cities point to the primacy of the city centre as a focal point for the majority of transit trips. It is easier for transit operators to operate transit lines with multiple origins (the suburbs) and one destination (the city centre). It is much more difficult to operate transit

routes linking multiple origins to multiple destinations, as recognized by Cervero (1998), one of the strongest advocates of transit. In most "transit cities" the trips toward the centre are mainly by transit while suburb to suburb trips are by car. While rail mass transit, commuter trains, metro, and light rail are well adapted to monocentric cities, buses are the only transit mode which makes sense in a polycentric city where jobs are dispersed throughout the metropolitan area. The more dispersed the jobs, the fewer the passengers per route, the smaller the capacity of the required buses. A related issue is whether transit investments might promote more compact urban development. Most, but not all, of the new rail transit developments are radial systems that either terminate or pass through the CBD. Some argue that this might help to promote downtown or inner-city development around rail stations, and thereby increasing densities. This might happen on a micro scale, e.g. moderate-size infill development.

In Tokyo, we find the combination of a cluster of high-rise buildings and individual high-rise buildings across the entire urban landscape as a result of the absence of clear zoning policies (Bognar, 1997). It is perhaps Singapore, the city-state where 90 per cent of its 3 million populations live in private or public high-rise buildings, that has succeeded best in creating community life in a high-rise environment by implementing a new pattern of high-rise neighborhoods in the Housing and Development Boards new towns. This was achieved by a high level of pedestrianisation and the use of outside space, along with easy walking distances from each building to the neighborhood centre and other facilities (Beng-Huat, 1997, pp. 111–123).

High density presents both opportunities and challenges in the transport arena. It is opportunities that have often been emphasized in the compact city literature. For example, high density offers the opportunity for average trip lengths to be short and to foster successful, economically viable public transport (Puckered and Zupan, 1977). Such high densities also promote a high level of accessibility for non-motorized modes of transport and enable cities to have low levels of energy use per person in transport (Newman and Kenworthy, 1989). The opportunity that high urban density presents to public transport is exemplified by the case of Hong Kong, where in 1990 public transport carried 82 percent of all motorized passenger kilometers. A number of mechanisms explain the potential for high levels of public transport in dense cities but there is not space to go into them here. Figure 4 makes clear that a very high role for public transport is possible in high density cities, even in those with high incomes. However, the examples of Bangkok and Surabaya suggest that high density does not necessarily guarantee the success of public transport. Another opportunity of high densities is the possibility that many trips can be short and therefore easily made on foot or by non-motorized vehicles However, Fig. 5 also shows that although high density provides an opportunity for non-motorised transport to play an important role, it does not guarantee it. For example, Bangkok seems to have remarkably little walking or cycling to work despite its relatively high density. In fact, the graph shows that the levels of non-motorised transport for work trips in the high and very high-density Asian cities in this sample are no higher than levels found in most middle-density cities. This probably reflects the hostility of the street environments for people on foot or on bicycles in most of these cities.

High urban densities also present formidable transport-related challenges, especially for cities where rising incomes have begun to unleash the potential for higher private vehicle ownership and usage. For example, traffic congestion tends to emerge rapidly as dense cities motorize, even if vehicle use per capita remains relatively low. This is not simply a result of poorly developed road systems, since in dense cities' road capacities per capita are inherently and inevitably low. It is physically impossible for dense cities to match the road provision levels of low-density cities. Furthermore, air pollution and other local impacts of traffic can become severe problems for dense cities even at low levels of motorisation. The most successful transport policies in dense cities are those that are compatible with the spatial realities of such urban areas. The voracious demand for space by cars has been understood for many years. An influx of cars therefore creates great difficulties for established dense urban areas and generates substantial pressure for activities to spread out to make way for access by cars. Research on transport space consumption using the product of the space occupied by the time that it is occupied, shows enormous differences (up to 90 times) in space consumption between cars and public transport for a trip to work in a central business district. This approach emphasises the importance of the space consumed for car parking, especially that which is occupied for the entire day in expensive central areas. Unfortunately, the recognition of the inefficiencies of private transport from a spatial perspective has often not penetrated to a policy level. Exploring how developing cities can retain or reinforce transit-oriented urban land-use patterns, even as incomes rise, is an important area for study (Gakenheimer, 1995). The experiences of some of the Asian cities show that, even with their high-

density land-use patterns, there is still potential and a need in dense cities for land use policies to explicitly favour public transport and non-motorised transport. This involves attention to the details of transit-oriented urban form. Unfortunately, there is not space to go into this in detail here. Suffice to say that explicit policies in Singapore, Hong Kong and Seoul are encouraging land-use patterns to become increasingly transit-oriented. In Tokyo, the land-use control system is relatively weak but nevertheless much new development is transit-oriented in its location and design (Hook, 1994), providing evidence that, in conditions of public transport dominance, transit-oriented land-use patterns can naturally develop as a market response. In the other cities in the Asian group, there is a trend for the design details of much new development to be oriented to access by private vehicles, even though densities remain high overall. In Bangkok, Kuala Lumpur, Jakarta and Manila, many new housing, office or shopping complexes built in the recent boom decade (1986 to 1997), and targeted at the newly prosperous middle class, have designs predicated upon private vehicle access. These developing Asian cities run a risk of building traffic disasters into their urban fabrics. This is because densities are still too high to cope effectively with many private cars but the pro-car design features tend to encourage private transport and make the provision of public and non-motorised transport facilities somewhat difficult.

4 HIGH BUILDING DENSITY AROUND SUBWAY STATION

Development densities are “as great as possible” within the context of a particular station and surrounding community. Minimum residential densities around rail stations are high enough to support higher frequency transit service and to foster lively, walkable communities. Housing forms include townhouse, walk-up apartment and high-rise buildings. Minimum employment densities are established in station areas to create a destination which generates transit trips. Below are some examples of minimum densities being used in LRT station areas by other jurisdictions?

The highest densities are ideally located closest to the station, to optimize transit rider convenience. This includes high-density housing and offices. Intensity of development can taper off away from the station, to create an appropriate transition and interface with the surrounding community.

Plans for areas around LRT stations should address the ability to increase density over time. Vacant lots, surface parking lots and existing low intensity uses present opportunities for future infill development. A phasing plan that demonstrates how the station area can intensify over time offers flexibility to meet changing community needs and provides a vision for this transition.

Within the higher density levels which sustain urban life, variations in the net density of built form profiles will occur naturally. This can be enhanced by building up the mass around centers, public transport access points, parks and riverfronts, for example. Shape the mass of built form to frame positive Public spaces.

There is currently a proposal for high-density housing at Yonge Street and Eglington Avenue. This area already contains mixed high and low density housing as well as stores, schools, public buildings, office buildings and restaurants. There is significant controversy surrounding this proposal as many studies have suggested that increasing density will increase traffic in the area thereby lowering the property values in the area.4 However, one could argue that the project is located directly on public transit lines, and would therefore encourage the use of public transit as well as attract residents who are already use public transit. Moreover, the increase in population could stimulate upgrades to the area’s transportation infrastructure. According to a recent issue of Realty Times, high-density housing that generates the need for upgrades to public transportation systems increases the area’s employment, household incomes and property values.

Taking public transport into account in urban planning decisions is an effective way to stop the increase in private car traffic and daily traffic congestion. One of the best incentives for leaving the car at home is a short walk to an attractive public transport station.

5 HIGH BUILDING DENSITY AROUND SUBWAY STATION

5.1 Mixed-land use

High-density, mixed-use development and high levels of transit service are often present together at sites exhibiting a high transit commute mode share and a high midday non-motorized mode share. Unknowns involving causality make it difficult to separate the contribution of each site element to the resulting transit and pedestrian activity (Douglas and Evans, 1997). commercial uses are encouraged to locate at subway

station nodes and development should be more residential in nature adjacent to designated stable residential areas. nature of development along the Sheppard East Subway Corridor should reflect the nature and character of the communities around the subway stations. The mix and range of uses encouraged by this Secondary Plan and the level of development potential are influenced by these characteristics. The key development areas are shown on Map 9-2 and their development will be governed by the following policies. The key development areas are primarily designated Mixed Use Areas and are focused within walking distance of the subway stations.

Development of lands designated Mixed Use Areas will be in accordance with the Official Plan and the fol owing policies:

- Mixed Use Areas may be permitted to be developed primarily for residential uses, however, mixed use developments with non-residential uses such as retail or small offices at grade with multiple residential or offices located above grade are encouraged along the Sheppard Avenue frontage;
- In predominately residential areas within Mixed Use Areas designations, non-residential retail and office uses will be located on properties with frontage or flankage on Sheppard Avenue, Bayview Avenue or Leslie Street. Access to such non-residential uses will be primarily via the arterial road and such development wil not depend upon obtaining vehicular access through local roads serving multiple residential development;
- Within the interior of Mixed Use Areas, a mix and variety of residential buildings, uses complementary and accessory to a multiple residential use and public and private open space areas will be encouraged;
- On lands designated Mixed Use Areas which abut properties designated Neighbourhoods, only residential uses which can be designed to be compatible with the low density character of the stable low density residential properties they impact will be permitted;
- It is intended that as densities are distributed within a comprehensive development area, the highest densities will generally be located closest to the subway nodes, and along the frontages of arterial roads and abutting Highway 401. Densities will be lowered toward stable residential areas where no change in land use policy is introduced by this Secondary Plan.

5.2 Job-housing balance

Jobs-housing balance is a planning tool that local governments can use to achieve a roughly equal number of jobs and housing units (or households) in a jurisdiction. The notion of balancing jobs and housing goes well beyond trying to attain numerical equality. Ideally, the jobs available in a community should match the labor force skills, and housing should be available at prices, sizes, and locations suited to workers who wish to live in the area. Jobs-housing balance is a planning technique rather than a regulatory tool. Nonetheless, various ways exist that the concept of jobs-housing balance can be applied in local land-use regulations and large-scale development reviews.

Any policy that seeks to balance jobs and housing has multiple objectives, but almost all of these objectives will promote smart growth. The leading scholar on the concept of jobs-housing balance, Robert Cervero (1989; 1991), suggests that jobs-housing balance policies can help to reduce urban sprawl and lower energy consumption. The most important objectives of jobs-housing balance policies, in the eyes of those who have implemented them, have been the reduction of VMT and other traffic impacts. Reduced congestion and lower VMT. There is evidence that intensifying housing in downtown areas can reduce peak-hour commute trips into those areas. David M. Nowlan and Greg Stewart (1991), for example, studied commuting to Toronto's central downtown and concluded that inbound trips had been reduced due to the increase in residential population there. The authors estimate that "for each 100 additional dwelling units in the Central Area there has been a reduction of approximately 120 inbound trips during the morning three-hour rush period" (Nowlan and Stewart 1991, 165). In a study of the Greater Seattle-Tacoma region, Lawrence Frank and Gary Pivo (1994) found that travel distances tend to be shorter for commutes to balanced areas (see also Cervero 1996). The San Diego Association of Government's Regional Growth Management Strategy (1991) found that commute trip lengths in sectors with balanced jobs and housing were 8.8 miles, two miles less than the regional average (Ewing 1996, 46, n. 17). The Southern California Association of Government

(SCAG) provides additional evidence of VMT reduction from implementing jobs-housing balancing policies. This policy can be effective with mixed-land use.

Generally, job-hosing balance is a policy that can be effective anywhere to promote building density, because the people who work somewhere, live near their houses. Otherwise accessibility for public transportation will increase.

5.3 Pedestrian design

The quality of walk connections has been shown to influence the distance people are willing to walk. A short walk made difficult or unpleasant by adverse environmental conditions such as high-speed traffic or lack of shade can seem longer while a long but pleasant or interesting walk can seem shorter. It follows logically that quality of the pedestrian connections between the transit stop and the front door of the development should be important to transit usage. In many subway stations, special attention has been given to the pedestrian environment, including streetscape improvements. It is generally held that the placement of parking lots, green spaces, and the buildings themselves can impact the pedestrian and transit friendliness and attractiveness of travel by transit or walking (Arrington et al., 2002). Results from development of an advanced travel demand model set for San Francisco County lend support to the concept that the quality of walk connections to transit is positively related to transit use. Neighborhood vitality at the destination was found to have a strong positive relationship to the choice of all non-auto modes examined (walk, bike, and transit) for most types of trips. Adverse topology (steep gradients and barriers) was nearly as important. Connectivity at the destination was also, for work trips, significantly and positively related to walk and transit choice (Cambridge Systematics et al., 2002). The lesser importance in the San Francisco travel models of connectivity, and the lack of significance of conditions at the trip origin, are likely artifacts of model calibration with travel data from a city with limited pedestrian-friendliness contrasts. Few city/county of San Francisco non-industrial areas have poor pedestrian connections and most neighborhoods are basically pedestrian-friendly.soe strategies that can help to the pedestrian design are:

- Station Area block lengths should range between 400 and 660 feet to facilitate connectivity and pedestrian accessibility.
- Develop primary and secondary bike and pedestrian paths connecting to the Station Area.
- (a) Primary paths attract high pedestrian and bike volumes, associated pedestrian and bike oriented services, and act as the major connections to the station. Primary routes should provide direct access between the station and major pedestrian and bike destinations in the surrounding community. Primary paths should be designed as continuous, convenient, safe and barrier-free routes.

  (b) Secondary paths do not provide direct links to the station, but feed into the primary routes.
- Utilize sidewalk widths adequate for social use (six to twelve feet depending on location and use).
- Provide pedestrian plazas to create social places and to tie buildings and uses together.
- Install direct, continuous, buffered sidewalks across any large parking areas.
- Utilize canopies, awnings, and arcades to provide pedestrian shelter.

5.4 Infrastructure and Facilites

While there is probably no “right” definition of infrastructure, much depending on the context, there is some advantage in reserving the term for structures and facilities that are the result of human intervention, creating something physical that was not there before. This definition can still embrace the movement of soil to create embankments or cuttings as well as the erection of buildings and the laying of lines. The difference between infrastructure and other potentiality factors, such as the location of the region or its natural resource endowment, is that the service bundles inherent in infrastructure have been ‘artificially’ created through investment, whereas location and natural resources are ‘naturally’ given. There are various ways in which infrastructure so defined can be categorized. The simplest is descriptive: Buildings, roads and related items, utilities, etc. However, this is not particularly helpful from an analytical point of view. A more economic approach is to consider supply characteristics, particularly economies of scale, and demand characteristics, particularly the “publicness” of the goods or services provided, and to develop a categorization on this basis. For present purposes, however, we adopt a categorization based on just two characteristics, which highlight

access to the service. We see much of the man-made urban infrastructure as belonging to one or other of two broad types:

• Area Type: Provides services within a defined area (e.g. utilities, transport systems). In such cases, getting the service to users involves distribution costs;

• Point Type: Provides services at a specific point (e.g. hospitals, schools, offices, shops, museums, theatres, etc). In such cases, the equivalent consideration is the cost to users of accessing the facility.

In the urban economics literature, the provision of infrastructure services tends to be viewed as naturally monopolistic because of scale economies. It seems self-evident that setting up rival systems to compete with each other to supply a community would mean duplication and waste. And the more people who can be connected to a system, the lower average costs must be. However, this view overlooks the effect of distribution or access costs.

Higher densities focused on urban centers ensure that they remain lively, with local facilities close at hand giving people the choice to use public transport, by sitting bus/tram stops or railway stations within walking distance also helps underpin viability by significantly increasing potential custom. This not only applies to residential uses, but to industry, commerce and shopping. The better served and connected a site or development is, the stronger the case for considering higher densities and lower car parking provision. If we want to promote density around subway stations, Infrastructure and facilities should be forecast, otherwise building density will not rise by the reason of lack of Infrastructure and facilities.

The policy should be Focus public infrastructure investments where development is most desirable to correct existing deficiencies and ensure capacity for high-intensity around subway stations and also Maximize smart growth planning techniques and opportunities as a mechanism to promote the practical preservation of the floodplain/floodway and to reduce potential runoff into Clear Creek.

There are some strategies for this polices:

- Ensure that adequate public facilities, including streets, drainage, pedestrian and bicycle amenities, are in place in advance of or can be completed concurrent with development in Station Areas.
- Relocate or reconstruct existing facilities that are incompatible with desired Station Area development, such as utility sub-stations, abandoned freight rail spurs, overhead utility lines, or oversized streets or street layouts.
- Coordinate capital improvement plans by the County, Metropolitan Districts and private developers to facilitate TOD development.
- Document baseline infrastructure conditions.
- Ensure that developers and agencies comply with County requirements for road and intersection improvements.
- Implement the findings and recommendation of the Clear Creek Master Drainage Study and other floodplain and drainage studies done by the County or the Urban Drainage and Flood Control District.
- Comply with federal, state and local storm water programs by using 'Best Management Practices' (BMPs) to manage storm water runoff over the life of development and redevelopment projects within the overlay district.

6 CONCLUSION

High building density around subway stations can have to positive effect on using public transportation ,first high building density increase accessibility to public transportation for more persons and the result is that passengers benefit public transportation will increase and VMT will reduce. Second high density cause reducing operational costs of transportation networks that are in the high density areas author to decreasing the time of journey. High rise building without investment can have bad effects on environment sustainability. However in this paper we reviewed some polices and solution to increase building density around subway stations that are mixed-land use, pedestrian design, Infrastructure and facilities and job-housing balance. These police and solutions can not promote building alone. Development intensity and density should be significantly higher in station areas to provide a base for a variety of housing, employment,

local services and amenities that promote transit usage, encourage pedestrian activity and support a vibrant station area community.

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🏆 *reviewed paper*

How Is Mobility Behaviour Affected by a Migrant Background?

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1 ABSTRACT

Population changes are part of the transformation in European cities. The growing group of migrants is one element of these transformation processes. Due to socio-demographic changes they are set to play a greater role in the future development. Thus, new mobility needs and requirements as well as increasing cultural and ethnic influences and diversity are new challenges for planners and city authorites. In the context of such re-mixing processes, cities are in demand to reconsider existing management procedures in order to adapt and manage different elements accordingly. This is also true for the transport system that needs to facilitate and support sustainable mobility behaviour. In Germany, nearly 20 % of the population are first- or second-generation immigrants (so-called "people with a migration background"). Despite these facts, little is known about their mobility behaviour, mobility options and needs, and they remain "terra incognita" with regard to their travel patterns. An important and interesting research question is therefore if and how a migration background affects mobility behaviour and transport demand, with such information needed to define whether local infrastructures can fulfil the needs of all inhabitants.

In reply to this, the ILS conducted a pilot study[1] to broaden the empirical basis in Germany and ascertain possible motives and reasons for any differences in mobility behaviour. Results show some interesting differences between the survey's three main target groups ("without a migration background", "with a Turkish migration background" and "with another migration background") regarding mobility-related variables such as driving license ownership, vehicle ownership, personal vehicle availability and usage of different transport modes.

People with a migration background have their own views and needs regarding mobility services and transport infrastructures as parents of schoolchildren, public transport customers, or as employees of different companies. Some also belong to groups with special mobility needs, like elderly people or people with reduced mobility. Up to date it remains an open question if people with a migration background need additional assistance and further services to use all mobility options which are offered by a sustainable, barrier-free and inclusive transport system. So the project paves the way to further research.

2 INTRODUCTION

2.1 Background

In addition to population decline – varying widely from region to region –, the overall ageing of society and changing forms of social life, growing ethnic diversity is a major quantitative and qualitative consequence of demographic change, with nearly 20 % of people living in Germany now having a migration background[2] (Statistisches Bundesamt 2010).

In view of the shift from labour migration to permanent immigration, which continues to take place in Germany, the inclusion of immigrants, their families, and coming generations in societal and political life is

[1] In cooperation with ´Integriertes Verkehrs- und Mobilitätsmanagement Region Frankfurt RheinMain (ivm GmbH)´ and City of Offenbach

[2] The definition of a population group with a migration background was introduced in 2005 by the 'Microcensus', an official representative survey of the population and labour market. The group includes " (…) all persons who have immigrated into the territory of today´s Federal Republic of Germany after 1949, and of all foreigners born in Germany and all persons born in Germany who have at least one parent who immigrated into the country or was born as a foreigner in Germany. The migration status of a person is determined based on his/her own characteristics regarding immigration, naturalisation and citizenship and the relevant characteristic of his/her parents (Statistisches Bundesamt 2012)."

becoming increasingly important. Due to the positive migration balance together with greater follow-up immigration of family members and higher birth rates than among the ethnic German population, the proportion of children and young people with a migration background, as well as older people, is set to greatly increase. From a spatial, societal, and economic point of view, people with a migration background will thus remain a determining factor in urban development.

Urban development policy research and practice, programmes and measures have until now focused on integration, community life, language acquisition, political participation, education, and vocational integration, as well as cultural diversity. What has so far been neglected is the question of the impact of growing ethnic diversity on everyday mobility, transport and traffic in cities and urban neighbourhoods.

There are some initial indications that people's everyday mobility is determined not only by the classical spatial, economic, and socio-demographic factors such as age, gender, education, and employment, but also by national and thus cultural/ethnic background. In particular, there are signs of gender-specific differences in access to and use of different forms of transport (Kasper, Reutter, Schubert 2007).

Although mobility and transport studies have as yet ignored the migration background of transport users, a few studies included their nationality in the bivariate form German/non-German. One of these few studies is MID (Mobilität in Deutschland) 2002, the survey on mobility in Germany. The findings of this ten year-old survey show that immigrants do not necessarily travel less than Germans, but they do so differently. Differences are also apparent between nationalities, with gender variable often having an intensifying effect. For example, whereas on average German women and men made the same number of journeys, among non-German respondents, men made more journeys than women of the same nationality. On average, far fewer non-German women own a car and vehicles are more rarely available to them. As far as driving licences are concerned, there are similar major differences in immigrant groups between men and women (Kasper, Reutter, Schubert 2007 based on MID 2002).

Findings from studies in European and US contexts also suggest that everyday mobility may be determined not only by "classical" factors (age, income, transport facilities, specific location-related spatial factors, etc.), but also by national or cultural/ethnic background and by migration circumstances (e.g. duration of stay in the new country) (DfT 2010; Beckman, Goulias 2008). For example, a study on the mobility behaviour of ethnic minorities in the Netherlands found that immigrants were less mobile than the native Dutch population, mainly differing in their use of public transport and bicycles (Harms 2007).

However, statements about differences in mobility behaviour between Germans and non-Germans, between people with a migration and non-migration background, or between different groups of migrants are very poorly grounded, with research urgently needed.

2.2 Project objectives

In reply to this dearth of knowledge in Germany about the mobility options, needs and behaviour of people of non-German origin (with a migration background), the ILS conducted a pilot study to broaden the empirical basis in Germany and to ascertain possible motives and reasons for any differences in mobility behaviour. Initial indications suggest that everyday mobility may well be determined not only by the "classical" factors, but also by national or cultural/ethnic background.

3 METHOD

3.1 Survey Design

The survey was conducted as a pilot study, designed to combine questions on family background such as citizenship, date of migration and native country with such mobility-related questions as the number of cars and bicycles per household or the availability and use of different transport modes.

The survey took place in Offenbach am Main, a major city with over 120 000 inhabitants. The share of people with foreign citizenship (31 %) is one of the highest in Germany; with even more people accordingly having a migration background. Therefore, telephone interview participants could choose between four different languages. German was by the far most frequently selected (94.0 %), followed by Turkish (4.9 %), Russian (0.8 %) and Polish (0.4 %). The survey took place in September and October 2010. The participants were aged 18 years and above and were allocated by quota to the three main groups "without a migration

background" (n=666), "with a Turkish migration background" (n=631) and "with another migration background" (n=617). In the last group, participants had 54 different nationalities and came from 73 different countries. In addition, each main group was equally divided between women and men. In the following text the results are presented separately for the three main groups.

To facilitate understanding, the group of participants without a migration background is referred to as "German", that of people with a Turkish migration background as "Turkish", and that of people with another migration background as "other-nationality". This reflects the background and not the current citizenship status of the particpants; i.e. Turkish participants who have adopted German nationality are assigned to the Turkish group, due to their Turkish background. When referring to groups with a migration background in general, i.e. without differentiating Turks, the term "non-German" is used.

3.2 Sample description

In total the survey sample contains data from 1914 participants. While non-German survey participants tend to live in or close to the city centre of Offenbach, German ones tend to live more on the city's periphery.

	Without a migration background	Turkish migration background	Other migration background	Total sample
Average age in years (participants age: 18 and above)	59	43	45	49
Average household size	2.0	3.2	2.9	2.7
Percentage of households with children under the age of 18	28.8	55.3	47.9	45.3

Table 1: Sample description by migration background

Regarding some general socio-demographic parameters, there are quite big differences between the three groups (see Table 1). The overall average age of the total sample is 49, pretty close to the average age of the whole population of Germany (aged 18 and above). Looking only at people with German citizenship, to be found in all three groups, average age increases to 52. Similar to the total population of Germany, in our survey Germans are older than non-Germans. Consequently, only 28.8 % of German households live together with children under 18. This contrasts to 55.3 % of participating Turkish households. Household size similarly reflects this pattern, with German households having only two household members on average, while Turkish households have on average 3.2 members, closely followed by other-nationality households.

The older age of German participants is reflected in the high proportion of retired people (48.6 %). By contrast, only 15.1 % of other-nationality participants belong to this group. More than half (53.3 %) of this group goes out to work (part-time or full-time), compared to 46.1 % of Turkish participants and only 38.9 % of German ones. The highest number of unemployed people is to be found in the Turkish group (9.7 %), the least in the German group (1.8 %).

	Without a migration background	Turkish migration background	Other migration background
Below 1,000 €	21.0 %	52.5 %	34.9 %
1,000 € up to 1, 499 €	21.9 %	23.5 %	27.4 %
1,500 € and 2,999 €	49.7 %	21.5 %	33.9 %
Above 3,000 €	7.4 %	2.4 %	3.9 %

Table 2: Household income per month by migration background (equivalent scale: OECD modified scale) 3

Even though many of the German participants are retired, they tend to have a higher household income per month than the other two groups (see Table 2). For example, only 21.0 % of them have a (equivalent scale) household income less than 1.000 € per month, in contrast to 52.5 % of those in the Turkish group. The latter group generally tends to have the lowest household income, followed by the other-nationality group.

[3] In order to reflect that the needs of a household grow with each member but not proportionately, the size of the household and the age of its members are taken into account. An equivalent scale is used following the OECD-modified scale. This scale assigns a value of 1 to the household head, 0.5 to each additional adult member and 0.3 to each child.

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4 FINDINGS

The following chapter provides an overview of selected mobility-related survey findings, such as percentages of people holding a driving licence, vehicle ownership and usage of different forms of transport as well as findings regarding satisfaction with the provision of key services. All findings are presented by three migration groups (´Without a migration background (German)´, ´Turkish migration background (Turkish)´ and ´Other migration background (other-nationality)´) and also by gender.

4.1 Driving licence ownership, car ownership and use

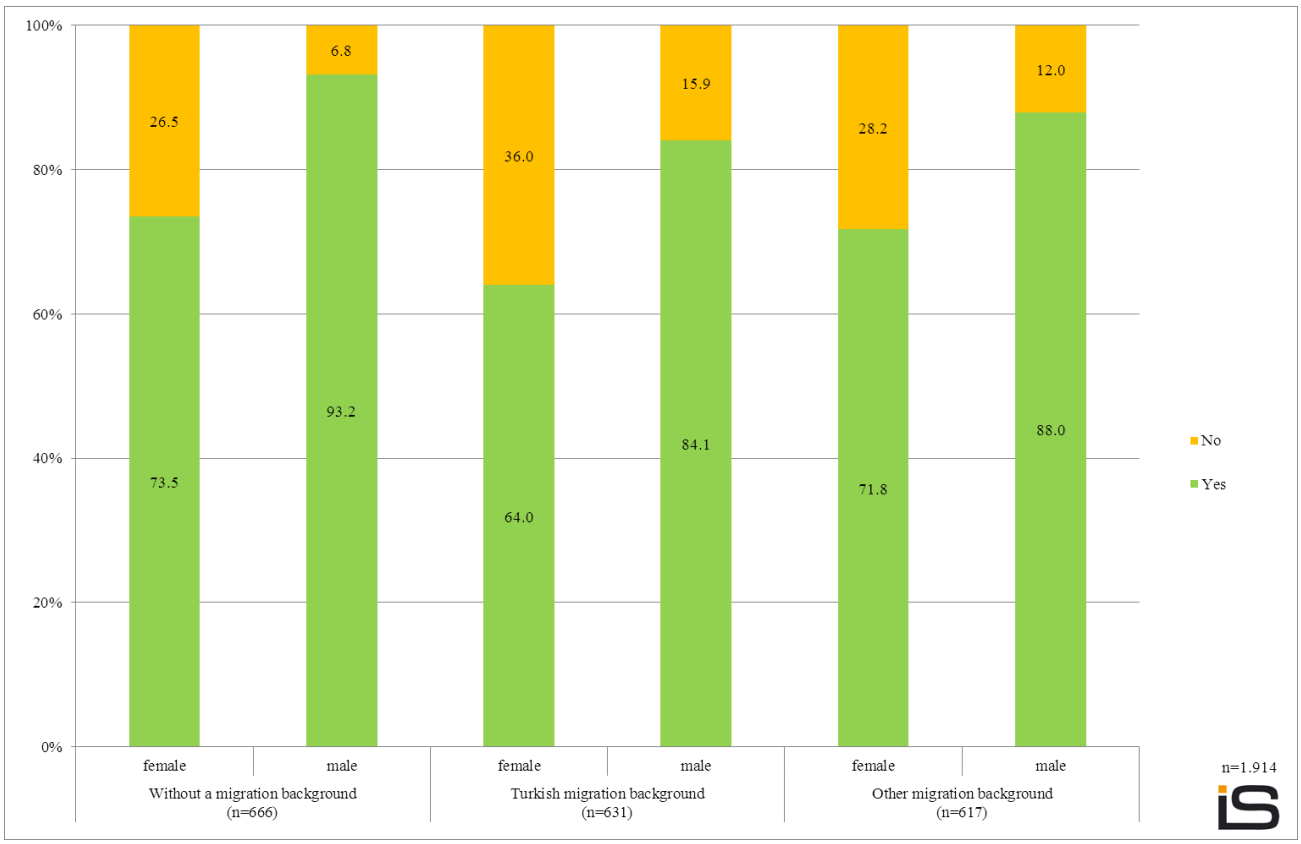

Fig. 1: Car driving licence holders by migration background and gender

As the chart above shows, the proportion of women holding a driving licence is clearly lower in all groups. Whereas 73.5 % of German women hold a driving licence, this figure drops to 64.0 % for Turkish women. It should also be taken into account that 80 % of all female German non-licence holders are over 60 years old. By contrast, the majority of non-German women are considerably younger (between 18 and 39 years old).

Findings on car ownership per household do not show any major differences between the three groups. The majority of all households has at least one car, with only 24.5 % of German households, 21.7 % of Turkish households and 23.5 % of other-nationality households not owning a car. The majority of these non-car-owning households are singles living – as expected – close to the city centre of Offenbach. To find out why these households did not own a car, the respective participants were asked about the reasons why. The majority of German households answered that the main reasons were age and health (reflecting the higher average age of this group), while non-German households cited primarily financial reasons (´Purchase or maintenance of a car too expensive`).

However, car ownership by household-size shows that German households tend to generally have more cars than non-German households – the larger the household, the higher the number of cars in the household. By contrast, in Turkish households the number of cars hardly increases with more household members, with only 23.1 % of 5-person-households having two or more cars.

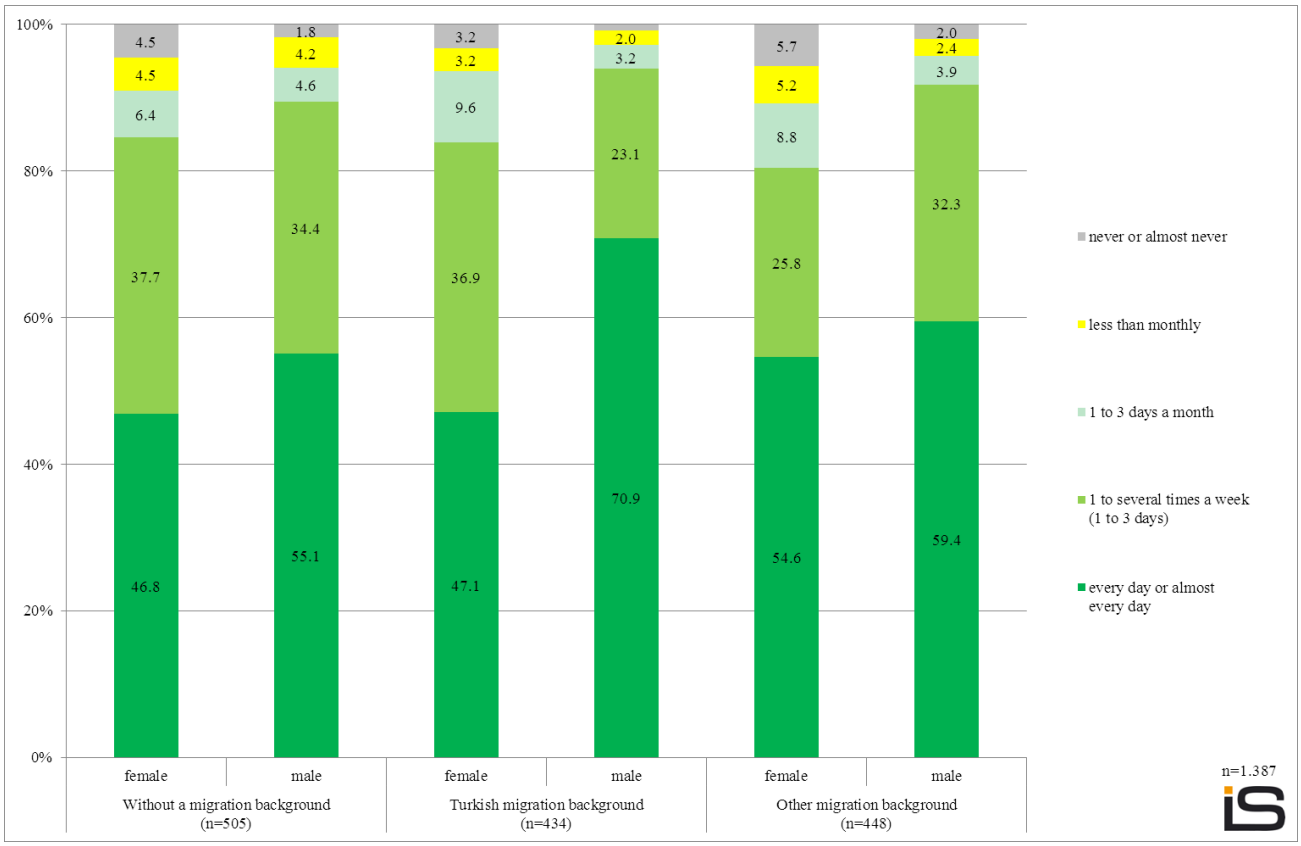

Fig. 2: Car use (as driver) by migration background and gender

Participants holding a driving licence and at least occasionally having access to a car were asked how often they normally use the car as a driver. Fig. 2 illustrates that in all three groups people use the car several times a week, though women use it less frequently than men. Turkish men use the car more often than all others (70.9 % use it every day or almost every day). In addition this group shows the greatest difference between women and men, with only 47.1 % of Turkish women using the car every day or almost every day. German women use the car less than the others but these women are older.

4.2 Bicycle ownership and use

Findings on bicyle ownership per household show no major differences between the three groups, with the majority owning a bicycle. Nevertheless 24.7 % of German households, 22.9 % of Turkish households and 26.8 % of other-nationality households do not own a (useable) bicycle. In all three groups these are mainly people living on their own. In German households nearly every household member has a bicycle – the more members per household, the more bicycles are available. By contrast a relatively high percentage of non-German households - especially other-nationality households and including multi-member households - do not own a bicycle. For instance, 1/3 of 2-person-households and 1/5 of 3-person other-nationality households do not own a bicycle.

Similary, participants with at least occasional access to a bicycle were asked how often they normally used it. Although German participants are on average older than the non-Germans, their bicycle usage is significantly higher: 60.2 % use the bicycle at least once a week in contrast to 45.7 % of the Turkish and 45.7 % of the other-nationality participants. Women also use the bicycle less than men, especially other-nationality women. 41.5 % other-nationality women cycle less than once a month or never. In addition, the main reasons mentioned for someone not using the bike are time constraints (Turkish participants), distance to destinations (not accessible by bicycle) (other-nationality participants) and health restrictions or physical disabilities (Germans).

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4.3 Public transport use

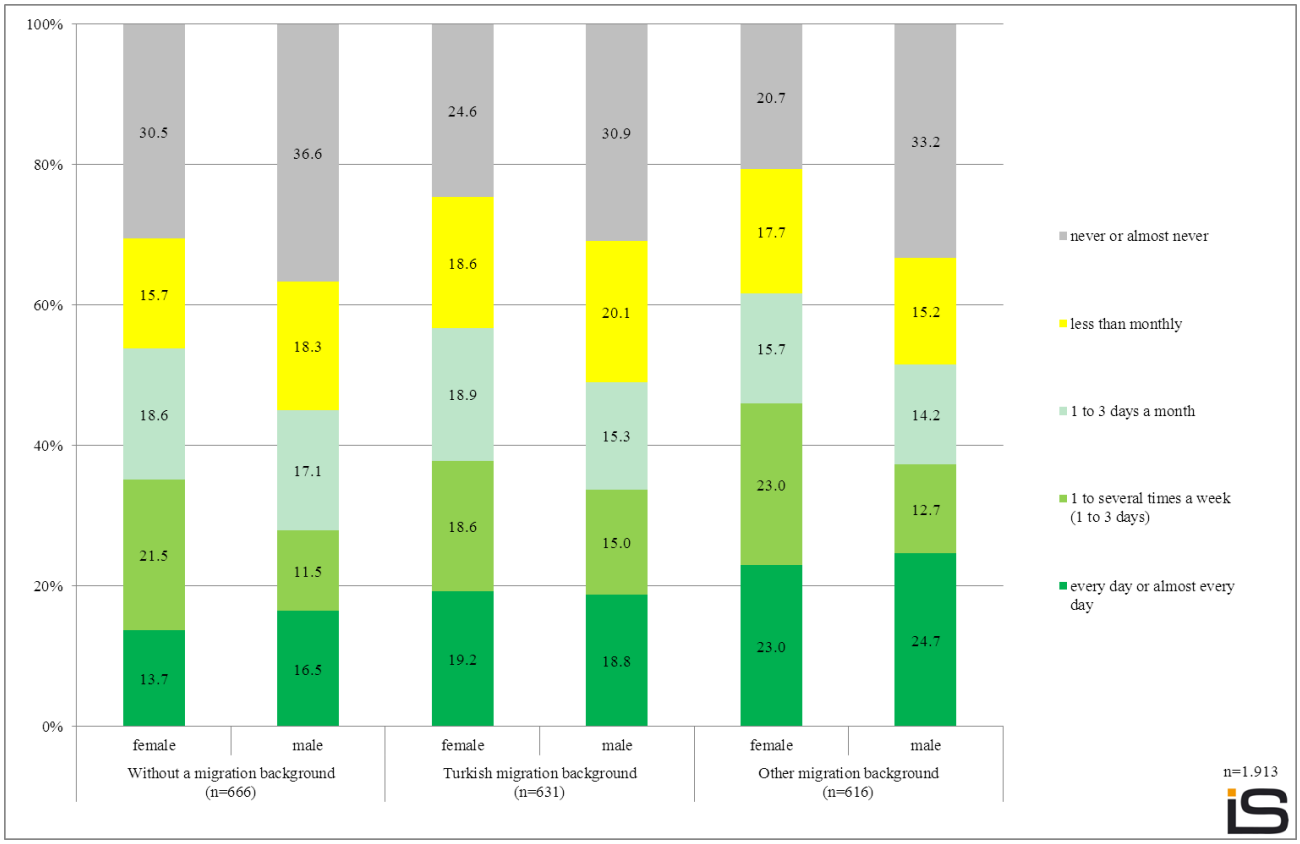

Fig. 3: Public transport use by migration background and gender

To find out more about Offenbach public transport users, participants were asked how often they normally used public transport (bus/local trains). A high proportion of all participants use the public transport system less than once a month or never. For instance, 36.6 % of German men never or almost never use public transport. In all three migration groups women make greater use of public transport than men. Nevertheless 46.2 % of German women, 43.2 % of Turkish women and 38.4 % of other-nationality women answered that they used public transport less than once a month, almost never or never. These results are particulary relevant in connection with the findings on car and bicycle use, with non-German women making lesser use of the car and bicycle but greater use of public transport than non-German men. It should also be noted that the main reason mentioned for not using public transport was the availability and convenience of a car.

4.4 Shopping facilities

Finally participants were asked how satisfied they were with shopping facilities in the district of Offenbach where they live. The findings show that Offenbach is very well equipped with shopping facilities: 77.0 % of German respondents, 82.8 % of Turkish ones and 82.7 % of other-nationality ones strongly agreed or agreed with the statement "My shopping facilities are good". Looking at the findings by place of residence, participants living closer to the city centre show higher agreement than those living on the city periphery.

5 CONCLUSION

What conclusions can be drawn from these findings? The project set out to broaden the empirical basis on mobility behaviour, options and needs of people with a migration background. In summary, the survey provides first important findings on the mobility variables of the sample, indicating certain significant differences between people with and without a migration background and especially between genders. For example, less women hold a driving licence than men. But it seems particularly important that the majority of German women without a driving licence are over 60 years old. By contrast, the majority of Turkish women without a driving licence are comparatively young (18-39 years old). It remains to be seen whether subsequent generations will behave more in line with their German counterparts. Furthermore choice of transport impacts their commuting, childcare or shopping travel patterns. Non-German women – especially

young ones – seem to be a very important target group for public transport and non-motorized forms of transport, thereby guaranteeing their independent mobility.

Findings on the usage of different forms of transport show that women use cars and bicycles less than men in all groups. Though women use public transport relatively more often, the proportion of non-users in all three groups is noticeably high (> 20 %). But the results also indicate differences between the three groups: German women tend to use the bicycle more than the other women in the sample although they are much older. It should be emphasized that non-German women– especially younger generations – need to be encouraged to cycle. For example a number of German cities offer cycling courses for women with a migration background. Such initiatives need to be further developed, together with improvements to the cycling infrastructure.

In addition, the findings on shopping facilities indicate a very positive attitude towards their living environment whether participants have a migration background or not.

More and more people with a migration background are entering Germany's – especially urban – society, they are re-mixing their city and affecting and influencing all aspects of everyday life. Research into the differences in mobility behaviour is becoming increasingly important. Whether as parents of schoolchildren, public transport customers or as company employees, they all have their own views and needs regarding mobility services and transport infrastructures. In addition, some also belong to groups with special needs, like elderly people or people with reduced mobility. To address all these specific needs it is undispensable to conduct more mobility research and include the findings in planning practice. To date the question remains unanswered whether people with a migration background need additional encouragement to use all mobility options. Such active participation needs to be supported by a real choice of mobility options, therefore cities have to offer a sustainable, barrier-free and inclusive transport system. In conclusion, this project provides first important scientific findings on the mobility behaviour of people with a migration background in Germany, a group which is re-mixing the city but is – up to date – almost neglected by mobility research. But, as already said, this project merely paves the way for a lot of absolutely necessary further research.

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🏆 *reviewed paper*

Humans as Sensors to Enhance the Built Environment: a Case Study of the Eastern Harbor, Alexandria, Egypt

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1 ABSTRACT

Good urban design is not about how places look like, but rather about the art of making places for people and creating public spaces that work for the whole community. Urban spaces suppose to be designed for pedestrians and are expected to fulfill their needs. Therefore, it is of great importance to receive the users' feedback and response in order to tailor our designs to suit them best. However, it is not always quantitative data that explains the user's interaction. Hence, this research focuses on making use of emerging technologies within the field of urban planning to efficiently collect and visualize qualitative data rather than only quantitative data. This happens in pursuit of enhancing the living conditions in our cities, which is the main goal of every planner, developer, politician, and citizen.

This research is investigating a new method of measuring how people feel in their city and how they react to the surrounding built environment with the help of using "SMART-Bands". These devices can measure body parameters in real-time, like skin temperature, skin conductance and heart rate, as indicators for human emotions. This collected data is used to interpret how humans feel and react towards the availability or lack of different urban elements within any studied area.

This paper experiments with those "SMART-Bands" to analyze one of the frequently used paths in the city of Alexandria, the Eastern Harbor. It is a major destination for Alexandrians all year long and during all 24 hours of the day. It represents a substantial recreational facility, as well as hosts a lot of civic and recreational buildings. The two sides of this path have relatively different appearance, pavements, and landscape elements.

The presented paper investigates how people react to those two sides of the same path and tries to link this feedback to the presence or absence of urban design elements and street conditions along that path. It is a pilot study for a more thorough analysis for involving users and their feedbacks - both qualitative and quantitative - to enhance the built environment of major urban areas. That helps re-mixing the city according to pedestrians' needs.

2 INTRODUCTION

Nowadays, the design of urban spaces has got a lot of interests from urban planners as it is the art of making places for people. A foundation with several concepts, theories, and methods that work on the relationship between the built environment and physical activity has been provided and used by urban planners (Susan L. Handy, 2002). Humans often reproduce their experience, so they assume that "things as they are" cannot be changed. Despite the fact that humans accept the world as it is, the community has a remarkable capacity to plan ahead, shape the future, and adapt to new settings (Jackson, 2003).

On the other hand, the built environment for pedestrians has attracted both planners and public health officials promoting policies that improve its quality through mixed land uses, interconnected street networks, sidewalks and other facilities. A growing number of experimental studies have contributed to the debate about the relationship between the built environment and pedestrian behavior (Cao, Handy, & Mokhtarian, 2006). Susan L. Handy (2002) augmented that a combination of urban design, land use patterns and transportation systems that promotes walking and cycling will help to create active, healthier, and more livable communities.

According to Landis, et al (2001), there are several pedestrian models that consider the statistically significant roadway and traffic variables, which describe pedestrians' perception of safety or comfort. Still, a method is needed to objectively quantify this perception in the roadway environment.

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There is general consensus that pedestrians' sense of safety and comfort within a roadway corridor is based on a complex assortment of factors, such as personal safety, architectural interest, pathway or sidewalk shade, pedestrian-scale lighting and amenities, presence of other pedestrians, conditions at intersections, etc.

All these factors that physically affect pedestrians throughout the built environment still need more studies on the statistically reliable impact on pedestrians' feelings and perception.

3 OBJECTIVES

Improving the quality of life in our built environment is the focal point of every planner, developer, politician, and citizen. This research focuses on making use of emerging technologies within the field of urban planning to efficiently collect and visualize qualitative data rather than only quantitative ones.

The presented study aims to test the usefulness of "SMART-Bands" to sense and chart pedestrians' perception within urban spaces. In spite of the non-representative size of the test sample, this study highlights potentials and limitations of such a tool and technique for aiding urban decision makers. If proven useful, more elaborate studies with bigger sample sizes can be planned and implemented.

This paper presents a sub-study of a wider research that aims at answering the following questions: how do people perceive their environment? How is it possible to collect all of the citizens' impressions in a centralized way and how could these qualitative impressions be visualized?

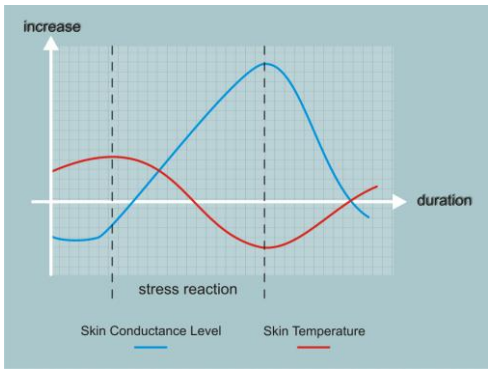
4 METHODOLOGY

The carried out test tracks the stress responses of two participants while walking on both sides of El-Geish Promenade of the Eastern Harbor in Alexandria. While both sides present different urban settings, the study investigates how this influences pedestrians' perception.

4.1 Emotion measurement with physiological vital data

This paper aims to make a contribution to a new method of measuring how people feel in their city. Peoples' feelings and affective emotions are tightly connected with the individual perception. In turn, this perception is linked with the actual surroundings, be it the build environment, pedestrians around or other influencing factors, i.e. traffic or noises. This raises the question how these feelings and emotions, influenced by the individual perception, are objectively measured and brought together with the environment. First, a better understanding of emotions is needed.

Based on previous research in the new field of Affective Sciences (NFS Affective Sciences, 2011) and classical emotion research, emotional reactions are reflected in changes in the activity of the autonomic nervous system. As a result of this activity, specific physiological parameters (e.g. skin conductance and skin temperature) show different values depending on the actual emotion (Kreibig, 2010). These parameters are classified as vital data of the individual. In this context, the so-called method of the psychophysiological monitoring implies the recording of objective vital data in real-time and for every instant. With the help of this data, unswayed affective emotions are derived. In the research at hand, especially mental load (stress) in context with the actual surroundings is observed. Stress can be understood as a product of anger and fear, both considered as highly negative emotions (Bergner et al. 2011).



Figures 1 and 2: The Physiological Stress Reaction (Bergner et al. 2011) and the SMART-Band (own source)

Figure 3: The Study Area with Street Sections along the Path

A negative emotion is given, when the skin conductivity increases and shortly afterwards, the skin temperature drops (Bergner et al. 2011). The following graphical curves illustrate this process (Figure 1). The slope values of the curves can be used for statistical analysis. The mathematical function of these parameters and their curves is simplified with the first derivation. The method of using scoring points (increase in skin conductivity = Scoring +1; decrease in skin temperature = -1) was previously used in several studies (Bergner et al. 2011). In the research at hand a new technical device, the sensor wrist-band

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called SMART-Band (Figure 2), is used to measure the changing body physiology. The SMART-Band (SMART-BAND by www.bodymonitor.de) was developed by GESIS, the Leibnitz-Institute for Social Science in Mannheim/Germany (Papastefanou 2009).

During the research study, the physiological data is recorded for every second. That is the premise to couple and synchronize the physiological data with GPS- and video camera data. The combination of the different data streams offers new opportunities to understand the complex coherence between the individuals' feelings, emotions, perception and the environments.

This approach was already pursued in several project studies. First test series were done in the emomap-project (Zeile, 2010). Furthermore, the so-called EmBaGIS (Emotional Barrier-GIS)-studies were conducted in the context of urban spatial barriers for handicapped (Bergner et al., 2011). Only recently studies concerning the correlation of stress and noise load and also emotional sensing of urban green areas were carried out (Bergner et al., 2012), as well as another study documenting the perceptional experience of pedestrians participating in one of the demonstrations in Alexandria (Taha, Raslan, and Bergner, 2012).

4.2 Factors affecting pedestrians' perception

To reach an optimum public space usability, a solid guidance is needed that displays the best conditions and designs of the sidewalks, how far sidewalks should be placed from moving traffic, when and what type of buffering or protective barriers are needed and how wide the sidewalk should be. That leads to the need of establishing some measuring factors to assess and plan urban spaces. These factors can be classified into tangible and non-tangible factors.

According to Landis, et al (2001), intangible factors are sidewalk capacity, quality of the walking environment and pedestrian's perception of safety and comfort with respect to motor vehicle traffic. However, the perceived safety or comfort has been a challenging factor to be quantified as a stand-alone performance measure. Contrarily, tangible factors are thought to significantly affect pedestrians' sense of safety or comfort. They include the presence of sidewalks, lateral separation from motor vehicle traffic, barriers and buffers between pedestrians and motor vehicle traffic, motor vehicle volume and composition, vehicle traffic speed, driveway frequency and access volume, among other factors.

Figure 4: Daytime and Nighttime Activities along the Path

4.3 The selected path

El-Geish Promenade, or as Alexandrians call it "El Cornice", is the most famous walked path is Alexandria, either for utilitarian or for recreational purposes. It represents an average of a 4.0 km stretch along the Eastern Harbor (3.87 km on the sea side and 4.30 km on the inner side), from the Citadel on its west end to the Bibliotheca Alexandrina on the east (figure 3).

This path is used by locals to reach the Courthouse-Complex, to access El Mansheya Square and the French Gardens, or to get to the famous Abu-El-Abbas Mosque within the Mosques-Square. Furthermore, this

promenade is used by both locals and foreigners as a major strolling, jogging, recreational and entertainment strip, since it harbors many restaurants, hotels, traditional coffee-houses, shops, as well as public gardens. For the small-budget pedestrians, just sitting by the water-front, watching fishermen in the morning or sipping a cup of tea, eating a corncob or a piece of hot sweet potato at night, it provides the needed get-away after work or in the weekend (Figure 4).

While the inner side of the path is almost completely planted with palms or trees, palms can be found on the outer (water-front) side from the beginning of the path as far as section 9, and again towards the end of the path, across the Bibliotheca Alexandrina.

4.4 The event description

The experiment took place on Thursday, November 3rd 2011 at 8:30 am. It started at the west side of the Eastern Harbor (green node) and ended almost 45 minutes later at Bibliotheca Alexandrina at the east side of the Harbor (blue node). The weather was very pleasant that day, with a clear sky and moderate temperature. Two female participants joined the experiment. Each was equipped with one video camera, one GPS tracker, as well as one SMART-Band. Participant A took the outer side of the path (the one closer to the waterfront), while participant B took the inner path (the one adjacent to the buildings).

5 FINDINGS AND ANALYSIS

Participant A showed more stress responses (112 readings) through the 3.87 km stretch along the waterfront (Figure 5) than participant B, who showed only 46 stress points along the 4.3 km walk at the inner side of the path (Figure 7).

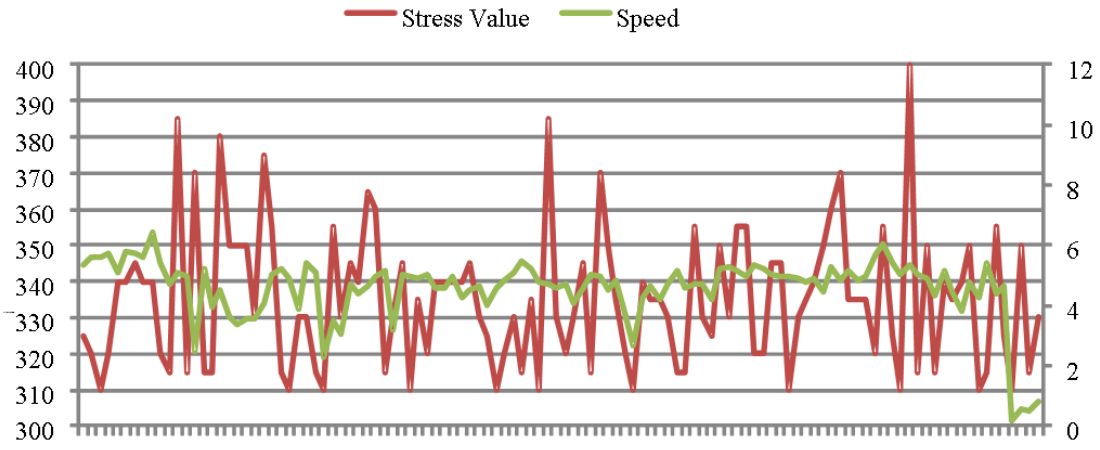

Figure 5: Participant A's Speed and Stress Response by Location

The average pedestrian's speed reaches 4.5 km/hr (Knoblauch, Pietrucha, Nitzburg, 2007). When dismissing extreme values, the speed of participant A varied along the complete path from 7.5 km/hr to 0.04 km/hr (slow speeds were present at the very beginning and at the end of the path), with an average speed of 4.68 km/hr. The average speed recorded at the locations of stress responses is not far from that value. It reached an average of 4.58 km/hr. Extremely slow speed tended to happen at the end of the path, when participant A was first looking for her colleague and then was talking on the phone, stating that she finally reached her target (Figure 6).

Stress responses were spotted when participant A faced pedestrians coming in her opposite direction of travel, when she had to step down or step back on the sidewalk, or when cars or pedestrians blocked her path. Participant's speed did not relate to the altitude of the sensed stress responses at those incidents. Both below-average and above-average speed was spotted at recorded stress points (Figure 5).

The stress points charted by participant B were significantly less in number than those spotted by participant A. However, the same causes triggered the recorded stress responses for both participants. Existing causes were: (1) blocked paths, by cars or by opposite coming pedestrians, (2) stepping down and back on relatively high sidewalks, (3) crossing intersections, especially when they are relatively wide, lack traffic signal lights or have cars coming from more than one direction.

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Same as in the case of participant A, Participant B's speed did not relate to the altitude of stress responses. Both below-average and above-average speeds are spotted at recorded stress points (figure 7).

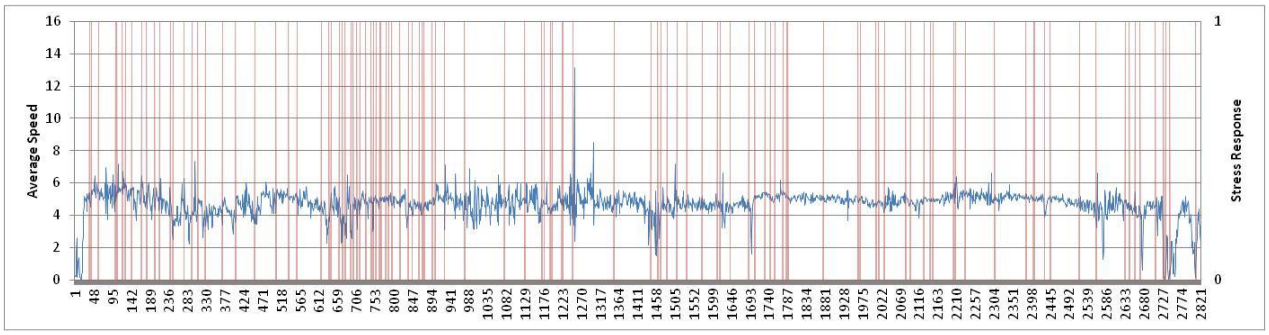

Figure 6: Participant A's Speed and Stress Response along the Path by Time

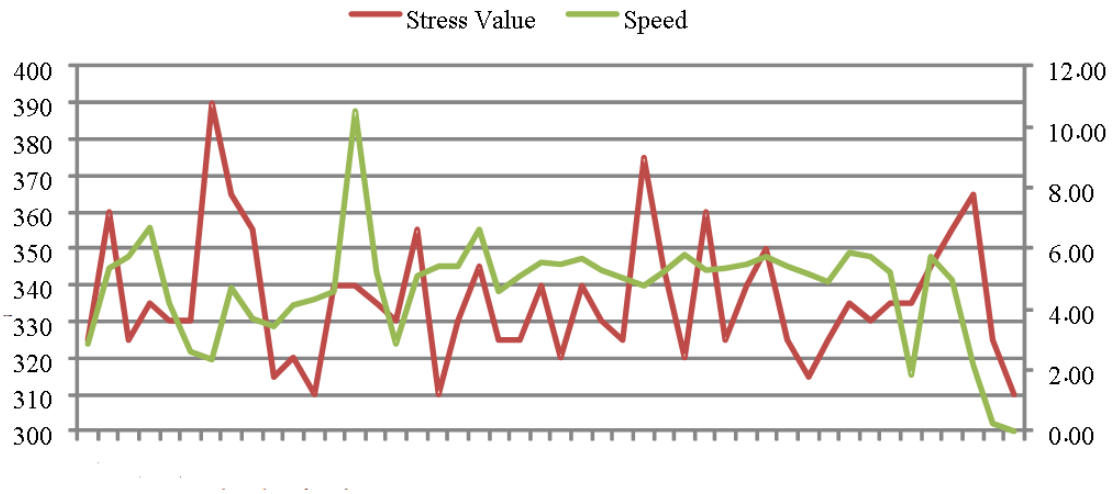

Figure 7: Participant B's Speed and Stress Response by Location

Participant B showed perplexing speed values along the path (Figure 8). Speed ranged from 0.01 km/h to 15.24 km/hr, with an average of 4.68 km/hr. The exaggerated maximum speed values can be caused by inaccuracies in the GPS tracker. When it loses satellite's signal, the following GPS data-pair is farther away than the preceding data. However, the average speed along the complete path (4.68 km/hr) is close to the value of the average speed recorded at the locations of stress response points (4.73 km/hr), which in turn is not far from the average pedestrian speed (4.5 km/hr). As participant B was taking the inner side of the path, which had about 40 intersections, speed variations occurred at those intersections. While in some cases participant B had to slow down or even come to complete stop to wait for a traffic signal or crossing cars, in other cases, she had to speed up to cross the intersection. That was because of the lack of traffic signals or speed tables that slow down vehicular movement that crosses pedestrians' movement.

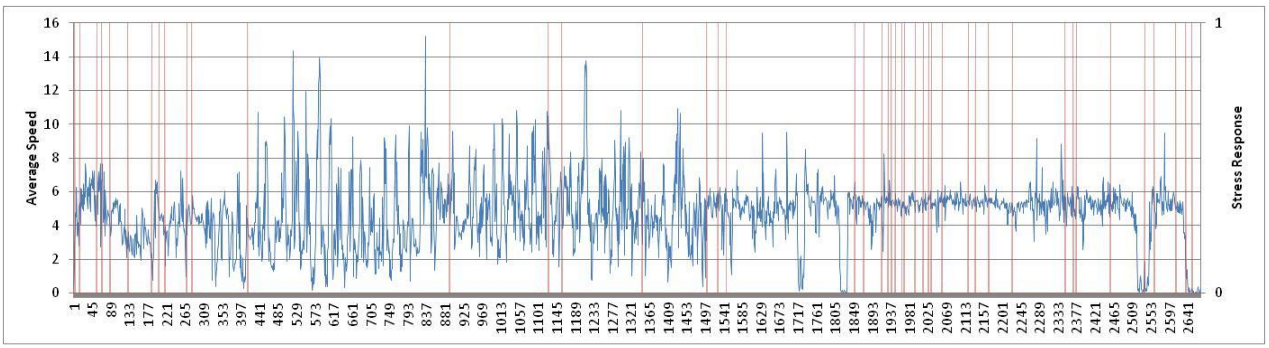

Figure 8: Participant B's Speed and Stress Response along the Path by Time

Participants A and B showed different intensities of stress responses in different zones of the path. When comparing Figures 6 and 8, representing the location of charted stress responses along the path, it is recognized that both participants showed moderate stress intensity at the start of the path. However, while

proceeding with the walk, participant A showed very high intensity of stress responses between sections 3 and 6 and again between sections 9 and 12. On the other hand, participant B had very few stress responses during that whole phase. Instead she had a relatively dense response rate from sections 12 to 15. Approaching the end of the path, both participants reflected more or less medium density stress response rates, although a higher density was on participant A's side.

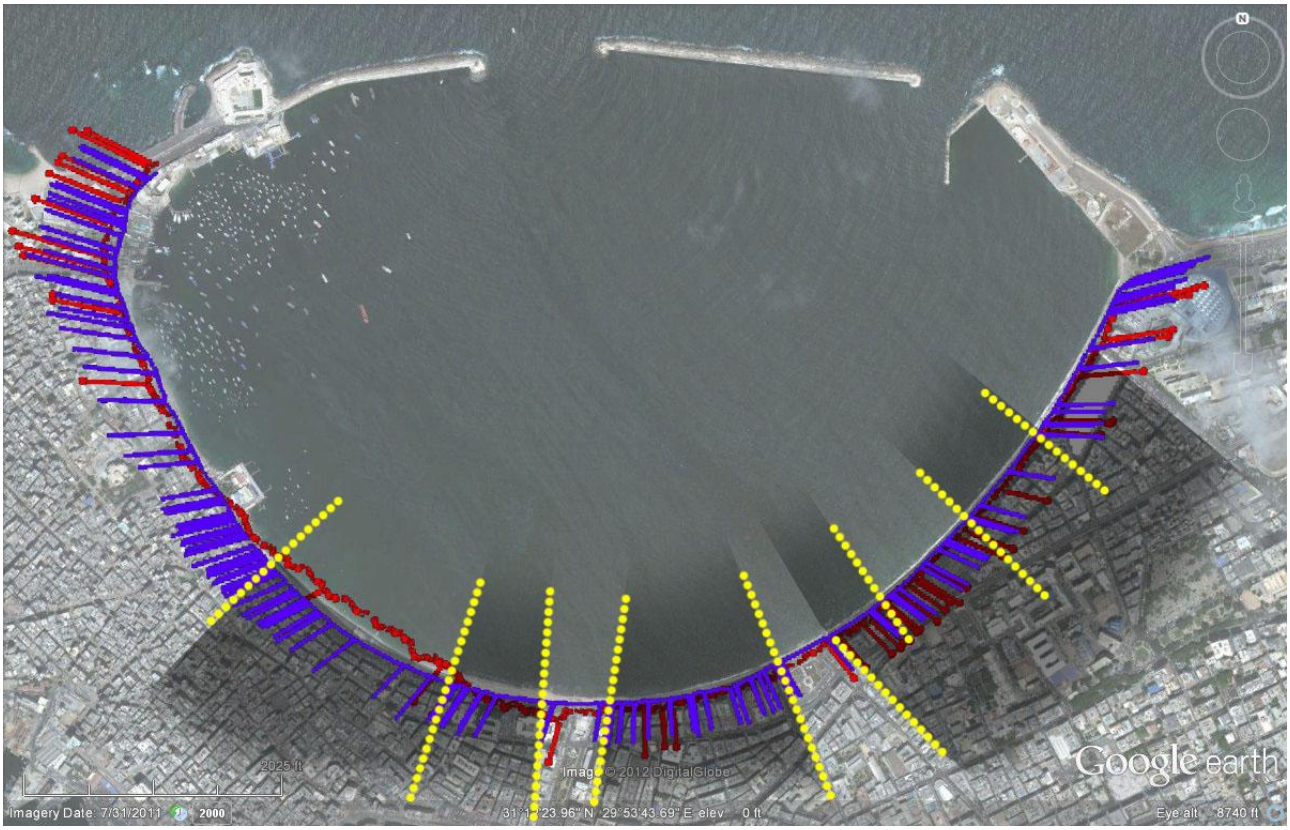

Figure 9: Shaded Zones along the Study Path and Stress Responses from Participant A (blue) and Participant B (red)

Walking in shaded areas or sunny ones did not have any effect on both participants. Figure 9 demonstrates which areas were shaded or sunny on both sides of the path along with stress responses from both participants. During hot summer days, it would have been expected to find dense stress responses in non-shaded areas. However, since the test was taken on a cool November day (where average temperatures range between 19 °C and 22 °C), zones on the path across open spaces, where shade was completely missing, caused no stress at all. At the beginning of the path (for both participants) and towards the end of it (for participant A) shade was missing. However, stress responses were spotted almost with the same density as in shaded areas along the path.

6 DISCUSSION AND RECOMMENDATIONS

Many situations were expected to be stressful out of the comprehension of everyday life, i.e. passing cars. The measurement of physiological indicators shows that in these situations no response was sensed with the SMART-Band.

The intersections at the Unknown-Soldier Monument represent two of the major streets with a high traffic density, where the traffic situation gets often quite chaotic. The first intersection (to the West) is a hub for all sorts of public transportation: taxis, mini-busses and larger busses. While crossing the first intersection, participant A had to take care of mini-busses parked at the intersection, loading and unloading passengers, as well as other vehicles coming from the main street, taking a right-turn (coming from the blind spot of the participant) into the side-street. On the second intersection, participant B had to speed up and dodge vehicles, since there were no means to slow them down by traffic signals or speed tables. However, when participant B was crossing those intersections, no response was sensed (Figure 10).

Figure 10: No Stress Responses were Perceived While Crossing Two Major, High Density Streets

This might be due to several factors. The subject might have been accustomed to those situations, but a foreigner might show some stress if put in the same position. Nevertheless, in the case study some indications which allow raising some hypotheses were observed. There were more stress responses on the sidewalk near the waterfront, than on the sidewalk with buildings on one side and the street on the other. It is assumed that the wider perception of the waterfront participant involves more spatial impressions, which can elicit stress. So the hypothesis is raised that a channeled perception has a more channeled impact on stress reactions in context with the near surroundings. In the study, more influencing factors on the individual perception were observed. Stressful situations were recorded when the participant encounters and perceives other pedestrians or groups. Also the car density and hence the load of noise during the study was higher on the waterfront as on the building side. The many billboards arising attention on both sides of the path were one further influencing factor on perception.

Participant A reflected more stress responses as participant B (112, 46 respectively). This is not only due to the wider perception chances on the waterfront side of the street, but it should also be mentioned that in yet another study, participant A also reflected more responses than participant B while taking the same path. However, while in the previous study stress responses for participant B reached 77% of those of participant A (260, 338 stress responses), in this study they only reached 41%.

These indications show the high complexity of urban open space and its design. In the past it was not possible to objectively measure this complexity in context of human perception. The measurement of unswayed physiological data and thus the individual feelings and emotions in combination with GPS-data offer urban planners new perspectives to understand urban open spaces from the view of its users. Hence, the employment of new technologies to sense space, like the SMART-Band, shows its high potential. But further research with more participants has to be done to get more robust data in case of decision making relying on this data.

7 ACKNOWLEDGEMENT

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Improvement of City Competitiveness by Re-Mixing of Inner Strengths

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1 ABSTRACT

Globalization was marked by mobility – mobility of people, goods, capital, ideas and knowledge. As a result, development strategies in many cities have concentrated on the attraction of new investments, multinational headquarters, international events, tourists and high-skilled workforce, on the attraction of part of the global capital. The question is have these strategies been truly successful in the previous decades, can the attraction of foreign capital still be adequate in the challenging times and economical crises.

This paper will explore another possible approach to strategies for improvement of city competitiveness, ones that are more based on inner city strengths and possibilities, which might be more suitable for contemporary times. Some of most recent research shows that global capital and workforce are not as mobile as it was considered, that are rooted in the economical path, social and cultural network of the city. The inner values of the city such as – inner social and business networks, identity and living conditions have strong impact on city competitiveness in global market. Local inner strength of city and its citizens can be the source of city's wealth and resilience in the era of globalization.

This paper will try to give a new way of looking on city development strategies for the improvement of its competitiveness on regional and global scale. It will elaborate the possibilities to reuse existing inner strengths of local production, creativity and innovations in the city, to remix existing and new values and qualities, with the aim of creation of city's growth in the present global conditions.

2 INTRODUCTION

The beginning of contemporary globalization is connected to the technological advances that made transfer of information and people easier and quicker, decreasing the importance of space distance. It is primarily perceived as the process marked by high and quick mobility. Globalization is connected with the transfer of capital across national borders, in order to reduce costs and expand markets (IMF, 2002). On the other hand, it is characterized by high mobility of people, as individual high-skilled professionals and massive low skilled immigrants.

Development strategies of many cities tried to respond adequately to globalization and its processes, looking for the best way to position themselves on the global market of cities. In a struggle for competitiveness cities, relying on the perception of globalization as mobility of capital, concentrated on attraction of global investment, multinational companies, international events and high-skilled workforce. The sustainable positive effects of these strategies on city wealth are questionable, especially in the challenging times of economical crises.

Another perception of globalization sees it as less mobile and more rooted in local environment and relations. Some new research shows that globalization is closer to inter-national mode of economy than borderless global one (Hirst and Thompson, 1996). High mobility of companies and people in globalization is connected to the small elite groups (Birkinshaw, 2006, UNDESA, 2005). Others are embedded in the economical and cultural path of the city, connected to the local social and business networks.

New approach to globalization opens a new understanding of city competitiveness. Inner values of the city, such as inner social and business networks, living conditions and innovation, became the main motors of competitiveness rise for many. The way how cities improved their competitiveness, based on the inner strength, differ from the support to local business and their expansions, increasing its number and their market; creation of conditions for higher cooperation between local companies and knowledge transfer, to making of needed high-skilled and creative workforce.

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This paper will explore possible strategies for improvement of city competitiveness based on inner strengths. It will elaborate the possibilities to reuse existing inner strengths of local production, creativity and innovations in the city, to remix existing and new values and qualities with the aim of creation of city's growth in the present global conditions. The aim of this paper is to give new way of looking on city development which might be more suitable for contemporary challenging times.

3 IMPROVEMENT OF CITY COMPETITIVENESS IN GLOBALIZATION MARKED BY MOBILITY

3.1 Perception of globalization as higly mobile

Globalization is not presenting completely new phenomenon. Capital accumulation and its spread over the world existed in the sixteenth century. What is new is the speed of change and transfer. The beginning of contemporary globalization is connected with the 80's of the 20th century, when this term came into use. The term came into use to reflect technological advances that made it easier and quicker to do international transactions and financial flows, movement of people (labor) and knowledge (technology) across international borders (IMF, 2008). Remarkable development in computing power and communications capacity transformed and globalised financial system and production networks (Friedman, 1999).

The contemporary globalization is defined as increasing integration of economies around the world, particularly through the movement of goods, services and capital across borders (IMF, 2002). It is acknowledged that globalization induced high mobility of capital across national borders, in order to reduce costs, improve market access and enhance competitive advantage. Companies internationalized their production process, diffused it to the foreign countries with potentials for more efficient production, while at the same time concentrating headquarters in the globalization centers of world cities (World Bank, 1999).

Beside the high movement of capital, globalization is seen as characterized by high mobility of people, tourists and workforce (Appadurai, 1996, Urry 2000). Deregulation of labour market in globalization induces migration of high-skilled workforce and immigrants. Global elite (Castells, 2000) of managers, creative and high-skill workforce, is seen as individuals that move around freely building portfolio careers rather than looking for steady jobs (Williams, 2009). On the other hand, globalization is manifested through international migration, especially transnational migration (Vertovec, 2004) faster and unpredictably shaped, with no clear point of arrival or departure (Urry, 2000).

"Hyper globalization" theses predicts a "borderless world" of global homogeneity, world of non embedded production and consumption chains, placeless capital, homeless subjects, world where all socialites are formed within context of global flows (Robertson, 1992).

3.2 Strategies for city competitiveness based on attraction of global capital

Globalization has intensively affected cities, provoking rapid and dramatic changes to the cities in the past 30 years. Competitiveness between cities has intensified. Although the competitiveness is not a new phenomenon, what is different in contemporary globalization is complexity and global wideness (Sassen, 2002, p.25). Competition, which was previously primarily between cities of the same nation or same region has expanded to the global level.

Perception of globalization as process of high mobility of capital and people have stressed the position of cities as replaceable entities (Lever and Turok 1999), which can be easily changed, capital or production process can relocate to some other place, people can move to other city. This new position of cities in the constant struggle for better global position has induced the need for new strategies of cities' development. The perception of globalization as mobile has influenced these strategies, putting the emphases on attraction of global capital (investment and workforce) as most important elements for cities' growth and wealth. These strategies, according to the basic element of global capital which wanted to attract, can be divided in the following groups: 1) strategies for attraction of global companies and investment, 2) strategies for attraction of global events 3) strategies for attraction of workforce and 4) strategies for attraction of creativity.

Strategies for attraction of global companies and investment

Modern communication has made it far easier to manage dispersed business operations from centrally located headquarters. Most large corporations found advantageous to locate in the main urban centres in order to have full access to the desired mix of services and other companies (Yusuf and Wu, 2002, p. 1215). In the theory the importance of the cities in the global urban hierarchy has been measured by the concentration of headquarters of important international corporations (Sassen, 2001, Hall, 1966, Borja and Castells, 1997). The higher the concentration of main headquarters the higher is the importance of the city in the global networks and flows.

This theoretical approach had its implications in the development strategies of the cities. Many cities around the world tried to improve their global competitiveness and importance by creating attractive ambience for international companies. By developing attractive international business centres in their cities, enhancing business capabilities and services, creating open market and labour conditions they tried to attract global transnational corporations to the city (Yusuf and Wu, 2002, p. 1215). Reason for this informal competition for global companies is that the existence of high ranking companies reflects economic prestige and instils confidence in future investors (Benton-Short, Price and Friedman, 2005, p. 946). The results varied, from success stories to failures, which invested huge amount of financial and human resources in creating alluring conditions without results. It is questionable whether the attraction of international headquarters improves the city competitiveness or the arrival of international companies is the consequence of cities‘ global position improvement.

Strategies for attraction of global evants

The mobility of people, in the first place the mobility of tourist and travelers, has influenced another strategy for city development – the attraction of global events in the city. Important element of the competition between cities is big global events and festivals, with the aim of attracting attention to city and creating a good image (Stahre, 2004, p.73). The promise of world wide exposure and economic gain has made hosting these major and regularly scheduled cultural and sporting events a lucrative goal for aspiring cities around the world (Short and others, 2000). Gaining some global cultural or sport event presented an opportunity for the city to build new image through big architecture and change in urban development. Significant improvement of city competitiveness through use of global events is questionable in the long run. Next event in the next city averts attention to another city.

Strategies for attraction of workforce

As an equally mobile and important component of globalization is seen migration of people (Sassen, 1999). Castells and Miller say that “while movement of people across borders have shaped states and societies since time immemorial, what is distinctive in recent years is their global scope” (2003, p.1). Globalization, mobility of people and the increasing economic integration of states is accepted that creates a global labour market. In that global market top cities are magnets for the skilled workforce, on a permanent or transient basis (Perrons, 2009). Consequently, migration is a significant component of interregional economic relationships.

The perception of high workforce mobility in global network; the possibility of cities to attract new skilled workforce or lose existing one; have influenced intensely city development strategies. Taking into consideration that human resources play the most important element of city development and wealth, especially high-skilled as they are the base of creation and innovation and at the same time of consumption, and that for demographic, economic and social reasons, all highly-developed economies are relying on immigrant labour at all skill levels (Castles, 2006) it is not strange that strategies for attraction of high-skilled personnel are part of city development. Strategies for attraction of workforce and keeping of the existing differ between cities. They range from creating lucrative tax environment, work environment and network to creation of attractive high qualities of life. That skilled people influence cities‘ competitiveness is easy to prove, but is the city competitiveness enough to attract needed labour is questionable.

Strategies for attraction of creativity

Successful city development in contemporary globalization and post-industrial society is, by some authors, seen as based on creativity. Richard Florida (2002) argues that the leading element of contemporary city

competitiveness is the creative industry; such as IT, design and art, on which cities should concentrate. He argues that capitalism is moving from a system defined by large companies to a more people-driven one and gives the assumption that all cities should compete for creative people, 'the creative class'. To be able to attract dynamic and mobile individuals of 'the creative class' cities need to offer attractive living conditions, e.g. urban buzz, varied cultural life, diversity and tolerance. The concentration of creative people will attract companies. The theoretical work of Florida had strong influence on strategies of large number of cities, large global centres as well as small peripheral ones. They tried to develop environment for 'creative class' and through that improve its competitiveness. But the magnetism of large global cities for creative workforce cannot be created in small cities, or in all big cities.

4 COMPETITIVENESS OF CITIES BASED ON THE INNER CITY STRENGTHS

All the strategies for city development presented above have been based on the attraction of global capital in its different forms with the assumption that global capital in contemporary globalization is highly mobile. These strategies have not been proven to be efficient in practice and lead to sustainable city development. What if the basic assumption is not right, if the global capital is more rooted than presented through these theories?

Most recent research shows that globalization is not characterized by high mobility and that global capital is more connected to local social networks and resources than to global flows, that city competitiveness in globalization, even for the high ranked cities in global urban hierarchy, is more result of the long determined development path based on existing inner city competitive elements and resources than on the short term attraction of global capital.

4.1 Perception of globalization as more rooted

Although the mobile elements of globalization, moving of companies, capital and people, are evident and easy to perceive they are not the only elements of contemporary globalization. Easy transfer of information, images, capital and people emphases this part of global process, hiding other important elements. Some critics of globalization argue that such process is occurring (Petras and Veltmeyer, 2001). For example Hirst and Thompson (1996) see it as inter-national mode of economy, seen as well at the end of 19th century, which is not drastically new.

More recent research shows that globalization is closer to inter-national mode of economy rooted in the local societies and networks. Globalization of companies, and creation of big international headquarters is present, but they are not too mobile. Headquarters relocation to new cities, and even more to new countries, is still relatively rare decision. Relocation projects reflect company's long-term identity as well as short-term continuity (Sweeney, 2003). Opening of new regional branches is usual choice of companies with the aim of exploitation of new markets and network benefits. Data support this thesis. Relocation to new countries is present in only 20% of multinational companies. The percentage is higher within large companies and it decreases in medium and especially small companies (Birkinshaw, 2006). For the medium and small companies local social and business ties and networks are more important for development than positioning in major competitive cities. In the decision for the location of companies existing personal links of managers and owners is the most important factor. This as well influences large companies (Musterd and Murie, 2010).

Although there have been growing levels of human mobility and higher levels of circulation in recent decades as opposed to long-term migration and settlement, this is not exceptional (King, 1998). What is deferent in contemporary globalization is individualization of migration process (Beck and Besk-Gemsheim, 2002), with migration becoming an instrument for personal employment responsibility. But mobility is privilege of small group of people. Only 3% of the world's population are international migrants (UNDESA, 2005). In addition far more people move within their own countries than internationally (Skeldon, 2006). Individual migration decisions are understood as investment decisions based on lifetime economic returns and balanced against the known and unknown costs and risks associated with migration (Stark, 1991). The decision for movement is not light decision, especially when the family is involved, and people are more rooted then placeless. For skilled migrants it is even more difficult, no matter that they are targets of many development strategies, since they face additional employment barriers in the professional regulations of some occupations (Williams, 2009). The temporary skilled professional migration, for a period of several weeks, is more present and used by multinational companies (Millar and Salt, 2008). Even here, rootless

professionals are mostly young and male, while others prefer steady connection with family. The most recent research of Musterd and Murie (2010) shows that people choose places to live, beside the job opportunities, according to the personal links they have in those places.

4.2 Improvement of city competitiveness as a result of growth of its inner strengths

When the globalization is seen from another perspective a new perception of city competitiveness in contemporary globalization opens. Even when the globalization is perceived as less mobile and more rooted the global competition between the cities for the development and part of the global market cannot be excluded. Today it is difficult to find isolated national markets. World Bank indicated significance of competition, saying that cities which manage to use their comparative advantages in global markets will prosper and those who stay isolated will fight for survival. Competition between cities does not just take place on global but also on a regional scale (Brenner, 1999), and it is not only important for big but as well for small and medium cities. What changes with the new perception of globalization is the understanding of how cities can be competitive on global markets. Instead of competing for the part of the global capital city compete for the development ratio and its wealth. This corresponds to the standard competition between cities with the difference in market size.

Development of cities and the rise of their wealth as a result of attraction of global capital have not been proven completely successful. Even the new top global cities tend to be the old global cities reinvented – New York, Los Angeles, London, Paris, Tokyo, Hong Kong… (O`Connor, 2006). The emergence of new top level global cities such as Singapore, Beijing, Sao Paulo, Tay Pay, Mexico City…., are result of the expansion of global market and inclusion of new countries in the global networks. When the cities which managed to improve their competitiveness on global level and their position in urban global hierarchy are examined the results indicate that their advancement was not result of arrival of new companies, investments or skilled labour. The main motor of their rise in competitiveness were inner strengths. The successful cities relied on their development paths and reinvented and re-mixed their potentials to the contemporary globalized market and society (Musterd and Murie, 2010). This supports the Jan Jacobs (1984) theory that cities in order to have successful economy must be innovative. Prosperity or stagnation of cities is based on their ability to continue import/export cycle, on their resources and capacity to come up with innovative response. This is applicable on the import/export cycle of global capital, knowledge, innovation, companies and workforce in the contemporary knowledge global society.

The way how cities improve their competitiveness, based on the inner strength, differ from the support to local business and their expansions, increasing its number and their market; creation of conditions for higher cooperation between local companies and knowledge transfer, to creation of needed high-skilled and creative workforce. For example, Amsterdam had stable trajectory of development towards creative knowledge city, long-term strategies and urban development (Streit, Bontje and dell`Agness, 2010). On the other hand, Munich kept developing its existing competitive industry and complementing it with R&D, which is in connection to their recognizable sectors (Goebel and Thierstein, 2006). Helsinki and Stockholm improved their competitiveness by creation of innovation and IT industry. Helsinki invested in formation of new skilled workforce as generators of development and in the period of 30 years rose a level of high educated people from 6% to 30% (Martin-Brelot and Kepsu, 2010).

The possibilities to improve cities' competitiveness by re-mixing and advancing inner strength do not mean that the success is not possible with strategies based on attraction of global capital. The aim is more to show the other possible way and the side of globalization, less used and marketed.

4.3 Strategies for improvement of city competitiveness based on re-mix of inner strengths

Improvement of cities` competitiveness and their position in the global networks can be achieved by different strategies of enhancement of inner strengths. According to the elements on which emphasis is putted strategies can be divided in the five groups: 1) strategies that enhance cities companies, 2) strategies that enhance cities productivity, 3) strategies that improve workforce, 4) strategies that enhance creativity and innovation and 5) strategies that improve tourism.

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Strategies for improvement of cities production

Jan Jacobs (1984) said in her import-replacement theory that successful economy of cities is based on replacement of imports with the local production. In order to be competitive and ensure wealth cities should enhance their productivity, lower import and become exporters of goods. Translated to the strategies for development, this would mean that cities should invest in improvement and development of their own production of goods, based on the existing production trajectories and specific possibilities.

Improvement of cities' production and its regional and global competitiveness can be achieved in different ways, depending on specific conditions. One approach is through government and tax support to preferred production, which has already marked city economy and made it regionally and globally recognisable and competitive. In most cases following the existing production path and further development of its strengths showed to be successful. This approach advantage is in low investment, because of the continuity and already existing elements of preferred production. On the other hand, it is applicable, only if the production has shown to be prosperous. Other approach can be in creation of competitive innovative production from the scratch, changing production specialisation. This asks for higher investment and deeper change of city's functioning. For the cities that have no successful production this might be the only choice.

If the production is not innovative other cities will develop same production of goods and export will decrease, or they would create more efficient ways for the production of same goods and take their position in global market. Relationships between dynamic firms stimulate the circulation of knowledge and improvement of innovation. To achieve this improvement a possible strategy is to create development-production clusters. As Alan Scott (2006) says transfer of ideas in production happens when there is spatial proximity and specialization. Companies profit from each other by exchanging information and knowledge about certain products. Clusters are geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities. The prerequisites for the emergence of clusters are qualified labour and strong networks between actors, the existence of universities and research centres (Porter, 1998). To ensure the production innovation a strong cooperation between R&D and production is preferable. This is accelerated by the spatial proximity of institutions and companies, adequate framework for knowledge exchange and the importance of social capital. "It is assumed that innovation generation proceeds most efficiently either in specialized clusters, where inter-firm links play a part, or in areas where industry, academia and other regional actors collaborate with each other" (Zientara, 2008, p.62).

Strategies for improvement of cities companies

In the present economic conditions marked by the global economic crisis, relying on foreign investment is not productive. Instead, cities should concentrate on intensification of relationships among the existing firms and seeking the establishment of new firms. Translated to the strategies for development it would mean that cities` government should support local companies by creating favourable tax, service and business conditions. Existence of adequate and competitive services and infrastructure in city helps companies to develop and enhance their business.

Beside business environment, similarly as with the improvement of city production, governments should encourage cooperation of local companies, the exchange of ideas and knowledge, and collective global presentation. Governments cannot force firms and other participants to cooperate, but they can provide them with favourable conditions. This would mean creation of spatial agglomerations of companies with similar speciality. Firms with similar or closely complementary capabilities should be concentrated. In order to survive on world markets, it is imperative for small and medium companies, which are the carriers of contemporary globalization, to cooperate with each other (Pratt, 2004). For example, Gibney et al. (2009) have argued that in the knowledge-based economy, leadership of place involves leading and holding together a consortium of potentially separate interests that shape place. Supporting cooperation between business and creation of local special business networks is one way to improve local strength and global competitiveness.

The other imperative of cities` government for improvement of competitiveness is helping their local companies to expand and invest in markets abroad. Through cooperation and common performance on broader markets this can be achieved. The other precondition is cities belonging to the global urban networks. The opportunity for cities to position themselves in global networks lies in careful developing of the unique character by segmentation and specialization. Cities should direct their policies towards strategic

sector. With the involvement in special urban networks the cities create conditions for their companies to integrate in global flows. The more networks it is involved the conditions for development of more sectors are created.

Strategies for improvement of cities workforce

Richard Florida stresses that "the key factor of global economy is no longer goods, services or flows of capital, but the competition for people" (Florida, 2007. P.16). This assumption is based on the mobility of creative and global elite. But taking into consideration that permanent movement of high-skilled workers is low and is mostly connected to young professionals the strategies of attraction of skilled workforce show their unsustainability. For the cities that do not belong to the top level global cities and creative centres this is even stronger. As a lack of social capital diminishes a region's ability to capture the gains of economic growth (Putnam, 1993) cities must find the ways to provide needed workforce. The sustainable strategies for this should rely on the creation of workforce, primarily high-skilled and creative. Ways to realize this strategy can be education of citizens, keeping the young professionals in the city and creating the connections with emigrated experts. The effects should not be expected to be visible immediately. They require decades.

Education and increase of high educated people is correlated with density of universities. The higher importance and quality of education stronger and more competitive city's human resources are. Glaeser and Saiz (2003) found that more educated cities grow more quickly than comparable cities with less human capital, because they become more economically productive. The city's government should invest and support initiatives for opening of universities. They should create spatial conditions for universities and research centres. What is important is the connection between the universities and labour market demands. The education should support preferred development and specialization of city. Human resources can be fully activated only if a city's economic base permits the generation of quality jobs. "That is why achieving a smooth integration between the supply from the education system and employers' demand becomes an essential objective for every city" (Mendez and Moral, 2010, p.5).

University centres, together with the adequate job opportunities in the city, are one of the most important elements for keeping the demography positive. Universities attract young people which afterwards decide to stay in that city. On the other hand, the availability of qualitative university keeps the present young from moving to other cities and raises high education by increasing the availability of student places and decreasing costs (Frenette, 2007). Most highly skilled workers in cities have had previous links with the city, either through family networks or the networking established during their studies. About 80% of young creative and knowledge workers have been educated within the region and very often the first reason for being there relates to the presence of a good university (Musterd and Murie, 2010). The connection of university with labour market insures that investment in education will be payable.

Evan when the emigration of citizens is present it can be used for the enhancement of cities inner strengths and global competitiveness. With the rooted cosmopolitanism individuals move cognitively and physically outside their spatial origins, but continue to be linked to the place, to the social networks of their origin. Professionals which are part of the complex international society have primary connection with domestic (Tarrow, 2005). Cities need to develop strategies for keeping connections with their emigrants and ways to keep collaborations with them, especially with innovative and creative elite.

Strategies for improvement of cities creativity and knowledge

Reliance on the outside creative class, when taken into consideration that is not as movable as it was assumed, is under the question. Charles Landry (2000) stresses the importance of creativity of city management, its resident businesses and citizens. The city gets its creative potentials from within itself. This brings the strategies for city competitiveness improvement back to the inner creative potentials and ways how to use, stimulate and enhance it.

The approaches for improvement of cities creativity are overlapping with already mentioned strategies for improvement of production innovation and education workforce. What differs is emphasize on creativity stimulation. The mere presence of creative people in the city is not sufficient to sustain the urban creativity over long period of time. Creativity needs to be mobilised and channelled, to emerge in practical forms of learning and innovation (Scott, 2006). Transferred to the strategies of city development it means that cities

need to develop stimulating environment for creativity. This can be achieved through creation of special creative clusters, artistic quarters and vibrant public places and events. Creation of spaces for meeting and interaction of creative people presents a precondition for exchange of ideas and stimulation of innovations. Of course, this is not enough. To sustain creativity cities need to support creative activities and help them organize common presentation on global market. Even more important is mobilisation of creativity for the real purposes in the city.

On the other end is the correlation between creative clusters and citizens. Through interaction in public arena the spill over effect of creativity on citizens can be achieved, at least in the openness to newness. This spill over effect is important for resident businesses as well. The creativity of city management is crucial. It needs to be creative in finding solution for stimulation of city development and competitiveness on regional and global scale; it needs to be flexible and adoptive to new conditions that change quickly in contemporary globalization. This can be achieved through inclusion of creative and talented people in city government or through the strong collaboration with them.

Creative cities cannot be created from scratch (Hall, 2004), they need history development path. Not all cities can become creative in the way Florida suggests, but they need to be creative in a sense of innovation and adaptability to competitive challenges of global city market.

Different strategies for improvement of city competitiveness based on re-mixing and enhancement of inner strengths are mutually interlinked and influence one another. The success in improvement city competitiveness usually is connected with use of several different approaches that re-use inner strengths, where one or two are more dominant and others complement. The presented strategies do not present the only that can be developed from inner strength of the city. They more present a short reminder how city development and competitiveness can be tackled depending on the city itself.

5 CONCLUSION

The aim of this paper was to bring attention to another perception of globalization, and emphasize another approach to strategies for cities development, strategies which will more use inner cities' strengths and potentials, re-mix them to correspond to contemporary needs in globalized world. This approach is not the only possible, but rather one more alternative for cities.

The global economical crises, which has affected almost all countries and cities around the world in the last four years, has putted under the question the contemporary globalization process and its possibility to induce sustainable development and growth. The fall in available free capital has drastically decreased movement of capital, primarily foreign investment, travel and high-skilled people migration. As a result the strategies for improvement of cities competitiveness, and consequently wealth, based on the attraction of the foreign capital and skilled workforce cannot be adequate. Cities in a need to counteract recession and induce development have to turn to themselves, aiming to create more resilient communities and resilient cities. In a time of ever-increasing uncertainty, the quest for new strategies of city development which will stand unpredictable turbulences is more important than ever.

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reviewed paper

Integrating Disaster Management and Metropolitan Planning in Tehran

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1 ABSTRACT

Natural disasters affect the performance of urban and regional systems in various forms. Problems caused by unpredictability of the environmental changes can cause inefficiency in short and long-term planning strategies. The importance of avoiding this indicates the necessity of applying appropriate approaches to problem solving in metropolitan planning as well as in disaster management. The process of disaster management and planning in metropolitan areas differ from other urban levels. These difference may be due to such reasons as (a) the importance of responding to disasters in all spatial aspects including social, economic, and physical aspects, (b) the need to act promptly by various stakeholders and players involved in disaster situations and (c) unclearness of the problem which both planning and management systems (i.e., metroplolitan planning and disaster management) have to deal with. It is based on these reasons that the establishment of an integrated disaster management and planning system is crucial specifically in metropolitan areas. Such an integrated planning activity comprises both substantive and procedural aspects including integrated metroplolitan planning and disaster management strategies as well as producing an integrated "spatial metropolitan and disaster management plan" plus specifying the role, functioning and responsibilities of the varied actors active in such an environment.

Tehran (the capital of Iran), a metropolis with more than eight million residents within its statutory boundaries and more than 13 million people residing in Tehran province as the urban region of Tehran, is prone to disasters, that the most important of them would be a severe earthquake. While the last devastating earthquake of Tehran occurred in about mid 1880's, according to studies on the return period of earthquakes, it is estimated that an earthquake with the magnitude of 7 to 8 Richter scale would occur sometime in Tehran in an undefined future. In this respect launching an efficient, while an integrated, planning and disaster management system is a major and crucial concern of policy making in Tehran. Accordingly, this paper has adopted a dual aim of (a) analysing the existing situation of Tehran in terms of disaster management as against metropolitan planning including an identification of the strengths and weaknesses of such a situation, and (b) envisaging the ways and means of integrating the two parallel but highly inter-related areas of metropolitan planning and disaster management

2 INTRODUCTION: ISSUE UNDER STUDY, AIME AND PURPOSE

Large cities and metropolitan areas are the place in which people live, perform their activities and is a place where their assets are concentrated. The high-level of aggregation of human activities makes metropolitan areas increasingly vulnerable to all kinds of disasters, man-made and natural. A natural disaster - usually defined as hazard – is the impact of an extreme and rare natural event that usually overcomes the capacity of communities and organisations and threaten the efficiency and effectiveness of urban physical, social, economic, and natural systems and their planning efforts (refer to & Fleischhauer & Wanczura, 2006: 741).

Application of strategic thinking in spatial planning provides it with a contingency nature. Meaning that spatial planning requires a multi-risk approach to consider all relevant disasters which threatens the vulnerability of a certain area. In such an integrated approach disaster management puts forward a task for spatial planning which enables it - from the beginning of a planning process - to anticipate and consider the consequences of disasters as part of the significant factors in achieving planning goals and objectives (refer to EPSON Monitoring Committee, 2006: 6-7, Greiving and Fleischhauer, 2006: 110).

This paper aims to integrate metropolitan planning with disaster management - with special attention to earthquake as a natural disaster - in Tehran, and envisages agenda such as the followings:

- Analysing the existing situation of Tehran in terms of disaster management within its broad framework of metropolitan planning. This analysis includes an identification of the strengths and weaknesses that such a situation presents.
- Envisaging the ways and means of integrating the two parallel but highly inter-related areas of metropolitan planning and disaster management

In order to achieve these aims a method comprising a four staged process has been devised as follows and as is shown in Figure (1):

- First stage involves studying the conceptual framework produced by reviewing and summing-up the findings of the parallel experiences worldwide.
- Second stage involves analysing the current state of both metropolitan planning and disaster management in Tehran in terms of their linkages so as to find the strengths and weaknesses of such systems. This stage would answer the two following questions of:
- How does spatial planning system in Tehran take into account the risks of earthquake as a natural disaster?
- Which role does spatial planning system in Tehran play in practice in the disaster management process?
- Third stage, based on the conceptual framework produced by reviewing and summing-up the findings of the parallel worldwide experiences as well as the analysis done in the second stage, involves proposing a framework for an integrated spatial planning and disaster management system in Tehran.
- Fourth stage involves the application of the proposed framework in the second stage in Tehran.

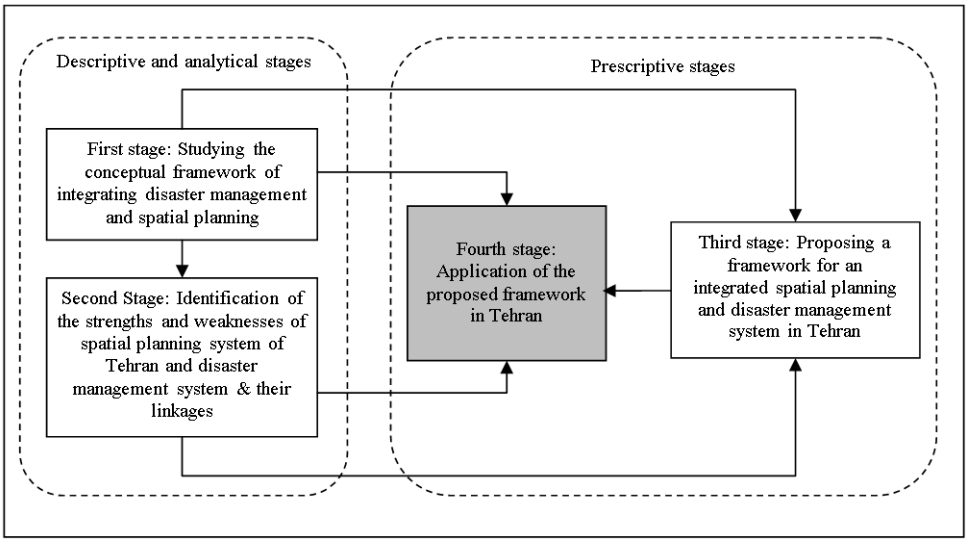

Fig. 1: Flowchart depicting the method adopted in achieving the aims of this paper

3 STUDYING THE CONCEPTUAL FRAMEWORK PRODUCED BY REVIEWING AND SUMMING-UP THE FINDINGS OF THE PARALLEL EXPERIENCES WORLDWIDE

This conceptual framework consists of disaster managment related definitions as well as spatial planning responses to disaster management.

3.1 Disaster

A disaster is the impact of an extreme and rare natural event that usually overcomes the capacity of communities and organisations to cope with which causes severe negative impacts on people, goods, services and/or the environment. A disaster happens when a hazard impacts on the vulnerable population and causes damage, casualties and interruptions. Thus it is a product of the combination of hazard, vulnerability and insufficient capacity or measures to reduce the potential chances of risk (refer to Greiving, Fleischhauer and Wanczura, 2006: 740, Sutanta, et. al., 2009: 342).

3.2 Vulnerability

Vulnerability is the degree of expected damage of natural, socio-economic and physical systems of a community as of the impact and the consequences of natural hazards which is rooted in the interaction between a system and its environment: this is related both to the internal system of a society and the way in which this system interacts with its external environmen (refer to EPSON Monitoring Committee, 2006: 6-7, Chunliang, et. al. 2011: 204). Altogether, two types of vulnerability can be identified: first, the stress-driven vulnerability which refers to the potential of a natural hazard, and second the vulnerability which is related to the potential to react to and/or to endure the hazard. On this basis, reducing vulnerability consists of two main kinds of activities (refer to Chunliang, et. al. 2011: 204).:

- First, removing the causes of the disaster (reducing the hazard),
- Second, removing the effects of the hazard if it occurs.

3.3 Risk

Risk is a combination of the probability (or frequency) of occurrence of a natural hazard and the extent of the consequences of its impacts which is a function of the exposure of assets and the perception of potential impacts as perceived by a community or system (refer to Greiving, Fleischhauer and Wanczura, 2006: 740, Sutanta, e. al., 2009: 342).

3.4 Disaster management

Disaster management can be defined as the organisation and management of resources and responsibilities for dealing with all humanitarian aspects of disasters in terms of activities, programmes and measures which can be commence before, during and after a disaster in order to avoid a disaster, reduce its impact and recover from its losses. Disaster management is a cyclical process which consists of following activities (refer to UNDP, 1994: 13, EPSON Monitoring Committee, 2006: 6-7, Greiving and Fleischhauer, 2006: 114-118):

- Risk assessment: Risk assessment is a combination of these activities (Greiving and Fleischhauer, 2006: 115):
- Risk analysis: The scientific and deterministic task of risk analysis is a mathematical calculation including estimation and description of a hazard – which have been determined based on scientific and technical findings- its frequency of occurrence (hazard component) and magnitude of its consequences (damage potential).
- Risk evaluation: In risk evaluation the outcome of risk analysis and risk perception - which is the overall view of risk as perceived by a person or a group and includes both feeling and judgment – determines the significance of the estimated risks for those affected.
- Mitigation: Mitigation includes a wide range of actions and interventions aiming at long-term goals and objectives that might be designated to reduce the adverse effects of a natural hazards and/or potentially harmful processes before it occurs. Mitigation activities fall broadly into three categories of (a) prevention oriented mitigation, (b) structural mitigation, and (c) non-structural mitigation.
- Preparedness: Preparedness means readiness for short-term activities, such as evacuation and temporary property protection, undertaken as soon as a disaster warning has been received.
- Response: Response indicates short-term initial emergency aid and assistance during or following the disaster as part of the reaction towards it.
- Recovery: Recovery, consist of activities such as the rebuilding of damaged structure, which brings the community back to a normal state

3.5 Spatial planning response to disaster management

Spatial planning response towards earthquake as a natural disaster that contributes to a disaster management system will be discussed in terms of the stages of disaster management process (Table 1).

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Risk assessment

Sectoral planning is the main existing approach for risk assessment, though the outcome of this task indicates a multiplicity of aspects of a system that might be threatened by disasters. A basic prerequisite for any kind of risk assessment to meet the requirements of spatial planning and be used in spatial planning is the existence of a legally binding basis for risk related information. Meaning that spatial planning needs specific spatially and cartographically presentable information which must fit into the spatial scale to be used on different levels: a basis for decisions about future land-uses/space uses (refer to Fleischhauer, et. al., 2007: 385 and JAICA, 2000: 61).

Disaster management activities	Linkages between spatial planning and disaster management systems	Aims
Risk assessment	• Providing vulnerability-related information for land suitability analysis and future development in spatial planning	• Provide awareness about high-risk, medium risk and low risk areas
Mitigation/ Risk reduction	• Prohibition / restrictions of land-uses and activities based on of identification of risk priority zones	• Reduce building damage and casualties
	• Regulating locations of significant public services of the city	• Reduce vulnerability of public services
	• Decentralisation of elements at risk	• Reduce the risk of failure
	• Decentralisation of population densities	• Reduce casualties
	• Strengthen service networks	• Reduce the risk of failure
	• Application of legislative powers and administrative functions	• Setting up building regulations
Preparedness, response, and recovery	• Distribution of urban facilities and infrastructure necessary to respond to the disaster	• Increase coping capacity
	• Rebuilding planning	

Key:	Main responsibilities of disaster management division toward spatial planning	Main responsibilities of spatial planning toward disaster management division

Table 1: Disaster management activities and linkages of spatial planning and disaster management systems. Source: writers (2012) based on various sources used in this article

Mitigation

For earthquake, preventing the actual geological or meteorological process from occurring is impossible and spatial planning have no potential for reducing earthquakes (refer to UNDP, 1994: 20) so the mitigation strategies fucuse on mesuears to reduce both disaster impacts and damage potential. Spatial planning has the specific responsibility in (a) making decisions on long term utilisation of land and (b) providing community with the adapted spaces to enable it to employ the following mitigation activities (refer to EPSON Monitoring Committee, 2006: 6-7, Greiving, Fleischhauer and Wanczura, 2006: 742, UNDP, 1994, Greiving and Fleischhauer, 2006: 121-122):

- Prohibiting future development in certain areas: Areas identified as high-risk, should be designated as risk priority zones. The effects can be greatly reduced if in highly prone areas development would be prohibited and restricted, especially in terms of public sector facilities which are easier to control than those controlled and decided by the private sector. According to the classification of risk priorities, two types of prohibitation / restriction would be applied:
- Exclusion of all uses, except the priority use. Priority use is the permitted use of land/space due to the possible occurrence of earthquake.
- Exclusion of especially threatened facilities (e.g. schools, hospitals) and hazardous facilities (e.g. chemical plants).
- Regulating land use or zoning instruments: An important measure in reducing the vulnerability of a society is carefully selecting the location of public sector facilities and major infrastructure.

- Decentralisation of elements at risk: Services concentrated are always more at risk than those well distributed all over the city. The same principle applies equally to hospitals.
- Decentralisation of population densities: A denser concentration of people will always be less desirable than a more dispersed pattern. In this context, permitted development densities in urban plans should reveal the spatial distribution of hazard severity. At regional levels, the concentration of population and industry in a city, generally has more disaster potential than extension of development over a broader region.
- Design of service networks to reduce risk of failure: In terms of roads, pipelines, and cables, radial networks are less vulnerable than long lengths of lines in circular systems which are at risk if they are cut at any point.
- Developing safety standards, construction codes and building regulations: Legislative powers and administrative functions are procedural tools aiming at special compulsion to protect buildings or other facilities against potential hazard impacts. Based on the information about potentially hazardous zones, it would be useful to integrate special compulsions within a legally binding urban plan aimed at the protection of buildings that might be developed within threatened areas. These obligations may include safety standards, construction codes and building regulations. Codes are likely to have little effect unless they are enforced by authorities. Such efforts need some requirement as:
- An existing and enforceable system of control.
- Awareness of building developers of the standards, codes and regulations and understanding them to considering them necessary.
- Acceptance by the affected community of the objectives and the authority imposing the controls.
- The economic capability of the affected community to comply with the regulations.

Reaction: preparedness, response, and recovery

Emergency response units are the key actors in reaction. Two elements can be recognized as the spatial planning tasks in the reaction stages (refer to Greiving and Fleischhauer, 2006: 122):

- Distribution of urban facilities and infrastructures necessary to respond to the disaster: Some of these facilities include search, rescue and relief stations, emergency medical and health centres, temporary accommodation and emergency roads. The existence and proper distribution of these features can lead to service quickly after the disaster and consequently reduce injuries and fatalities caused by the earthquake.
- Rebuilding of houses and infrastructure: Urban planning can be understood as a key actor in case of recovery activities after a disaster has occurred. The necessary rebuilding of houses and infrastructure has to be coordinated by planning that is ideally oriented on key risk management principles like avoiding hazardous areas.

4 ANALYSING THE CURRENT STATE OF BOTH METROPOLITAN PLANNING AND DISASTER MANAGEMENT IN TEHRAN

Analysisng the currant state of both metropolitan planning and disaster management in Tehran using the above identified conceptual framework, indicates the gaps (as weaknesses) and linkages (as strengths) in an integrated disaster mangement and spatial planning system in Tehran.

4.1 The role of the disaster management system in Tehran

The Study on Seismic Micro zoning of the Greater Tehran Area" is the most important and comprehensive study of risk assessment in Tehran and Tehran Metropolitan Area. This study has provided a comprehensive seismic disaster evaluation (or vulnerability analysis) based on many types of physical, environmental and socioeconomic data items, including (refer to: JAICA, 2000: 9):

- Earthquake catalogue,
- Active faults,

- Geology,
- Ground property,
- Topography,
- Census of buildings (building distribution and building density by type of structure, storey, and construction year),
- Census of population (population distribution and density),
- Urban facilities (distribution of fire fighting stations, police stations, traffic police stations, hospitals, public facilities, educational facilities, parks and public open spaces),
- Urban utilities (water network, gas network, electricity network, and telecommunication network),
- Road and metro network structures,
- Hazardous facilities (distribution of hazardous facilities).

Based on analysing the above data items, some analytical information is provided as peak ground acceleration, seismic intensity, slope stability, building damage, human causality, utility damage, and structural damages. Using this analytic information, overall earthquake risk of Tehran was evaluated by physical and social indicators as (refer to: JAICA, 2000):

- Hazard and damage: seismic, intensity, building damage and casualties,
- Social conditions: population density, open space, and narrow road.

The final result of risk evaluation presents high-risk districts, medium-risk districts, and relatively low-risk districts of Tehran. This risk assessment does not present a comprehensive and thorough picture required for considering the earthquake's risks in the spatial planning system of Tehran. The main problems of this assessment could be explained as follows:

- At the urban scale of spatial planning, data analysis employed in administratively delineated city sub-districts, or some smaller units is frequent. In Tehran, however, this study presents only concrete and detailed maps for Tehran's 22 urban district boundaries which do not fit in with the suitable scale for urban/ metropolitan planning.
- Considering changing social and physical data (population and density, building distribution and density, urban utility networks and so on), there is no mechanism to update the data and provide reliable and up to date vulnerability-related information for urban planners.
- The study area consists of 22 urban districts of Tehran, but the area beyond the city limits has not been considered in this study agenda: there is no information about the vulnerability aspects of the surrounding areas of Tehran (i.e., Tehran’s urban region).

Although there are some other studies on Tehran or parts of Tehran that present some information or analysis about the vulnerability aspect, but since these studies have been done in diverse years (starting from 1996) and by distinct agencies, they have different study areas, basics and principles, methods and outcomes and thus, they cannot able to be integrated to be used in an attempt towards spatial planning.

4.2 The role of the spatial planning system in Tehran

Tehran spatial planning response in employing mitigation measures of mitigation measures could be explained in terms of procedural and substantial aspects. Procedural aspects refer to planning documents and substantial aspects assess the Tehran urban physical and activity sub systems.

Procedural aspects

Urban planning documents system in Tehran is mainly consisted of two parts: (a) Strategic-Structural Plan of Tehran, and (b) detailed plans of Tehran's 22 urban districts. This two were prepared in Research and Planning Center of Tehran, an organization established to manage the collaboration of Tehran municipality and Ministry of Roads and Urban Development in terms of preparing spatial plans of the city.

Strategic-Structural Plan (2006) of Tehran has been recognized the importance of earthquake risk of this city and developed objectives considering managing this risk like identifying vulnerable areas and developing

planning and construction legislations appropriate to each area. Subsidiary documents of this plan also has been mentioned the necessity of developing construction legislative due to the importance of buildings, their stories and vulnerability of their location, developing legislative regarding risk reduction of utility and transportation networks, developing legislative to restrict building's density and arrangement based on vulnerability-related information and so on. But these have not yet become legal statement, and their implementation mechanisms are not defined yet.

Detailed plan of each Tehran's district is prepared based on an agenda which includes two main parts:

- First, studying and analysis of characteristics and specifications of urban development related issues, which lead to assess the determinant factors and trends of changes, and find the problems in the following categories:
- Land use characteristics,
- Spatial structure characteristics,
- Transportation networks characteristics,
- Environmental characteristics,
- Demographic characteristics,
- Socio-economic characteristics,
- Housing characteristics,
- Financial characteristics.
- Second, formulation of optimal spatial structure elements, including:
- Vision and mission statements,
- Goals statement and spatial strategies,
- Land use structure,
- Transportation network structure,
- Rules and regulations of space use,
- Subject and action area projects and their general framework.

The above tow-part agenda shows that disaster management consideration (such as identification and analysis of threats caused by hazards) is not embedded in, so there is no specific obligatory framework to application of earthquake mitigation measures in the optimal spatial structure proposed by these plans.

Substantial aspects

The most important shortcomings of spatial planning response in terms of urban physical and activity sub systems in Tehran in employing mitigation measures include (refer to JAICA, 2000 and International Institute of Earthquake Engineering and Seismology, 2005):

- Considerations of risk reduction were not observed in current location of public sector facilities and major infrastructure elements.
- Most parts of Tehran water network are more than 30 years old and even in normal conditions are often crushed. Studies indicate that in times of earthquake, fractures of water network in Tehran would disable the entire system.
- Tehran electricity, gas, and communication networks suffer from lack of sufficient strength against earthquakes and complete cessation of these networked is possible.
- Tehran's road and transportation network and traffic congestion in normal conditions shows that this network is also highly vulnerable to earthquake. Collapse of adjacent buildings and /or destroyed bridges will freeze the network and cause disorder in the rescue and relief operations and thus increase damages caused by the earthquake.

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- Population density in Tehran does not compliance with vulnerability-related information and even some most vulnerable districts (including districts 10, 11, and 12) are the most densely populated ones.
- Not only, there are not enough safe evacuation spaces with reliable accessibility in times of disaster to settle the survivors, but also the distribution of them is inefficient.

Disaster management activities	Strengths and weaknesses in linkages of spatial planning and disaster management systems in Tehran	
	Strengths	Weaknesses
Risk assessment	• Existence of a relatively comprehensive study on risk assessment of earthquake in Tehran. • Provision of the seismic data of Tehran (such as earthquake catalogue, active fault, topography and so on).	• Absence of the up to date physical and social data to evaluate risk of earthquake in Tehran. • Lack of detailed vulnerability related information in scales required in spatial planning (such as sub-districts and building blocks). • Lack of any applicable study on risk assessment of earthquake in Tehran metropolitan area beyond the city with its 22 districts. • Lack of a defined basis for doing studies on risk assessment so that they could be integrated and used in spatial planning.
Mitigation/ Risk reduction	• Increasing attention to the spatial planning role in mitigation strategies in Tehran spatial plans.	• Lack of mitigation consideration in Tehran Detailed Plans' agenda • Lack of detailed and well-defined legislative to regulate the use of lands and spaces, building density, population density and so on. • High vulnerability of Tehran urban utility, urban facility, road and metro network to the earthquake. • Congestion of population and buildings in some of the most vulnerable districts of Tehran.
Preparedness, response, and recovery	• Increasing attention of spatial plans to the spatial planning role in response and recovery strategies.	• Inefficient distribution of emergency stations. • Lack of safe accessibility to the most vulnerable areas in times of earthquake.

Table 2: Describing strengths and weaknesses of linkage between spatial planning and disaster management systems in Tehran. Source: writers (2012) after JAICA (2000) and International Institute of Earthquake Engineering and Seismology (2005)

5 PROPOSING A FRAMEWORK FOR AN INTEGRATED SPATIAL PLANNING AND DISASTER MANAGEMENT SYSTEM IN TEHRAN

To Integrate disaster management process with the spatial planning process, their interrelationships and interdependencies could be studied in three following main lines of activities (refer to Greiving and Fleischhauer, 2006: 111-115):

- First, problem analysis: Problem analysis process starts with the identification of certain conditions in the real world that regarded as unsatisfactory or demanding urgent action. Prerequisite for this phase is planning goals developing which describe the desired future circumstances. Afterward, observation of the environment, surveying and description of the information can be done to identify the dependencies, interactions and interrelations between the current condition and influencing variables. One of these variables is vulnerability-related information which could be provided by Tehran disaster management system through the appropriate and necessary data and assessment methods (such as hazard maps, risk maps and so on) to develop a correct scientific foundation of the decision-making process. Nevertheless, this activity itself depends on preparation of physical data (such as building types, distribution and density) from spatial planning supporting system.
- Second, evaluation of alternatives: In this stage, planning alternatives would be developed and later, they would be assessed to estimate their anticipated impacts through using necessary measures. Considering the impacts of these alternatives on the damage potential and coping capacity of Tehtran could be a significant contribution to the disaster management system, especially in mitigation activities.
- Third, decision-making and implementation: Paying attention to the above considerations in evaluating the alternatives in the line with willing, proficiency, and power of Tehran spatial planning to regard disaster management as an element of planning process leads to establishment of procedures and development of measures contributing to disaster management activities.

These three activities can be categorized in two main parts of (a) providing a scientific base, and (b) making decisions and implementation as shown in Figure (3).

6 APPLICATION OF THE PROPOSED FRAMEWORK IN TEHRAN

An integrated spatial planning and disaster management framework in Tehran consists of two elements, including providing scientific base and taking decisions and implementing.

6.1 Providing scientific base

A scientific basis provide both required spatial information for risk assessment and vulnerability-related information and classification of earthquake-prone areas which enable the spatial planning system to define land and space uses based on alerting about hazardous areas. Provision of this basis requires the following activities:

- Establishment of an information support system, including complete physical data (building type, building distribution, building age, building density, urban facility distribution, urban utility networks, road networks and so on), demographic data, and seismic data for building blocks of Tehran,
- Designing a mechanism to update spatial data in the information support system,
- Designing a mechanism to update population census in the information support system.

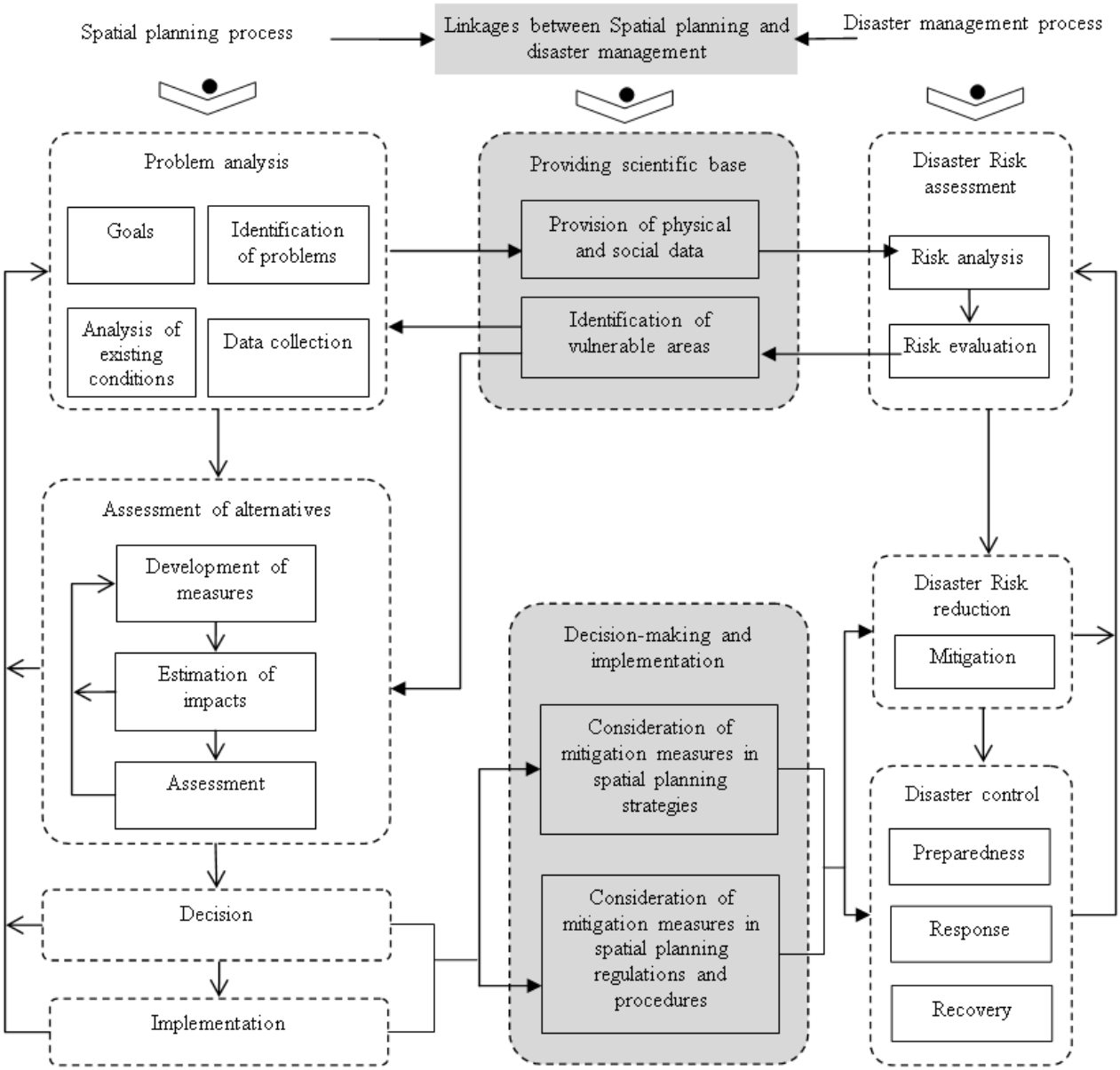

Fig. 3: Integrated framework of spatial planning and disaster management in Tehran. Source: Writers (2012) after Greiving and Fleischhauer, 2006: 116

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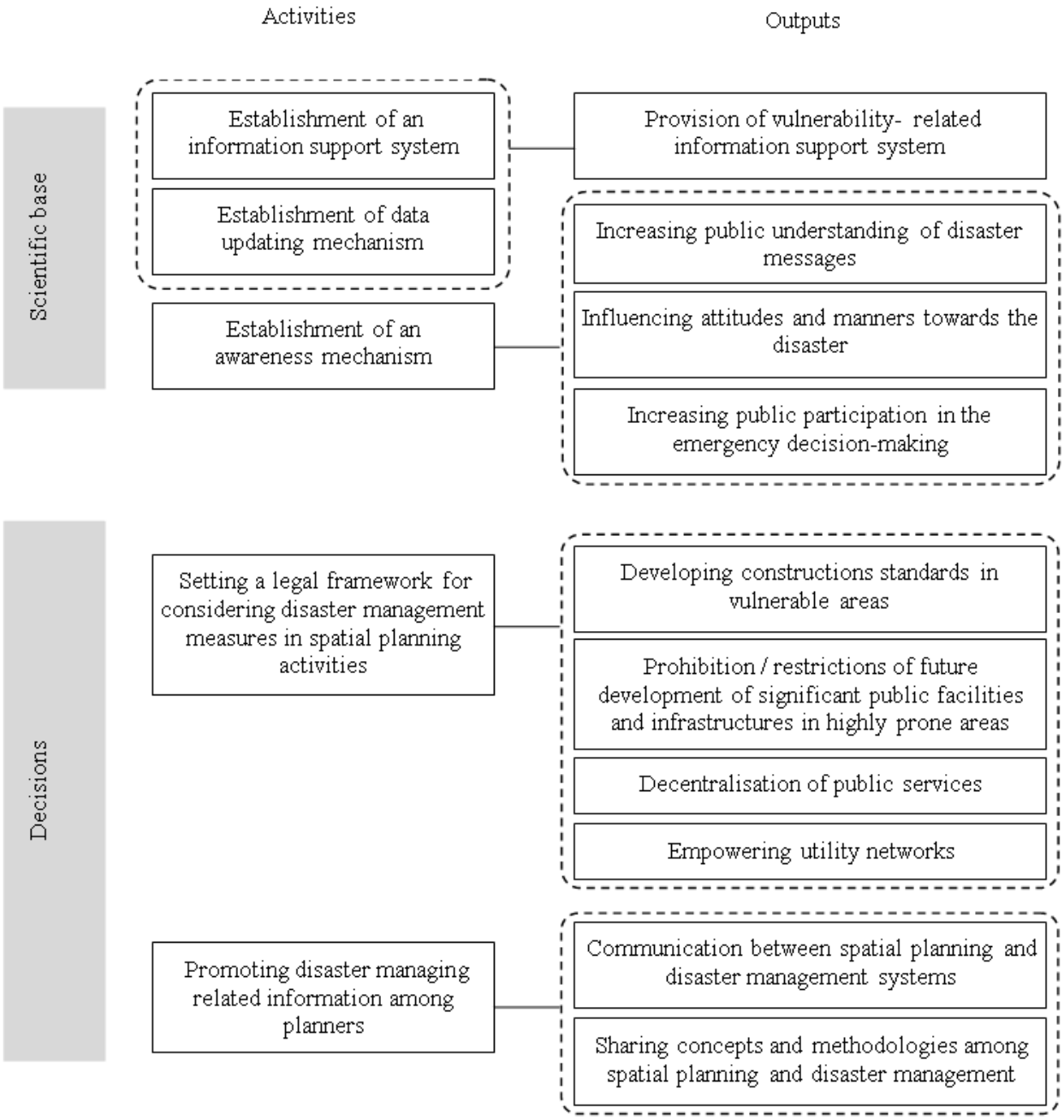

Fig. 4: Application of the proposed framework of spatial planning and disaster management in Tehran. Source: Writers (2012)

Scientific base can also have a different role in raising awareness of Tehran spatial planning officials and experts about disaster management by equip them with information which broadens their view of hazards and risks, since only those hazards and risks that are known can be managed. Moreover, the training of experts engaged in planning is also important in that they may act as multipliers and contribute to the raising of awareness to public. In this situation, the provision of any kind of information (including sources, existing actors and contacts, the cost and effectiveness of different measures, and, etc.) to introduce a disaster management process at the metropolitan level by means of a guideline or a handbook can be seen as a good solution. The guideline or handbook would fulfil these three main objectives:

- Guaranteeing the ability of all receivers of a risk message to understand its meaning,
- Influence receivers of such message to change attitudes towards the disaster and their manners,
- Offering the basis of a two-way communication process which increases public participation in the emergency decision-making.

6.2 Decisions-making and implementation

A legal framework to considerate disaster management measures in planning activities can be seen as the most important need procedurally and legally since it direct spatial planners to take into account earthquake risk while making decisions about urban change and development. Such a framework could include disaster management measures as follows in the spatial plans' agendas:

- Developing spatial construction standards /criteria in vulnerable areas,
- Prohibition and/or restrictions of future development of significant urban facilities and major infrastructure elements in highly prone areas,
- Relocation of hazardous facilities,
- Decentralisation of public services,
- Empowering utility networks through the replacement of damaged parts and switching circular systems with radial ones.

In addition, considering disaster management strategies in spatial planning requires training planners who have skills of understanding seismic map or at least are capable to communicate with the disaster management sector. Cause the lack of shared concepts and methodologies to assess vulnerability may lead to pay little attention to vulnerability in Tehran spatial planning practice. Furthermore, these planners can inform the disaster management system about the real information spatial planning system needs to deal with earthquake in decision-making.

7 CONCLUSION

This article with regard to the important role of spatial planning in disaster management cycle and the connection between the ways of dealing with earthquake and the role of spatial planning, concerns the demands that are made on Tehran spatial planning to integrate with the disaster management system. For the earthquake, preventing the actual geological or meteorological process from occurring is impossible. Thus, disaster management effort toward earthquakes mainly focuses on protection measures related to internal characteristics of the urban system, including city size, density, spatial form, socio-economic development, infrastructures, and the level of emergency response.

Analysis of current state of disaster management and spatial planning systems in Tehran indicates that the main shortages of disaster management system, in terms of its relationship with spatial planning process are lack of maps with suitable scale for urban/ metropolitan planning, lack of mechanism to update vulnerability-related information for urban planners, and lack of vulnerability-related information for the area surrounding Tehran. Additionally, there is no legal framework for taking into account the disaster management considerations in urban planning practises, which leads to high risk of spatial structure and residents of Tehran in times of an earthquake.

In this regard, the proposed framework of integrating spatial planning and disaster management consists of two main elements: (a) setting a supporting scientific base, and (b) making decisions and implementing them according to the mentioned scientific base.

In the scientific base, integrating spatial planning and disaster management process would be occurred in a tow-way relationship: first, spatial planning system provides physical and social data, which is needed for disaster risk analysis of disaster management system, and later, risk evaluation activity of disaster management process identifies vulnerable areas which would be important in analysis of existing conditions, setting planning goals, and assessment of alternatives in spatial planning process.

Disaster risk reduction and control activities would also be integrated in spatial planning process by considering of mitigation measures in spatial planning strategies, regulations and procedures, which are determined in decision-taking and implementation stages of spatial planning process.

In such a framework, the responsibility for disaster management is shared by sectoral planning and spatial planning whereas spatial planning mainly acts in the area of earthquake mitigation due to the long-term character of planning decisions.

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Integrative Urban Design Game as a Method for Creating Liveable Urban Ambients

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1 ABSTRACT

Complexity of urban environments implies new methods that can design urban ambients in sustainable manner. This means that urban design and urban planning must work together in order to achieve flexibility for liveable urban ambients in the process of sustainable urban regeneration. Problem and research questions that guide this work are: How to achieve this kind of disciplinary, interdisciplinary and participative cooperation? Is it possible to overcome main obstacles of interest based urban development? Do traditional methods of urban design and urban planning can achieve the integration? The aim of the paper is testing the "Integrative urban design game", the method applied in the process of urban regeneration of Bač Fortress Suburbium, regarding its possibilities to frame and integrate different rationalities into a coherent future. Different rationalities come from variety of actors and stakeholders in the community seen as carriers of urban vitality and identity. The hypothesis is that the method is in the relation with local context and level of social capital in local communities. Therefore, the expected results of the paper will (dis)prove the integrative "power" of the method using case study as a methodological approach of measuring the level of acceptance and integration among different group of stakeholders.

2 INTRODUCTION

The multilevel dimension of urban design and urban planning and their mutual overlapping in contemporary urban paradigms create rich area for integration of the positive sides of both disciplines in the process of urban regeneration. Urban regeneration is framed by sustainability as "youngest" urban paradigm (Reeves, 2005). Sustainability seeks to integrate aspects, aims, and spaces of "older" paradigms providing liveable places. Furthermore, urban regeneration of protected ambients emphasises the need for this kind of integration. Most would say that it is a subject of integrative protection, however, by my opinion the issue goes beyond this concept. The argumentation for this is in the institutional dimension of sustainable development, crucial for the provision of Healey's "soft infrastructure" and objectification of different worlds into coherent whole.

Therefore, the aim of the paper is to discuss the question when urban design and urban planning should work together to build the institutional space for achieving sustainable places in protected urban ambients. This will be researched by analysis the results of a workshop: "Participatory approach in urban design of public spaces of Bač Fortress Suburbium" held in August 2010 as a part of Summer school of Architecture in Bač. The workshop used the innovated method "Integrative urban design game" (Mrđenović, 2010) to experiment its possibilities to integrate different rationalities in participatory process, as well as to build soft infrastructure for place making. Also, the data acquired from the Report on the results of "Summer school of architecture in Bač 2010", (Architecture, 2010) will provide a base for the conclusions.

In line with this in the first chapter I will discuss the integrative aspects of urban design and urban planning in situations when they should work together, as well as their relation to integrative protection. This discussion will be leaded by multilevel dimensions of the disciplines to produce sustainable, rich and liveable spaces. The second chapter will examine the "Integrative urban design game" regarding its power of integration. It will be analysed from the perspective of making linkages between urban design and urban planning using different methods and techniques form both disciplines. The type of the linkages that method can provide in the community are by my assumption in the relation to the level of community social capital. Conclusions should prove the previously presented hypothesis.

3 URBAN DESIGN AND URBAN PLANNING: INTEGRATIVE DIMENSIONS?

3.1 Overlapping dimensions

The discussion between urban design and urban planning is related to favoured urban paradigm in specific socio-economic context. Therefore, both disciplines can be practiced as blue prints, achieving expected results in top-down instructive process of policy decision making. This paradigm is usually seen as rational -

positivistic one where hierarchy of planning system is deterministic and strict. On the other hand, the disciplines could be practiced as iterative and integrative processes of achieving mutual consensus among relevant stakeholders. These processes are practiced in collaborative and sustainable paradigm. Sustainability evaluates urban design and planning solutions by the quality of process, regarding the level and type of participation. These I would say antipode positions of urban design and urban planning in different paradigms mostly make assumption and opinion that urban planning and urban design have strict boundaries. I believe that these boundaries are rather dashed then solid.

Therefore, the point that I stand for is the one where urban design is seen as multidimensional process of subjective-imaginative, communicative-creative, interdisciplinary and technical activities (Madanipour, 1996). Also, urban planning seen as a process in contrast with blue-print planning has its communicative-creative, interdisciplinary and technical dimension (Healey, 1997). The subjective-imaginative and creative dimension of urban design is powerful integrative force regarding different kinds of integration. As it is presented the most of the process of urban design and urban planning are overlaping. Therefore, urban design is also seen as decision making process that goes through the phases of strategic planning. This dimension equalizes the discipline to urban planning. Most would ask: So, what is the difference between urban design and urban planning? I would answer the imagination of urban designers. And this is crucial for making quality of places nevertheless the theory in which we explore and practice urban design and planning.

I would say that urban design and urban planning are overlapping in all dimensions except subjective-imaginative (Figure 1). This dimension is essential for the process of quality place making in sustainable regeneration. According to the principles of New Urbanism these qualities are: "…neighbourhoods should be diverse in use and population; communities should be designed for the pedestrian and transit as well as the car; cities and towns should be shaped by physically defined and universally accessible public spaces and community institutions; urban places should be framed by architecture and landscape design that celebrate local history, climate, ecology, and building practice…" (CNU, 1996).

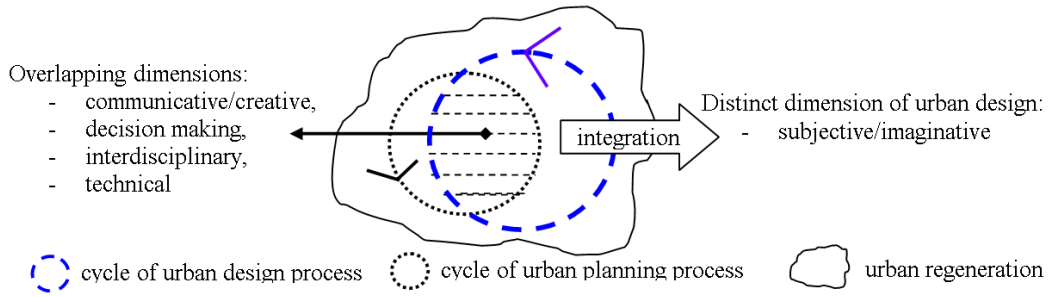

Figure 1: Overlaping and distinct dimension of urban design and urban planning in the process of urban regeneration

By my opinion these qualities are achieved in the overlapping areas, leaded by imagination of urban designers. According to Landry, Harvey, Jacobs, Dovey the imagination of urban designers is crucial for quality place making, integration and rationalization of different ideas and creativities in wide participation process practicing Dovey's "power-to" rather then "power-ower" in the creative milieu for open communication(Landry, 2005) (Jacobs, 1992) (Dovey, 1999). This integration leads to Harvey's "making sense together" for Habermas's communicative action (Harvey, 2007) (Habermas, 1984).

3.2 Integrative urban design and planning regarding protection

As it is said urban design and urban planning should work together in order to achieve quality of place making in urban regeneration. The integrative dimension lies in urban design, particularly in the imagination of urban designers as artisans. By my opinion all the other dimensions have "corrective" role in rationalization of urban designers' imagination and social creativity. Therefore, urban design seen as a process plays an integrative role in urban regeneration, as well as between two disciplines (Mrđenović, Integrative Urban Design in Regeneration - Principles for Achieving Sustainable Places, 2011) (Mrđenović, Urban Design and Urban Planning in Global Positioning of Local Identities, 2011) (Mrđenović, Urbana regeenracija zaštićenih ambijentalnih celina u kontekstu održivog razvoja - Podgrađe Tvrđave Bač / Urban regeneration of protected ambients in the context of sustainable development - Bač Fortress Suburbium, 2011). From this point after I will look on two disciplines as "fusioned /united" (Figure 2) regarding

achieving betterment of urban regeneration. Also, I will call them using term Integrative urban design. This will be especially important for the discussion of their role in urban regeneration of protected urban ambients. The attribute 'protected 'will lead discussion among "fusioned disciplines" and integrative protection.

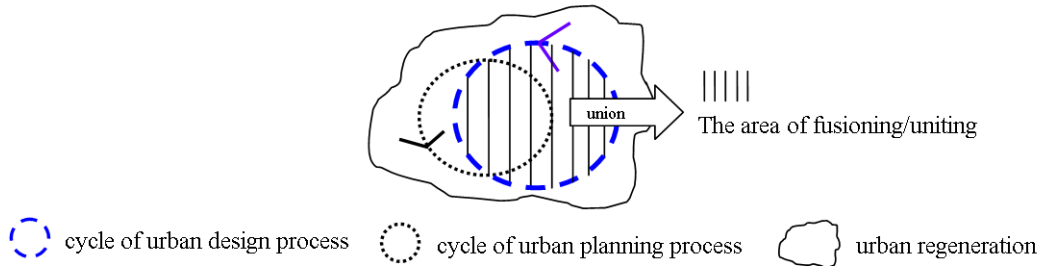

Figure 2: The area of "fusioned/united" disciplines of urban design and urban planning creating the process of Integrative urban design

Integrative protection as a discipline is in line with international documents on UN, EU and ICOMOS level that seeks to "bring life" into protected urban areas according to the principles of sustainability (UNESCO, 2005), (ICOMOS, The Stockholm declaration, 1998) (ICOMOS, The Nara document on authenticity, 1994) (ICOMOS, DECLARATION OF TLAXCALA, 1982) (ICOMOS, Resolutions of the Symposium on the introduction of contemporary architecture into ancient groups of buildings, 1972)(EU, 1996). This means integrative protection, also integrates different sectors of sustainability: economy, society, environment and institutions through encouraging public participation to be active in the promotion of cultural heritage in line with contemporary concept of cultural tourism (Dojčinović 2005). This kind of integration leads to promotion and protection of non-renewable resource like cultural-historic heritage. This process also leads to social cohesion among local people, who brings life into physical structure, and who are carriers of social and knowledge of past times. This is essential for holistic approach between past, present and future and our responsibility to preserve past and present cultural practice for future generations (Figure 3).

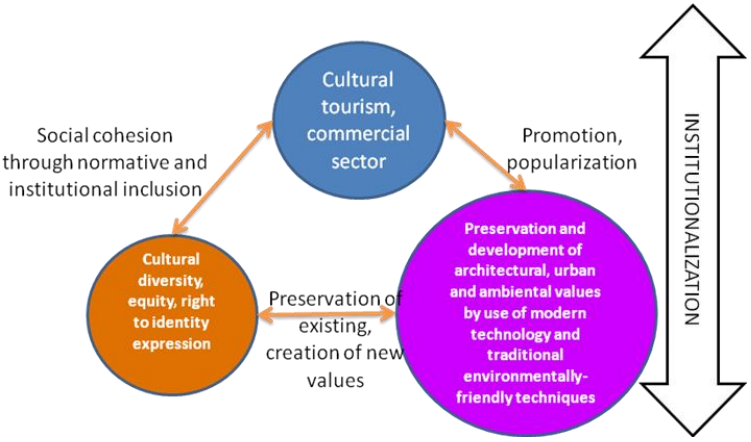

Figure 3: The model of sustainable development for the regeneration of protected urban areas (Mrđenović, Urbana regeenracija zaštićenih ambijentalnih celina u kontekstu održivog razvoja - Podgrađe Tvrđave Bač / Urban regeneration of protected ambients in the context of sustainable development - Bač Fortress Suburbium 2011)

This holistic interpretation of cultural goods is the best described in Stockholm declaration: "These rights assume the need to recognize, appreciate and maintain heritage, and to improve and respect a framework for action. They assume appropriate development strategies and an equitable partnership between society, the private sector and individuals to harmonize interests affecting cultural heritage, and to reconcile preservation with development." (ICOMOS, The Stockholm declaration, 1998) . According to the previously discusses I rise a question: What is the role of the united urban planning and urban design (integrative urban design) in development of protected urban areas if integrative protection already covers it?

By my opinion the role is in Lefebre's "spatial reproduction" (Lefebvre, 1991) of "social and knowledge of past and present times" creating place that brings contemporary life into past structures, interpreting past activities and enabling them into space. This "place making thing" is crucial for the pivotal role of "united disciplines" in protected ambients, as I claim for "new universality" in "golden unity" for "colourful

fragments" (Mrđenović, Urban Design and Urban Planning in Global Positioning of Local Identities, 2011). Here, integrative protection has a corrective, rational, role regarding what should or should not happen in the place. In line with this, the process of creating the place should be leaded by integrative urban design. According to Amsterdam Declaration: "...conservation calls for artists and highly-qualified craftsmen whose talents and know-how have to be kept alive and passed on." (EU, European Charter of the Architectural Heritage, 1975). It seems like integrative protection and integrative urban design are in conflict, both creating liveable places in protected ambients. In further discussion I will make these fuzzy issues more clear regarding the process. Figure 4 gives more clarity to this fuzziness.

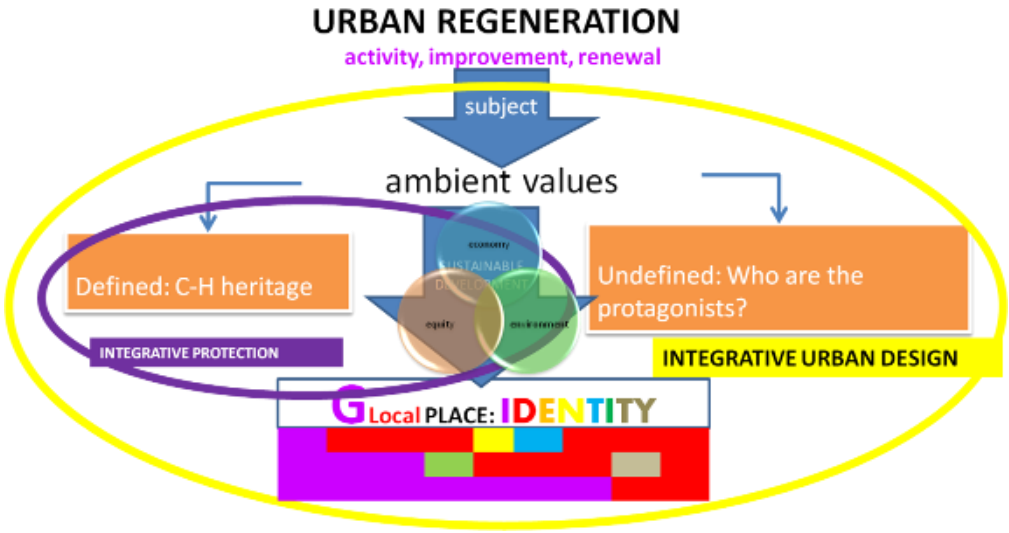

Figure 4: The relation among urban regeneration, urban design and integrated protection (Mrđenović, Urbana regeenracija zaštićenih ambijentalnih celina u kontekstu održivog razvoja - Podgrađe Tvrđave Bač / Urban regeneration of protected ambients in the context of sustainable development - Bač Fortress Suburbium 2011)

This question is related to the favoured urban paradigm in the process of urban regeneration. The need for protection calls for rational and positivistic approach, when experts put standards and assure their implementation; while collaborative approach assure sustainability of protected urban ambients, creating "liveable places" that carry past tradition, urban forms, morphology and contemporary ones oriented towards future development fitting into wider plans and policies. According to Gospodini: "...it can be said that urban space morphology and urban design are gradually becoming significant parameters or resources in urban tourism development." (Gospodini, 2001).Therefore, I believe that the type of the urban regeneration process (more rational or collaborative) as well as used methods in the process will make clearer picture on the discipline that should have a leading role in the specific phase of the urban regeneration process.

4 INTEGRATIVE URBAN DESIGN GAME: THE UNITY POWER

4.1 New method for integration

I will now introduce the "Integrative urban design game" (Mrđenović, 2010) as a new method firstly used in the workshop: "Participative approach in urban design of public spaces - Bač Fortress Suburbium" (Mrđenović, Workshop: Participative approach in urban design of public spaces - Bač Fortress Suburbium / Radionica: Participativni pristup u oblikovanju javnog prostora - Podgrađe tvrđave Bač, 2010). The workshop was a part of "Summer school of Architecture in Bač 2010" with a mission to create Healey's "soft infrastructure" (Healey, 1997) through educational process on sustainable urban regeneration and integrative protection among local and regional stakeholders. The method went through different phases of "fusioned disciplines" using various methods and techniques seeking to integrate them creating "new golden unity" (Mrđenović, Urban Design and Urban Planning in Global Positioning of Local Identities, 2011) for Habermas's "communicative consensus" (Habermas, 1984), and Landry's "creative milieu" (Landry, 2005) towards achieving quality of future public spaces.

Related to the discussion in the previous chapter the method integrates different types of methods and techniques supporting wide range of purposes in the multidimensional process of sustainable urban regeneration. In general my criteria for systematization of the methods are based on their support in:

- Phase of integrative urban design,
- Level collaborativeness,
- Type of rationality.

Figure 5: Gradual - incremental creation of the mimicry model of future public space of Bač Fortress Suburbium as a result of Integrative urban design game (Mrđenović, Workshop: Participative approach in urban design of public spaces - Bač Fortress Suburbium / Radionica: Participativni pristup u oblikovanju javnog prostora - Podgrađe tvrđave Bač, 2010)

Regarding this I would say that integrative urban design and integrative protection use different methods according to the criteria. The former uses both rational and collaborative in all phases of the process, while the latter uses more rational and expert ones due to its corrective and normative role in the process of promotion and protection of built cultural-historic herritage.

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Here I would point out again the role of integrative urban design (fusioned disciplines) in this process, which is assuring liveable places with specific glocal identity making them recognizable on global map. On the other hand, integrative protection should prevent the 'dark side' of globalization that is by Nara document characterized as homogenization of cultural expressions. "In a world that is increasingly subject to the forces of globalization and homogenization, and in a world in which the search for cultural identity is sometimes pursued through aggressive nationalism and the suppression of the cultures of minorities, the essential contribution made by the consideration of authenticity in conservation practice is to clarify and illuminate the collective memory of humanity." (ICOMOS, The Nara document on authenticity, 1994) Therefore, the Integrative urban design game is in line with the one of the document's suggestion to develop innovative methods and processes that will treat cultural heritage in integrative manner according to local context. (ICOMOS, The Nara document on authenticity, 1994).

"Integrative urban design game" seeks to play among various interests and rationalities in fair manner using Habermas's "communicative ethics" (Habermas, 1984). In that play it integrates different processes of urban design, such as the subjective-expressive, social-creative, social-communicative, technical-rational, and interdisciplinary. The aim of this method is to develop different types of rationality in wide community participation process towards achieving the quality of place using a creative game in the visualization of space. The method applied on Bač Fortress Suburbium is rationalized in the key segments of the process, using argumentative and expert methods. In this way, it created 'future image' of the place through its spatial visualization, using three-dimensional and two-dimensional presentations, drafts, drawings and text, different expert methods of polling, interviewing, context analyses, morphological analyses, as well as collaborative methods that support argumentation by use of different diagrams such as problem tree and tree of aims and measures (Figure 5).

The essence of "Integrative urban design game" is to establish a relation between different types of rationality, as well as between the phases of the urban regeneration process. As a method, it implies a continual procedure in the development of social creativity, as well as its rationalization. In the light of creating the conditions for communicative action in the regeneration processes and unity of reality fragments, the method integrates the advantages and disadvantages of the two most present paradigms in urban decision-making, the rational-comprehensive and collaborative; changing the role of urban design in the integrative processes. Therefore, in the situations of urban regeneration of protected urban ambients the method is appropriate for shaping the places in overlapping area of urban design, urban planning and integrative protection (see Figure 1) using mimicry three-dimensional model of present, and future place bringing into light the richness of cultural diversity of past, present and future times through wide participation. This mimicry model is also a polygon for integration of different types of appropriate methods, as well as phases of the process (Figure 5).

4.2 The power/acceptance of the method

In this chapter I will argue the method regarding its power to integrate different rationalities, values, cultural practices and interests into coherent whole, through its acceptance and level of participation among relevant stakeholders on local and regional level. The basic data will be acquired through analysis of the workshop as a case study, as well a on the Report on the results of "Summer school of architecture in Bač 2010", consigned to the Ministry of education and science in 2010, by University of Belgrade – Faculty of Architecture (Architecture, 2010). It is important to emphasise that Municipality of Bač is national, multiethnic and multicultural community.[1] Accortding to this fact In the workshop participated relevant stakeholders on regional and local level representing cultural diversity:

- "Province Institute of Cultural Monument Protection",
- "Directorate for Urban Construction of Bač Municipality",
- "Tourist Organization of Bač municipality",

[1] According to the records of Statistical Office of the Republic of Serbia in Bač municipality live: 47.33% Serbs, 0.35% Montenegrians, 5.02% Yugoslavs, 0.04% Albanians, 0.02% Bosniaks, 0.01% Bulgarians, 0.06% Bunjevci, 6.18% Hungarians, 0.07% Macedonians, 1.35% Muslims, 0.55% Germans, 1.98% Romas, 3.55% Romanians, 0.04% Russians, 0.06% Rusyns, 20.02% Slovacs, 0.05% Slovenians, 0.57% Ucrainians, 8.65% Croats, 0.83% Czechs, 3.27% uncomited. (RGZ, 2011)

- "Fund Centuries of Bač",
- "Radio Bačka" and
- Local population of Bač Suburbium.

The process of "Integrative urban design game" was created regarding following phases: (1) Preparation of the participative procedure, (2) Defining the desired future – visioning, (3) Analysis of problems and potentials, (4) Defining strategic objectives and measures for public space improvement, (5) Testing the place making solutions through mimicry model.

In the first phase the interviews and questionnaires for local people and relevant stakeholders were done as an expert method giving relevant inputs for further process cycle. The questions were structured regarding:

- The present usage of public space by local people: level, way and regime;
- The wishes and ideas of future usage of public space by local people: spaces for socialization, interaction among cultures, festivals;
- The memories on how the public space was used in past time;
- The existing and future plans and projects for the Suburbium regarding its protection and development: potentialities and obstacles.

These preparatory activities included field inventory like sketching, urban morphology analysis, photographing, measuring. The preparation phase gave a solid grounding for the workshop.

The workshop was held in Bač Fortress Suburbium and was designed as one and a half day training using "Integrative urban design game" as a method for consensus building through art and design. Therefore, the workshop had also, the educational aim. This leaded towards building capacity of local community on sustainable urban regeneration of protected urban ambients. The other phases of the process were done with high level of participation by all relevant stakeholders (see Figure 5) where the author of the method facilitated the process by encouraging creativity, argumentative discussion, making conclusions using text, slogans, images, sketches, 3D model and other types of methods and techniques. Also, students from Faculty of Architecture in Belgrade, students participants of "Summer school of Architecture in Bač 2010." enabled Landry's creative milieu through generating ideas and enabling their flow. In that manner the "Integrative urban design game" integrated different types of methods as well as different ideas, values, interest into "golden unity" of urban design of mimicry model of future public place (see Figure 5).

Also, the results generated by the method are and will be incorporated in future documents, plans and projects regarding Bač Fortress Suburbium. According to the Report on the results of "Summer school of architecture in Bač 2010" (Architecture, 2010), the results will be used mostly by the "Province Institute of Cultural Monument Protection", "Directorate for Urban Construction of Bač Municipality", "Tourist Organization of Bač municipality", "Radio Bačka" in their future activities and programs regarding the sustainable urban regeneration of the Suburbium and its promotion towards cultural tourism. Therefore, I can conclude that the method had powerful force regarding the integration of multicultural values, interests and ideas among stakeholders form public and civil sector ("Fund Centuries of Bač" has a role of financing activities and it is inside local authority), as well as among vertical integration of different institutional jurisdictions. Also, it integrated various types of methods and techniques that were tailored made according to specific socio-cultural and urban context. In line with this I can conclude that the method is more open than strict, giving a skeleton for adopting it to various urban contexts in the process of sustainable urban regeneration.

5 CONCLUSION

The discussion went through presentation of different options regarding fuzziness among disciplines of urban design, urban planning and integrative protection in sustainable urban regeneration. This fogy issue leaded towards further examination of overlapping dimensions among disciplines, their union and dashed boundaries. I conclude that urban design, seen as multidimensional process with subjective-imaginative dimension, has a leading role in place making and "bringing life" into protected urban ambients, making them liveable places. This process is supported by other dimensions regarding sustainable paradigm where urban design and urban planning are overlapping: communicative-collaborative, social-creative, decision

making-integrative, technical-positivistic. This overlapping area I call integrative urban design (Mrđenović, 2011). In line with this integrative protection has a "corrective role"due to protection of non-renewable resources such a built cultural-historical heritage is. Therefore, the positivistic rationality in this type of urban regeneration should come from integrative protection, while integrative urban design should provide communicative consensus among different rationalities, values, cultural practices and interest bringing them into "golden unity".

Also, the "Integrative urban design game" as an innovative method (Mrđenović, 2010) integrates different types of methods and techniques that varies according to the phase of the process, type of rationality and level of collaborativness they support. The method uses mimicry three-dimensional model/skeleton of present place as a polygon for wide participation and creating creative milieu for communicative action. Therefore, the "skeleton" is incrementally built by relevant stakeholders integrating their values using different expert, collaborative, argumentative, creative methods and techniques like: text, drawings, slogans, sketches, photographs, problem tree, objective tree; appropriate for each phase of the process. The analysis of the case and the report showed that the method was highly accepted among stakeholders as they plan to use its results in future. Also, the method used training as an instrument for building capacity and developing social capital in local community through interactive education. Finally, the method enabled creating liveable ambients through developing social capital, "soft infrastructure" and creating a framework for future plans and actions regarding protection and promotion by stakeholders from public sector on local and regional level.

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🏆 *reviewed paper*

Integrierte Simulation von Raumentwicklung und Verkehr bei stark steigenden Energiepreisen

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1 ABSTRACT

Etwa die Hälfte ihres verfügbaren Einkommens geben deutsche Haushalte für das Wohnen und die Mobilität aus. Ausgangsthese des vom deutschen Forschungsministeriums geförderten Projekts €LAN ist, dass die Energiepreise mit hoher Wahrscheinlichkeit beides deutlich teurer machen werden, da das Ölfördermaximum unmittelbar bevorsteht. Die Energiepreisentwicklung wird erheblichen Einfluss auf Landnutzung und Mobilität haben, da es die Standortwahl von Haushalten und Unternehmen, das Mobilitätsverhalten, die Wohn- und Gebäudekosten sowie die kommunale Einnahmen- und Ausgabensituation betrifft. Zudem spitzen steigende Energiekosten vor dem Hintergrund des demographischen Wandels Fragen der Daseinsvorsorge insbesondere im ländlichen Raum weiter zu.

Das Projekt €LAN setzt sich zum Ziel, die Betroffenheit von Haushalten, Unternehmen und Gebietskörperschaften zu analysieren und ihre Anpassungsreaktionen mit Hilfe eines räumlichen Wirkungsmodells zu simulieren. Es geht zudem vor allem der Frage nach, wie Entscheidungsträger aus Verwaltung und Politik in den kommenden Jahren angemessen mit der Energiepreiszunahme umgehen können. Dabei wird erwartet, dass steigende Energiepreise einen erheblichen politischen Handlungsdruck generieren. Anpassungsmöglichkeiten und -strategien bedürfen dabei einer räumlichen Spezifizierung zwischen Städten und ihren Umlandgemeinden und dem ländlichen Raum.

Das Projekt koppelt daher die räumliche Wirkungsmodellierung und politische Handlungs- und Reaktionsmuster in einem Verbundvorhaben. Die Kopplung erfolgt über ein Simulationsexperiment. In dessen Verlauf werden die Handlungsreaktionen von relevanten politischen Akteuren in einem Planspiel abgefragt und zu politischen Rahmensetzungen für die folgende Simulationsperiode verdichtet. Dieser experimentelle Regelkreis dient als Grundlage für die Ableitung umsetzungsorientierter Handlungsempfehlungen, die in einem transdisziplinären Prozess entwickelt werden.

In diesem Paper wird zunächst der Ansatz des €LAN-Projekts vorgestellt und dann das integrierte Landnutzungs- und Verkehrsmodell für die Metropolregion Hamburg, bei dem in einer Multi-Agenten-Simulation Demographie und Unternehmensentwicklung, Arbeits-, Wohnungs- und Gewerbeimmobilienmarkt sowie Verkehrs und Flächenentwicklung für Szenarien von 2010 bis 2035 unter den Bedingungen steigender Energiepreise abgebildet werden, erläutert.

2 WAS BEDEUTEN STEIGENDE ENERGIEPREISE FÜR DIE SIEDLUNGSENTWICKLUNG?

Etwa die Hälfte ihres verfügbaren Einkommens geben deutsche Haushalte für das Wohnen und die Mobilität aus (Statistisches Bundesamt 2010). Ausgangsthese des vom deutschen Forschungsministeriums (BMBF) geförderten Projekts €LAN ist, dass die Energiepreise mit hoher Wahrscheinlichkeit beides deutlich teurer machen werden, da das Ölfördermaximum unmittelbar bevorsteht (IEA 2009). Die Energiepreisentwicklung wird erheblichen Einfluss auf Landnutzung und Mobilität haben, da sie die Standortwahl von Haushalten und Unternehmen, das Mobilitätsverhalten, die Wohn- und Gebäudekosten sowie die kommunale Einnahmen- und Ausgabensituation betrifft. Zudem spitzen steigende Energiekosten vor dem Hintergrund des demographischen Wandels Fragen der Daseinsvorsorge insbesondere im ländlichen Raum weiter zu.

2.1 Das Projekt €LAN

Das Projekt €LAN setzt sich zum Ziel, die Betroffenheit von Haushalten, Unternehmen und Gebietskörperschaften zu analysieren und ihre Anpassungsreaktionen mit Hilfe eines räumlichen Wirkungsmodells zu simulieren. Projektpartner sind das Institut für Verkehrsplanung und Logistik der TU Hamburg-Harburg, das Institut für Raumordnung und Entwicklungsplanung der Universität Stuttgart (IREUS) und das Finanzwissenschaftliche Forschungsinstitut an der Universität zu Köln (FiFo) in Zusammenarbeit mit dem Institut für ökologische Raumentwicklung Dresden (IÖR).

Es geht zudem vor allem der Frage nach, wie Entscheidungsträger aus Verwaltung und Politik in den kommenden Jahren angemessen mit der Energiepreiszunahme umgehen können. Dabei wird erwartet, dass

steigende Energiepreise einen erheblichen politischen Handlungsdruck generieren. Anpassungsmöglichkeiten und -strategien bedürfen dabei einer räumlichen Spezifizierung zwischen Städten, ihren Umlandgemeinden und dem ländlichen Raum.

Das Projekt koppelt daher die räumliche Wirkungsmodellierung und politische Handlungs- und Reaktionsmuster in einem Verbundvorhaben. Die Kopplung erfolgt über ein Simulationsexperiment. In dessen Verlauf werden die Handlungsreaktionen von relevanten politischen Akteuren mittels einer „Planspiel"-Methodik abgefragt und zu politischen Rahmensetzungen für die folgende Simulationsperiode verdichtet.

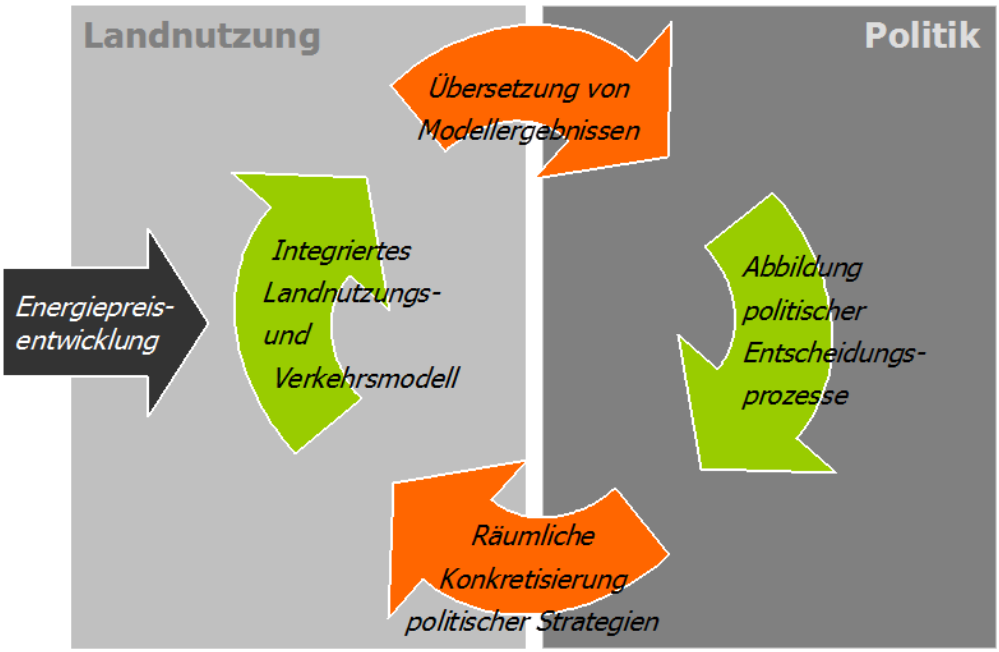

Fig. 1: Ablauf des Projekts €LAN

Dieser experimentelle Regelkreis (Fig. 1) dient als Grundlage für die Ableitung umsetzungsorientierter Handlungsempfehlungen, die in einem transdisziplinären Prozess entwickelt werden.

In diesem Paper soll das integrierte Landnutzungs- und Verkehrsmodell vorgestellt werden und die Fragen diskutiert werden, wie steigende Energiepreise auf Landnutzung und Verkehr wirken, welche Strategien Politik und Planung zur Verfügung stehen und welche zentralen Wirkungszusammenhänge dafür im Modell abgebildet werden müsssen.

2.2 Warum haben steigende Energiepreise Auswirkungen auf Siedlungsentwicklung und Verkehr?

Die heutigen Sieldungsstrukturen und Verkehrssysteme haben sich in den letzten Jahrzehnten bei relativ geringen Energiepreisen herausgebildet. Die Siedlungsentwicklung war lange gekennzeichnet von einer Suburbanisierung von Haushalten und (teilweise) Unternehmen: mehr Wohnfläche in Gebäuden mit einem hohen Energieverbrauch, einer steigenden Motorisierung und immer weiteren Wegen zur Arbeit, zum Einkaufen und in der Freizeit.

Bei in Zukunft weiter steigenden Energiepreisen sind Haushalte mit höheren Nebenkosten und Verkehrsausgaben konfrontiert. Dabei sind vor allem Bewohner von Wohnungen und Häusern mit großem Energieverbrauch sowie die Haushalte, die weite Wege zur Arbeit und zu anderen Aktivitäten mit dem Pkw zurücklegen, betroffen. Dies trifft Haushalte mit mittlerem und geringem Einkommen, für die sich bei immer geringerem verfügbaren Einkommen für andere Konsumbudgets ein steigender Handlungsdruck ergibt (Fig. 2).

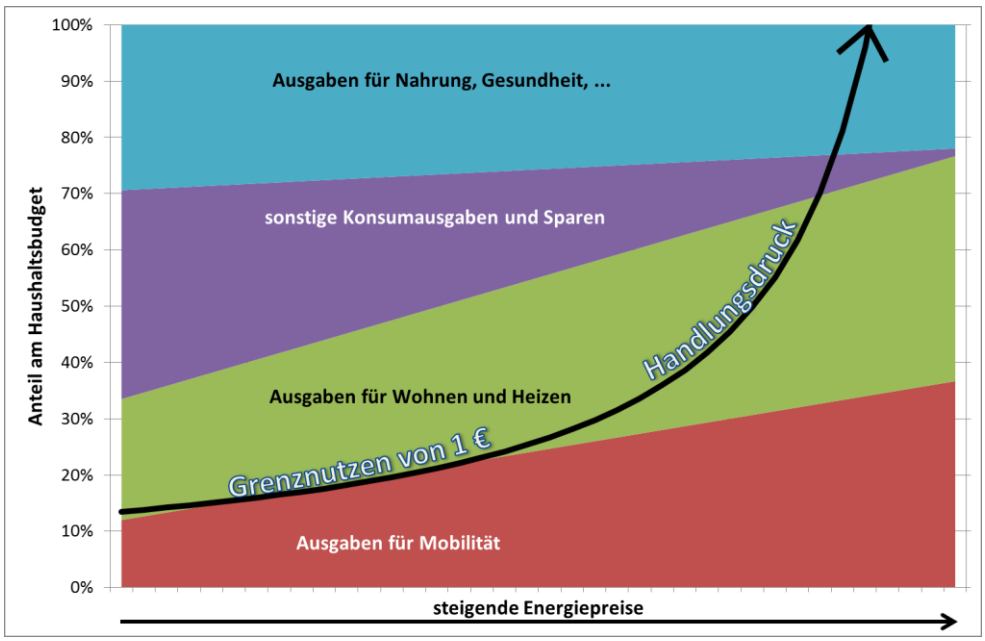

Fig. 2: Haushaltsbudget

Mögliche kurz- und langfristige Anpassungsreaktionen liegen in einer

- energieeffizienteren Pkw-Nutzung
- einer verstärkten Nutzung günstigerer Verkehrsmittel (ÖPNV, Fuß- und Radverkehr) einer räumlichen Reorganisation (Aufsuchen näher gelegener Einkaufs- und Freizeitziele, der Suche eines näher gelegenen Jobs oder schließlich die Suche nach einer neuen Wohnung, die kürzere Wege zur Arbeit und zu anderen täglichen Aktivitäten ermöglicht)
- einer Suche nach einem besser bezahlten (Vollzeit-)Job
- und schließlich der Einschränkung von Aktivitäten oder dem Kürzen von anderen Haushaltsbudgets

(vgl. Gertz et al. 2008).

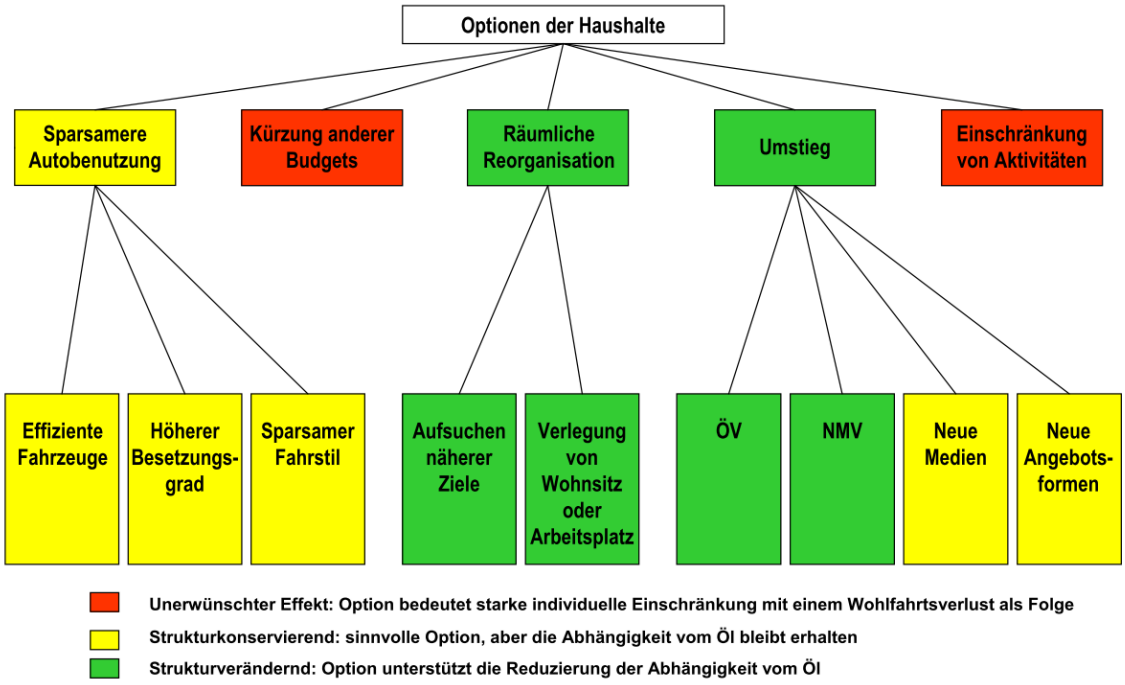

Fig. 3: Mögliche kurz- und langfristige Anpassungsreaktionen auf steigende Energiepreise (Quelle: Gertz et al. 2008)

Gerade bei der räumlichen Reorganisation (Jobwechsel, Umzug) sind die individuellen Entscheidungen von den Wechselwirkungen zwischen Angebot und Nachfrage auf dem Arbeits-, Wohnungs- und Immobilienmarkt abhängig.

Zur Abbildung dieser komplexen Entscheidungen und Wechselwirkungen wird ein integriertes Landnutzungs- und Verkehrsmodell eingesetzt. Im folgenden Abschnitt wird ein Überblick über die Gesamtsimulation gegeben und insbesondere die Teilmodelle des Wohnungs- und Immobilienmarkts vorgestellt. Dabei wird ein Focus auf die Frage gelegt, wie die Prozesse der Reurbanisierung, Innenentwicklung und Gentrifizierung abgebildet werden können und wie eine Wirkungsabschätzung verschiedener Handlungsstrategien von Politik und Planung, die im Planspiel diskutiert werden sollen, erfolgen kann.

3 DAS INTEGRIERTE FLÄCHENNUTZUNGS- UND VERKEHRSMODELL

Intgrierte Flächennutzungs- und Verkehrsmodelle wurden seit den 1970er-Jahren weltweit entwickelt. Einen Überblick über Integrierte Landnutzungs- und Verkehrsmodelle finden sich bei Wegener und Fürst (1998), Torrens (2000) und Wegener (2004). Im deutschsprachigen Raum sind als Anwendungen integrierter Modelle bekannt: Das makroskopische IRPUD-Modell für die Region Dortmund (Wegener 1998) und dessen mikroskopische Weiterentwicklung ILUMASS (Beckmann et al. 2007), das Dresden-Modell (Rümenapp 2004), die Anwendung der mikroskopischen Simulation UrbanSim (Waddell 2002) für die Region Zürich (Löchl 2007) sowie das systemdynamische Modell MARS für die Region Wien/Bratislava (Pfaffenbichler et al. 2007). Eine Diskussion der Vor- und Nachteile makros- und mikroskopischer Modellansätze findet sich bei Wegener (2009).

3.1 Gesamtstruktur des €LAN-Modells

Für €LAN wurde eine im Wesentlichen dynamische, mikroskopische Multi-Agenten-Simulation mit einigen makroskopischen Teilmodellen entwickelt, die mit dem mikroskopischen Steuer-/Transferleistungsmodell FiFoSim (Peichl and Schaefer, 2009) gekoppelt wird.

Das Modell soll Entscheidungen von Haushalten und Betrieben sowie die Entwicklung von Gebäuden und der Flächennutzung in der Metropolregion Hamburg (4.5 Mio Einwohner, 2 Mio Jobs, 1 Mio. Gebäude) von 2010 bis 2035 simulieren.

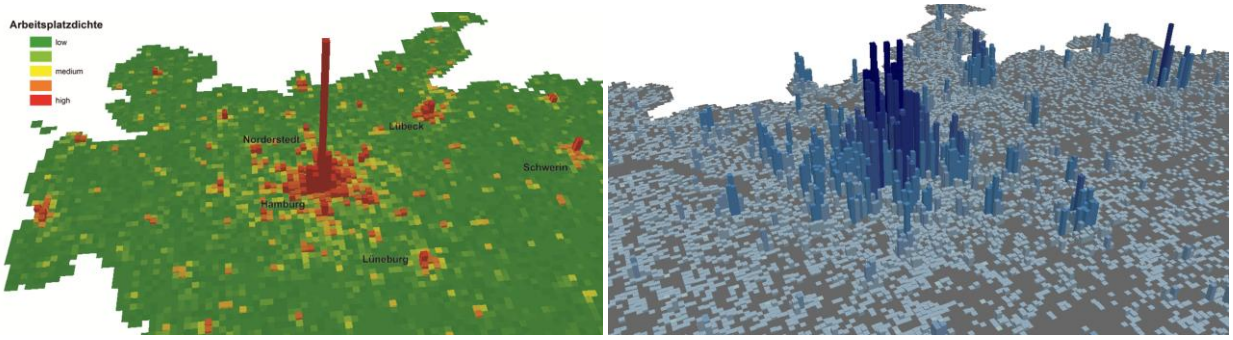

Fig. 4: Arbeitsplätze und Einwohnerdichte in der Region Hamburg

Diese synthetischen Haushalte und Personen, Betriebe und Jobs sowie Gebäude mit Wohnungen und Gewerbeeinheiten wurden auf der Basis verschiedenester Datenquellen generiert (amtl. Statistiken auf Gemeinde/Stadtteilebene, amtliche Geodaten, Mikrogeographische Daten kommerzieller Anbieter generiert und werden weiter mit Hilfe verschiedener Mikrodatensätze (Mikrozensus, Sozio-Ökonomisches Panel SOEP) weiter attributiert. Daten zum Gebäudebestand, die auf der Basis topographischer Karten generiert wurden (Meinel 2008) werden weiter um Informationen zu Sanierungszustand und Energieverbrauch sowie Miet- und Kaufpreisen auf der Basis eines umfangreichen Datensatzes von Immobilien-Angebotsdaten ergänzt.

In jedem Simulationsjahr werden verschiedene Teilmodule durchlaufen, welche die demographischen Prozesse, die Entwicklung von Betrieben und Jobs (Firmographie), den Wohnungs- und Arbeitsmarkt, die Immobilien- und Flächenentwicklung sowie den Verkehr abbilden. Da der Fokus des Modells auf der Simulation der Wirkungen von Preisänderungen auf Standort- und Mobilitätsentscheidungen unterschiedlicher Haushaltstypen liegt, werden die Haushaltsbudgets (Einkünfte, Steuern/Abgaben, Ausgaben für Energie, Mobilität und Wohnen und sonstigen Konsum) abgebildet. Haushalte, deren verfügbares Einkommen nach Abzug von Energie-, Wohn- und Mobilitätskosten sinkt, spüren einen besonderen Handlungsdruck und werden verstärkt Anpassungsreaktionen auf steigende Energiepreise

zeigen. Das Modell FiFoSim ermittelt zudem die Konsequenzen der Trends und möglicher fiskalischer und sozialpolitischer Handlungsoptionen der Planspielakteure auf die öffentlichen Haushalte.

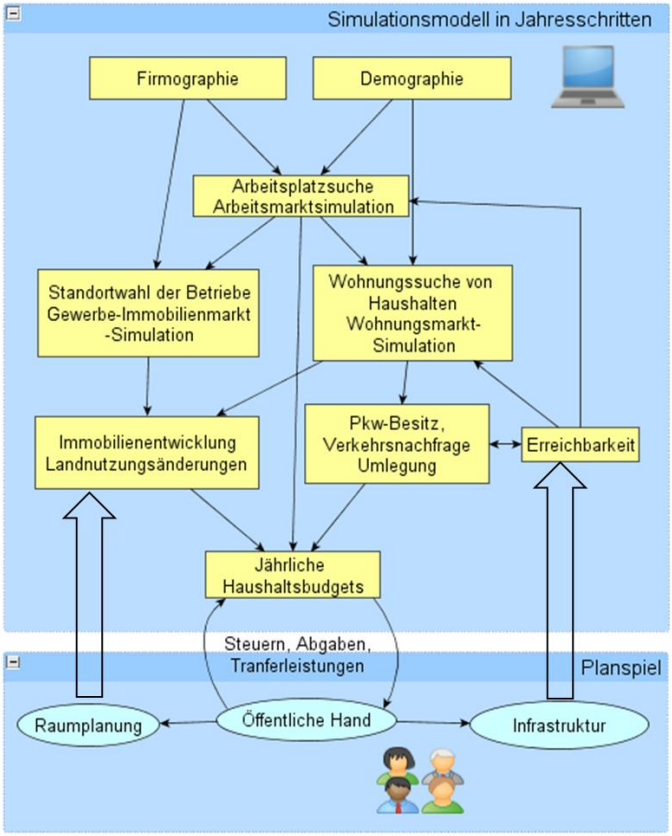

Fig.5: Modellstruktur (Quelle: nach Bohnet/Gertz 2011)

Abbildung 5 zeigt die Gesamtstruktur des Modells. Im Folgenden soll das Arbeitsmarktmodell, das Wohnungsmarktmodell, die Immobilienentwicklung und das Verkehrsmodell abgebildet werden.

3.2 Das Arbeitsmarktmodell

Das Arbeitsmarktmodell bildet das Arbeitsangebot und die Arbeitsnachfrage ab. Zunächst wird ermittelt, welche Personen einen Voll- bzw. Teilzeitjob suchen und welchen Bildungsgrad und Qualifikation sie mitbringen. Diese Modelle wurden empirisch auf der Basis der SOEP-Daten (Wagner et al. 2008) geschätzt. Dabei wird in Abhängigkeit der Erreichbarkeit (Pendelzeiten und -Kosten) für jeden Jobsuchenden simuliert, wo in der Region sie sich auf passende Jobs bewerben.

Die Arbeitsnachfrage ergibt sich aus dem „Firmographie-Modell“, das (Wachstum, Schrumpfung, Fluktuation, Schließungen und Neugründungen, sowie Umzüge von Betrieben abbildet). Bei der Standortwahl neugegründeter und umziehender Firmen spielen je nach Branche unterschiedliche Standortfaktoren eine Rolle (Arbeitkräfteangebot, Flächenverfügbarkeit, Kundennähe, Erreichbarkeit von Infrastruktureinrichtungen, z.B. des Flughafens, s. folgende Abbildung).

Das Arbeitsmodell geht nicht von einem Gleichgewichtszustand aus. Vielmehr ist es eine dynamische Simulation, bei der sich Jobsuchende auf Stellen bewerben und die Betriebe dann den passendsten Bewerber auswählen (Distanzfunktion aus Qualifikation und bisheriger Branche). Erhält ein Bewerber mehrere Jobangebote, so wählt er den mit dem höchsten Lohn abzüglich Pendelkosten. Bewerber können in einer Simulationsperiode keinen Job finden und passen dann ggf. ihre Suchkriterien an (weitere Pendelwege werden in Kauf genommen). Jobs können unbesetzt bleiben, wenn sich keine passenden Bewerber finden. Dies ist bei steigenden Energiepreisen für schlecht erreichbare Gewerbegebiete mit gering entlohnten Jobs zu erwarten, zu denen das Pendeln sich nicht mehr lohnt.

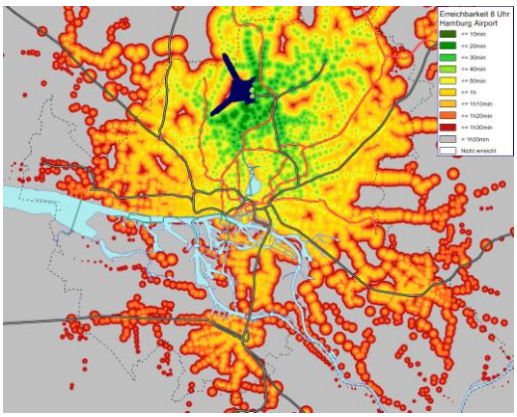

Fig. 6: Erreichbarkeit des Flughafens mit dem ÖPNV

3.3 Das Wohnstandortwahl und Wohnungsmarktmodell

Die Wohnstandortwahl wird als mehrstufiger Prozess abgebildet. Zunächst wird auf Basis der Daten des SOEP ermittelt, welche Haushalte aus welchen Gründen als Nachfrager auf dem Wohnungsmarkt in Erscheinung treten (Matthes 2011, 2012). Neben Wohnungs- und Haushaltsbezogenen Gründen können hierbei auch zu hohe Wohnnebenkosten und Mobilitätsausgaben bei steigenenden Energiepreisen berücksichtigt werden.

Dann wird definiert, welche Art von Wohnung sie suchen (Größe, Haustyp, Eigentumsform, maximaler Kauf/Mietpreis) und wo sie suchen. Der Suchraum wird dabei wesentlich von der Erreichbarkeit des bisherigen Wohnstandorts (als Fokus der sozialen Kontakte), der Arbeitsplätze der Haushaltsmitglieder und der Erreichbarkeit von Infrastruktureinrichtungen bestimmt.

Die Haushalte bewerben sich dann auf passende angebotene Wohnungen im Suchraum, der Vermieter/Verkäufer bietet die Wohnung dann dem Haushalt mit dem höchsten Zahlungsfähigkeit an. Haushalte, denen mehrere Wohnungen angeboten werden, wählen in einer Monte-Carlo-Simulation eine Wohnung auf der Basis einer Nutzenfunktion aus. In die Nutzenfunktion fließen neben dem Preis, den Wohnungseigenschaften auch Eigenschaften des Ortsteils/Stadtteils und der Erreichbarkeiten ein. Wohnungen, die ein Haushalt nicht nimmt, werden dem nächsten Bewerber angeboten. Damit ein (freiwillig umziehender) Haushalt die neue Wohnung wählt, muss der Nutzen der neuen Wohnung den Nutzen der alten Wohnung zuzüglich der Transaktionskosten übertreffen.

Im Jahr 2012 ist eine Befragung von kürzlich umgezogenen Haushalten zu ihren räumlichen und sachlichen Suchkriterien und zu ihren Entscheidungskriterien vorgesehen, um auf dieser Basis unter Zuspielung der Daten nicht gewählter Wohnungen die Modellparameter des Wohnstandortwahlmodells ökonometrisch zu schätzen. Für eine erste Modellversion müssen allerdings zunächst Modellparameter aus anderen Studien (Dittrich-Wesbuer et al. 2008, Vallée et al. 2012, Kühl et al. 2012) „guestimated“ werden.

Haushalte, die in einer Simulationsperiode keine Wohnung gefunden haben, passen im nächsten Monat ihre Suchkriterien an (Preis, Größe oder Lage). Wohnungen, die nicht vergeben werden, stehen leer und werden in der nächsten Simulationsperiode wieder angeboten.

Analog zu den Wohnungen werden auch Büro-, Einzelhandels- und Geberbeflächen an flächensuchende Betriebe vergeben. Die Angebotspreise werden am Ende des Jahres angepasst. In einem Ort/Stadtteil mit hohem Leerstand werden die Angebotspreise gesenkt, bei geringem Leerstand werden sie erhöht. Dabei können vorgeschlagene Maßnahmen der Wohnungspolitik berücksichtigt werden.

3.4 Immobilienentwicklungsmodell

Immobilien altern und entsprechend verschlechtert sich mit den Jahren der Sanierungszustand und die Energieeffizienz. In einem Investitionsmodell wird simuliert, ob die Eigentümer Immobilien (energetisch) sanieren, leerstehende Gebäude abreissen oder Wohn- in Bürofläche oder umgekehrt umwandeln. Dabei wird wie bei der Simaltion der Immobilienpreise die Nachfrage nach den einzelnen Gebäudetypen berücksichtigt, die sich in den Leerstandsquoten im Ort/Stadtteil widerspiegeln.

Bei hoher Nachfrage werden bei verfügbaren Bauflächen im Gebiet neue Immobilien gebaut. Die verfügbaren Bauflächen werden durch die Flächennutzungsplanung gesteuert. Ausgeschlossen sind Flächen,

die durch eine „Negativplanung“ (Flächen für Natur- und Landschaftsschutz, Grünflächen und Verkehrsanlagen für Straßen, Bahn- und Hafen) für eine bauliche Nutzung nicht in Frage kommen. Dabei könnten z.B. in Abhängigkeit der im Planspiel definierten planerischen Strategien Festlegungen zu erlaubten Nutzungsarten und Baudichten definiert werden.

Durch diesen Modellansatz soll der Tatsache Rechnung getragen werden, dass sich ein immer größerer Anteil der Immobilienentwicklung in der Region im Rahmen von Umnutzungen und Nachverdichtungen bestehender Gebiete vollzieht und der Neubau „auf der grünen Wiese“ in den zentralen Bereichen kaum mehr möglich ist. Zudem erlaubt dies auch die Abbildung gemischter städtebaulicher Nutzungen, was in vielen Modellen, die in Nordamerika entwickelt wurden, nicht vorgesehen ist.

3.5 Verkehrsmodell und Erreichbarkeiten

Der Verkehr wird in einem hybriden Mikro-/Makromodell simuliert. Der Wirtschaftsverkehr wird in einem vereinfachten makroskopischen Nachfragemodell als Verkehrsströme zwischen Verkehrsknoten sowie Betrieben verschiedener Branchen abgebildet.

Im Arbeitsmarktmodell wurden schon die Arbeitsorte aller erwerbstätigen Personen lokalisiert. Für die Haushalte wird daher zunächst mit einer mikroskopischen Monte-Carlo-Simulation der Pkw-Besitz und die Verkehrsmittelwahl auf dem Arbeits-/Ausbildungsweg modelliert. Dabei fließt neben Haushaltstyp und dem einkommensabhängigen verfügbaren Mobilitätsbudget die Erreichbarkeit des/der Arbeitsplätze und der Einkaufs- und Freizeitgelegenheiten mit und ohne Pkw als nutzenbasierter Erreichbarkeitsindikator ein (Bohnet 2008, 2010). So kann z.B. konsistent abgebildet werden, dass bei steigenden Energiepreisen ein Pendler auf den ÖPNV umsteigt und der Haushalt ggf. deshalb auch den Zweitwagen abschafft.

Ein ergänzendes Modell zur Wahl des Pkw-Typs und der Antriebsart (Elektromobilität...) ist für eine zweite Stufe des €LAN-Modells vorgesehen.

Die Verkehrsnachfrage (Ziel- und Verkehrsmittelwahl) im Einkaufs-, Erledigungs- und Freizeitverkehr wird dann in einem klassischen makroskopischen Verkehrsmodell berechnet.

Die gesamte Verkehrsnachfrage wird dann auf die Netze des Kfz-Verkehrs und ÖPNV in 4 Zeitscheiben (HVZ morgens, NVZ, HVZ nachmittags, SVZ) umgelegt und so Reisezeiten und -kosten berechnet.

Auf der Basis dieser Reisezeitmatrizen und der simulierten Raumstruktur werden Erreichbarkeitsindikatoren berechnet, die nicht nur mit dem Verkehrsnachfragemodell iterativ rückgekoppelt werden, sondern auch in der nächsten Simulationsperiode in das Wohnungs- und Arbeitsmarktmodell einfließen. So können auch die Wirkungen von Infrastrukturmaßnahmen auf die Raumentwicklung abgebildet werden (z.B. Erreichbarkeitsveränderungen auf den Arbeitsmarkt durch einen neuen Autobahnring).

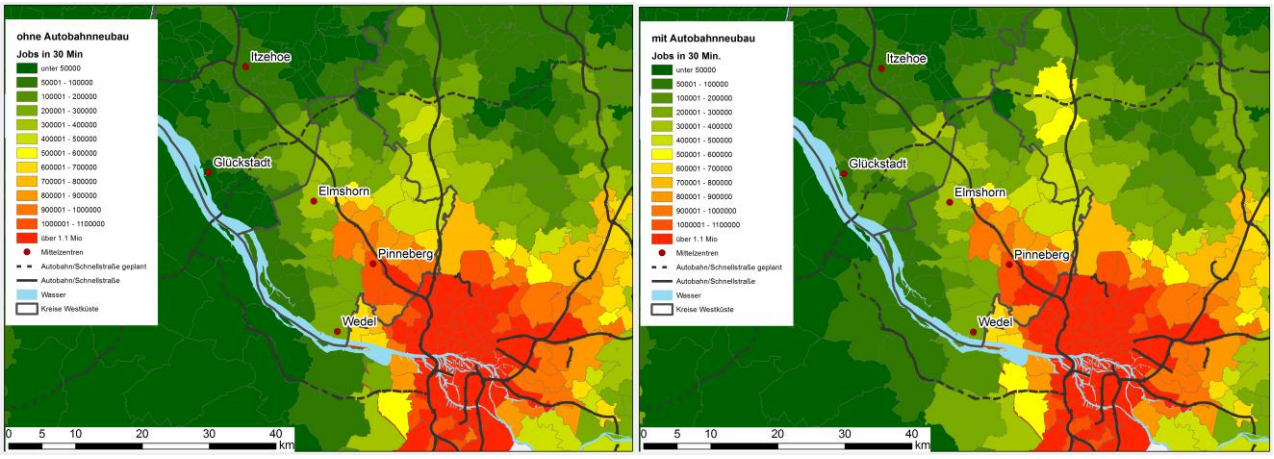

Fig. 7: Wirkungen der geplanten Nord-Umfahrung Hamburg auf die Erreichbarkeit von Arbeitsplätzen in 30 Min. mit dem Pkw (Off-Peak)

4 FAZIT UND AUSBLICK

Mit dem vorgestellten integrierten Flächennutzungs- und Verkehrsmodell für die Metropolregion Hamburg sollen die komplexen Wechselwirkungen zwischen Energiepreisentwicklungen, Raum- und Verkehrsentwicklung abgebildet werden. Das Modell befindet sich zur Zeit in der Entwicklung. Die meisten

benötigten Datengrundlagen wurden aufbereitet, einige Modellbausteine bislang fertig gestellt, andere sind im Stadium der Parameterschätzung. Im 1. Halbjahr 2012 soll das Gesamtmodell dann funktional und im Hinblick auf seine Sensitivität gegenüber Maßnahmen und Trends getestet sowie anhand weiterer Datengrundlagen aus der Region validiert[1] werden, bevor es im Jahr 2013 im Planspiel mit den Praxisakteuren aus der Region eingesetzt wird.

Ziel ist es, zu testen, wie die Resilienz unseres Raum- und Verkehrssystems am Ende des Ölzeitalters bei steigenden Energiepreisen verbessert werden kann. Wir glauben, dass ein Umbau des Verkehrssystems durch eine intensive Förderung der Nahmobilität und des ÖPNV sowie eine Siedlungsentwicklung mit mehr Mischnutzung an integrierten, gut erreichbaren Standorten erforderlich ist, um den Stresstest (Wulfhorst) des Peak Oils zu bestehen. Allerdings gibt es aufgrund der komplexen Wechselwirkungen und Nutzungskonkurrenzen keine einfachen Lösungen, wie sich an der aktuellen Debatte um die Gentrifizierung innerstädtischer Quartiere zeigt.

In einer Policy-Analyse wurden sechs grundsätzliche Politik-Strategien identifiziert, mit steigenden Energiepreisen in den verschiedenen Politikfeldern (Stadtentwicklung, Verkehrspolitik, Fiskalpolitik, Sozialpolitik, Umweltpolitek) umzugehen. Dabei reicht die Spannbreite vom „nichts machen“ über verschiedene Formen des „Gegensubventionierens“ bis hin zu proaktiven Strategien, die Innovationen bei der Energieeffizienz und bei alternativer Energiequellen für Mobilität und Wohnen fördern oder gar einen Strukturumbau weg von einem ölabhängigen Siedlungs- und Verkehrssystem fördern. In folgender Tabelle sind exemplarisch einge ausgewählte Maßnahmen aus den verschiedenen Politikfeldern im Sinne dieser Strategien aufgeführt.

Politikfeld	Grundsätzliche Politikausrichtung				
	„nichts machen“	Gegensubventionieren (I): „Energiesteuern senken“	Gegensubventionieren (II): „Härtefalltarife“	Innovationsoffensive	Strukturumbau
Stadtentwicklung			sozialer Wohnungsbau		Konzentration der künftigen Bautätigkeit auf nichtautoabhängige Standorte
Verkehrspolitik			, Pendlerpauschale	Elektro-Mobilitäts-förderung	ÖV-Ausbau
Fiskalpolitik		Energiesteuer-senkung			
Sozialpolitik			Wohngeld		
Umweltpolitik					verbindliche Dämmstandards

Table 1: Grundsätzliche Politikausrichtung beim Umgang mit steigenden Energiepreisen und ausgewählte Handlungsoptionen nach Politikfeldern

Ein integriertes Flächennutzungs- und Verkehrsmodell, könnte einen Beitrag dazu leisten, diese und andere Lösungsoptionen auf ihre Wirkungen auf verschiedene Bevölkerungsgruppen differenziert zu untersuchen und die politische Debatte, die sich bei stark steigenden Energiepreisen verschärfen wird, zu versachlichen. Bislang ist es allerdings in der Planungspraxis wenig geübt, langfristige Modelle zur Entscheidungsunterstützung einzusetzen. Daher sollen im Planspiel in einem „geschützten Raum“ gemeinsam mit den Akteuren aus Politik und Verwaltung wertvolle Erfahrungen gesammelt werden.

[1] Eine an sich wünschenswerte Modellvalidierung anhand von Modellläufen über die letzten Jahrzehnte, die von unterschiedlichen Phasen schnell steigender und fallender (realer) Ölpreise gekennzeichnet waren, ist aufgrund der Datenlage zur Zeit leider nicht möglich.

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🏆 *reviewed paper*

Intra-Urban Differentials in Poverty and Livelihoods in Selected Residential Neighbourhoods of Lagos Metropolis

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1 ABSTRACT

This paper critically examines Home Based Enterprises (HBE's) in residential areas of the Lagos Metropolis in order to determine their major characteristics as well as the effects their activities have on Urban Planning.

Data was obtained by the administration of structured questionnaires on HBE owners in buildings with more than one informal economic activity. 929 questionnaires were administered in 5, 18 and 31 low, medium ann high density residential neighbourhoods respectively. 712(76 %) were fully completed and thus fit for analysis. Analysis was by simple descriptive statistics as well as chi square among others.

The research revealed the importance of informal activities, particularly home based enterprises, as a major source of employment, income and services in urban areas. It was discovered that about 45 % of the respondents rely solely on their home enterprises and would otherwise have been destitiute. 29.7 % of respondents earn between N7,500 and N15,000 monthly from their home enterprise. Across the income groups, multiple income earners are prevalent in the family. Also respondents are involved in multiple streams of income with 18.76 % being also employed in the formal sector of the economy.

The paper concludes by suggesting recommendations for harnessing HBEs at minimal cost to the environment. These recommendations include enabling the informal economy, encouragement of collective action and implementing planning reforms as well as embracing pro-poor planning and restructuring the National Poverty Eradication Programme

2 INTRODUCTION

Poverty is an outcome of economic, social and political processes which most often result into the deprivation poor people face. Evidence of this phenomenon is quite common in both urban and rural areas. Though income data is scarce, low social indicators highlighting poor living conditions have existed for decades. While quantitative measurements are difficult to generate, the visual aspects of urban poverty are easy to record and according to Asaju (1996), they include extreme slum conditions, lack of basic services, ill health and malnutrition.

For many low-income households, the dwelling is one of the few resources that they have for generating income and they do this either through passive activities such as renting out rooms or more active home based enterprises (HBEs)(Tipple, 2000). Owners of HBEs have been able to consolidate their dwellings through the income from these micro-enterprises and many households would not have been able to afford their dwellings without the HBEs (Tipple, 2000). HBEs, which form a significant proportion of informal economic activities, are of particular interest to the urban planning professional.

This study investigates the activities of homebased enterprises across residential neighbourhoods of the Lagos Metropolis and the urban planning implications of their activities.

3 OVERVIEW OF THE STUDY AREA

The study is set in the Lagos Metropolis, Lagos State, South Western Nigeria, on the narrow coastal plain of the Bight of Benin. Lagos Metropolis is situated within latitudes 6o 23′N and 6o 41′N and longitudes 2o 42′E and 3o 42′E. It comprises settlements that have grown from predominantly farming and fishing villages to highly urbanized settlements. Lagos Metropolis is bounded in the west by Ojo and Ijanikin, Lekki Peninsula in the east and Ikorodu and Alagbado towns in the north. Water is the most significant topographical feature in Lagos State as water and wetlands cover over 40 % of the total land area within the State.

Lagos is regarded as a mega city, because its population is estimated to be about 12 million people, with a population density of 20,000 persons/sq km (Mabogunje, 2002). Lagos state is on a built-up land area of about 18,558 Hectares made up of about 9,669 hectares (52.1 %). residential, commercial, 1,021 hectares (5.5 %); industrial, 1,448 hectares (7.8 %); institutional and special areas, 2,784 hectares (14 %); transportation 3,340 hectares (18 %), and open spaces 52 hectares (2.8 %). The Lagos metropolis comprises

88.7 % of Lagos State (Lagos State Economic Summit,2001). Based on its high urbanization rates and dense population, the poverty level in the Lagos Metropolis is quite high.

UNDP (2003) estimates that 51 % of men and 54 % of women resident in Lagos live below the poverty line. Lagos is simply the biggest node in the shantytown corridor of 70 million people that stretches from Abidjan to Ibadan: probably the biggest continuous footprint of urban poverty on earth, (Davis, 2006). The urban poor, who are dominant in Lagos, are transforming the city to meet their needs, often in conflict with official laws and plans. They reside in the slums and squatter settlements scattered around the city and are predominantly engaged in informal economic activities which encompass a wide range of small-scale, largely self-employment activities.

Lagos metropolis is stratified into various neighborhoods according to income levels. The income indicators used include some socio-economic characteristics of the neighborhoods, for example, type of accommodation (duplex, bungalow, flat, rooming), quality of buildings (good, dilapidated), monthly income of household etc. The income groups identified include; low income/high density, medium income/medium density and high income/low density.

4 LITERATURE REVIEW

Urban poverty, in particular, has been exacerbated in Nigeria by low levels of social development resulting from corruption, misallocation of funds, poor investment habits, poor family planning habits, minimum wage laws and declining life expectancy. The Human Development Report (2004) rates Nigeria as the 24th poorest country in the world. 70.2 % of the population live below the United Nations Poverty cohort (US$1 per day).

Though many studies have been carried out on urban poverty and the informal sector, most of them have been in socio-economic, cultural and political settings quite different from what obtains in Nigeria. Bartone (1991),from a study of selected towns in the United Kingdom, posited that economic disadvantages usually as a result of unemployment/ underemployment are the root cause of urban poverty and consequently environmental degradation. Buvinic (1997) from studies cutting across Zambia and Bolivia submitted that poverty, especially when feminised, slows global economic growth. Other studies include Eversley (1990), Satterthwaite (1992), Menwhta (2000) and Gardener (2002). Studies on home based enterprises have been carried out in South Africa (Cross et al, 2001, Napier et al, 2005), India (Kellett and Tipple, 2000), Colombia (Gough and Kellett, 2001) and Zambia (Kazimbaya-Senkwe, 2004).

Reasonable research has been carried out on the twin issues of poverty and the informal economy in Nigeria. They include those of Okojie (1987) who did a measurement of poverty among women and their households in Benin City; Ogundele (1997) sought to develop an urban management framework for poverty reduction in Nigeria, while Olanrewaju and Okoko (2000) assessed women organizations and poverty reduction in Akure. Aina (1990) analysed the shantytown economy of Makoko, Lagos and discovered that the informal sector represents both the efforts and the response of low-income urban dwellers to cope with their problems of housing and seeking a livelihood. Other studies include those of Dawson and Oyeyinka (1993), Adeshina (1994), UNDP (2000), Olanrewaju and Okoko (2000), and Afolayan (2006).

These studies have highlighted the fact that poverty is a consequence, not only of the misfortunes and limited capabilities of individuals, but also of the structure and processes that determine the distribution of income. Furthermore the informal economic sector, estimated to employ over 80 % of the working population of Nigerians, provides a wide range of income generating opportunities for those lacking skills or opportunities of entering the formal sector. Participants in the informal sector are unable to separate economic life from such other aspects of social life as culture, religion, kinship and lineage. This necessitates an investigation on the HBEs which is the manifestation of the home as residence and survival mechanism

5 RESEARCH METHODOLOGY

The study population are Home Based Enterprises (HBEs). Small scale businesses located in and adjacent to residential buildings with multiple trade, service and production enterprises were sampled. The population was stratified on the basis of residential neighbourhood density into low, medium and high density residential areas. Administration of questionnaires within each of these subsets was by simple random sampling.

Questionnaires were administered to obtain data on components of poverty and livelihood. Questionnaires were structured to collate information on economic conditions and quality of life; socio-economic and socio-cultural peculiarities, environment and housing conditions.

929 questionnaires were administered in the 16 local government areas that make up the Lagos Metropolis. This comprised of 75 questionnaires in 5 selected low density neighbourhoods; 301 questionnaires in 18 selected medium density neighbourhoods and 553 questionnaires in 31 selected high density residetnial neighbourhoods respectively. Of these figures, 712 (76 %) were fully completed and form the basis of this paper.

Data analysis encompassed univariate analysis using descriptive statistics, bivariate analysis by adoption of the chi square test and multivariate analysis including analysis of variables

6 DATA DISCUSSION

6.1 Spatial Distribution of Household Characteristics of Respondents

The respondents are made up of 51.8 % male and 48.2 % female. Results indicate that most of the respondents are within the working ages of 16 to 45 years, making up 82.5 % of the population. The population is relatively literate based on UNESCO standards, with about 74.6 % having a minimum of secondary school education. 19.5 % of low income respondents have only primary school education, compared to 15.6 % of middle income respondents and 9.5 % of high income respondents. Only 8 % of the population has no formal education.

Average household size is 4-6 for the entire households sampled. Household size of more than 10 occurs more among the low income class (14) compared to the high income (1). The study also revealed that over 60 % of the respondents are migrants to Lagos, who have lived in their neighbourhoods for more than 10years. The major consideration for choosing the specific neighbourhoods is that it is profitable for business and that the average rent is relatively affordable.

Variables		**High income**		**Medium income**		**Low income**		**Total**	
		Fr	**%**	**Fr**	**%**	**Fr**	**%**	**Fr**	**%**
Gender	Male	29	46.03	128	50.19	213	53.78	370	51.82
	Female	34	63.97	127	49.81	183	46.22	344	48.18
	Total	63	100.00	255	100.00	396	100.00	712	100.00
Age	≥15	1	1.59	8	3.14	8	2.02	17	2.38
	16-30	33	52.38	105	41.18	165	41.66	303	42.44
	31-45	21	33.33	101	39.61	162	40.91	284	39.78
	46-60	7	11.11	36	14.11	50	12.63	93	13.03
	≤ 61	1	1.59	5	1.96	11	2.78	17	2.37
	Total	63	100.00	255	100.00	396	100.00	712	100.00
Highest Level Of Education Attained	None	10	15.87	18	7.06	30	7.58	58	8.12
	Primary	3	9.53	40	15.67	77	19.44	123	17.23
	Secondary	34	53.97	129	50.59	162	40.91	325	45.52
	Tertiary	13	20.63	68	26.68	127	32.07	208	29.13
	Total	63	100.00	255	100.00	396	100.00	712	100.00
Household Size	1-3	18	28.57	71	27.85	94	23.74	183	25.63
	4-6	26	41.27	130	50.98	225	56.81	381	53.36
	7-9	18	28.57	42	16.46	63	15.91	123	17.23
	≤ 10	1	1.59	12	4.71	14	3.54	27	3.78
	Total	63	100.00	255	100.00	396	100.00	712	100.00

Table 1: Socio-Economic Characteristics of Respondents

The relationships between income levels and household characteristics are further corroborated by chi-square tests as displayed in Table 2. The table shows that there are no significant differences in the gender distribution of the respondents. However there are significant differences in the levels of educational

attainment, household size and age with significance level of 0.000. It can therefore be concluded that the household grouping of respondents is a function of the educational attainment, household size and age.

Pearson Chi Square	*Chi Square Value*	*Degree of Freedom*	*Level of Significance*	*Comment*
Gender	558.384	1	.374	Not Significant
Age	.789	4	.000	Significant
Highest Level of Education Attained	224.816	3	.000	Significant
Household Size	384.758	3	.000	Significant

Table2: Chi Square test for Household characteristics and income classification of Respondents

6.2 Spatial Distribution of Income and Assest Ownership of Respondents.

It was discovered that about 45 % of the respondents rely solely on their home enterprises. 29.7 % of respondents earn between N7,500 - N15,000 monthly from their home enterprise, while 21.1 % earn below the national minimum wage of N7,500. This set of people automatically fall under the absolute poor category and their HBEs are subsistence enterprises. Across the income categories, multiple income earners are prevalent in the family. Also respondents are involved in multiple streams of income with 18.76 % being involved in formal employment. Other sources of income include income from abroad and returns from thrift/ cooperative collaborations.

Variables		**High income**		**Medium income**		**Low income**		**Total**	
		Fr	**%**	**Fr**	**%**	**Fr**	**%**	**Fr**	**%**
Monthly Income From Home Enterprise	≤ ₦7,500	15	23.81	43	16.86	97	24.64	155	21.70
	₦7,500 - ₦15,000	23	36.51	74	29.01	115	29.21	212	29.68
	₦15,000 - ₦30,000	12	19.04	81	31.75	94	23.59	187	26.18
	₦30,000 – ₦60,000	8	12.70	38	14.90	61	15.49	107	14.98
	≥ ₦60,000	5	7.94	19	7.45	27	6.86	51	7.14
	Total	63	100.00	255	100.00	394	100.00	712	100.00
Monthly Income From Other Sources	None	20	31.74	101	39.59	201	51.05	322	45.08
	≤ ₦7,500	13	20.63	37	14.50	51	12.95	101	14.14
	₦7,500 - ₦15,000	11	17.46	41	16.07	60	15.24	112	15.68
	₦15,000 - ₦30,000	4	6.35	60	23.52	51	12.95	115	16.10
	₦30,000 – ₦60,000	2	3.17	10	3.92	21	5.334	33	4.62
	≥ ₦60,000	13	20.63	6	2.35	10	2.54	29	4.06
	Total	63	100.00	255	100.00	394	100.00	712	100.00
Other Family Income Earner	Spouse	37	58.72	176	68.99	272	69.08	485	67.90
	Children	12	19.04	34	13.33	69	17.53	117	16.66
	Relatives	14	22.22	45	17.64	53	13.46	112	15.68
	Total	63	100.00	255	100.00	394	100.00.	712	100.00
Other Income Sources	Office Job	12	19.04	40	15.68	82	20.83	134	18.76
	Inheritance	4	6.35	28	10.98	38	9.65	70	9.80
	Rent	11	17.46	24	9.41	17	4.32	52	7.28
	Income from Abroad	12	19.04	44	17.25	65	16.51	121	16.94
	Cooperatives/ Thrift	25	39.68	46	18.03	98	24.89	169	23.66
Possession Of Assets	Land	18	28.57	135	52.94	213	53.79	366	51.26
	House	23	36.50	133	52.16	210	53.03	366	51.26
	Car	17	26.98	79	30.98	119	30.05	215	30.11
	motorcycle	4	6.35	36	14.12	41	10.35	81	11.34
Possession Of Household Items	Generator	27	42.86	131	51.37	257	64.89	415	58.12
	Air conditioner	17	26.98	78	30.59	14	3.53	109	15.27
	Gas/Electric Cooker	15	23.81	86	33.73	123	31.06	224	31.38
	Deep Freezer	22	34.92	123	48.24	182	45.96	327	45.80
	DVD Player	48	76.19	213	83.53	335	84.60	596	83.47
	Electric kettle	21	33.33	141	55.29	218	55.50	380	53.22

Table 3: Income and Assets Distribution of Respondents

The analysis of variance tests shown on Table 4 further shows that the F value for income from home enterprises and income from other sources are significant at P<.05. That means that there is a significant intra-group variation

		Sum of squares	df	Mean square	f	sig
Monthly Income From Home Enterprise	Between groups Within groups Total	7.458 660.739 668.197	2 566 568	3.279 1.167	3.194	.042
Monthly Income From Other Sources	Between groups Within groups Total	0.451 426.540 426.991	2 344 346	.225 1.240	.182	.834
Other Family Income Earner	Between groups Within groups Total	18.181 1291.511 1309.693	2 706 708	9.091 1.829	4.969	.007
Other Income Sources	Between groups Within groups Total	29.325 594.550 623.875	2 414 416	14.663 1.436	10.210	.000

Table 4: Analysis of Variance test for Income Distribution of Respondents

6.3 Spatial Distribution of Employment of Respondents

Only about 19 % of the respondents are employed in the formal sector. Of these, 7.7 % work with the government, while the others are employed in private companies. Over half of the respondents are involved in informal trade activities. These range from petty trading to hawking, selling of cooked food, raw farm produce and other minor household items. Informal service sector accounts for 38 % of the respondents. These activities include hairdressing and barbing, tailoring, secretarial services, horology, sign writing, photography and auto repair services. Informal manufacturing is done by 7 % of the respondents and includes cobbling, production of sachet water and packed food, nylon production, crafts, carpentry and metal works.

Table 5 shows that more than 70 % of the businesses are sole proprietorships. Source of funding for most of the businesses is a combination of savings, thrift and cooperative loans. Only 45 % of the respondents claim to have registered their businesses with any government body, with about 26 % operating with local government trade permits.

Majority of the enterprises employ between one and four apprentices. Only 17 % of the businesses have more than five staff. Business location is usually rented shops for about 65 % of the respondents, with about 15 % of them operating along the street. About 9 % use part of their living quarters for their enterprise. More than 90 % of the respondents live within the vicinity of their businesses. i.e. less than 2 km

While 81 % of the respondents are wholly engaged in the informal economy, 7.7 % hold government jobs while 11.09 % are privately employed. About half of the respondents are engaged in the informal trade sector. 38 % offer services while manufacturing only accounts for about 7 %. This disparity may be due to the fact that skills are required for services and manufacturing. They are also relatively capital intensive since one will need to purchase equipment and plants to operate in the subsector.

Over 80 % of the respondents run kinship based enterprises in which the ownership of the business lies with them and/or members of their families. Average staff strength is 2. About 35 % of the businesses are run by single individuals, while 43 % have paid employees or apprentices of between one and three. Only 17 % employ more than three workers. Unpaid family workers make up about 8 % of the staff strength.

About 65 % of the businesses are located in rented shops while 10 % use part of their living quarters as commercial entities. 28 % of respondents engage in their commercial activities outdoors. 27 % of respondents in the high income areas use open sheds while none are located on the street. This may be because high income areas are usually planned and any disruption to the aesthetics and harmony of the environment are frowned on. 25 % of respondents in the middle income area and 14 % of those in the low income area operate on street premises. It was also discovered that about 97 % of the respondents live within the neighbourhoods of their businesses, 80 % reside less than 1km from their businesses.

Business registration status is weak as more than 50 % of the businesses have no form of registration with appropriate authorities. About 26 % have local government trade permit; while only 10 % of the respondents have registered their businesses with the Corporate Affairs Commission. However, it was discovered that all the respondents pay daily service charges to itinerant agents of the local government.

Sources of funding for business are multiple with the predominant ones being savings, thrift and cooperative loan. The reliance on bank loan occurs for less than 1 % of respondents and this may be attributed to the fact that most HBEs lack legal status and so are unable to access credit from the formal financial sector.

Variables		High income		Medium income		Low income		Total	
		Fr	%	Fr	%	Fr	%	Fr	%
Nature Of Employment	Not formally employed	51	80.95	215	84.28	312	79.25	578	81.18
	Government employed	1	1.59	14	5.49	40	10.16	55	7.72
	Private Employed	11	17.49	26	10.19	42	10.67	79	11.09
	Total	63	100.00	255	100.00	394	100.00	712	100.00
Category Of Informal Sector	Trade	31	49.197	136	53.31	193	49.02	360	50.4
	Service	30	47.61	85	33.32	156	39.62	271	37.94
	Manufacturing	2	3.17	30	11.76	30	7.62	53	7.42
	total	63	100.00	255	100.00	394	100.00	712	100.00
Nature Of Business	Sole Proprietorship	50	79.35	181	70.95	292	74.17	523	73.22
	Partnership	5	7.94	46	18.03	97	24.64	97	13.58
	Family owned	8	12.70	37	14.50	71	18.03	71	9.94
	Total	63	100.00	255	100.00	394	100.00	712	100.00
Business Registration	Not registered	45	71.42	120	47.04	234	59.44	399	55.86
	Local Govt trade permit	7	11.11	85	33.32	100	25.40	192	26.88
	Lagos state govt	7	11.11	16	6.27	7	1.78	30	4.2
	CAC/ Federal Govt	4	6.35	26	10.19	44	11.18	74	10.36
	Total	63	100.00	255	100.00	394	100.00	712	100.00
Source Of Business Funding	Bank loan	1	1.59	3	1.12	2	0.51	6	0.84
	Thrift	13	20.63	58	22.74	199	50.55	270	37.8
	Cooperative loan	22	34.91	73	28.62	134	34.03	229	32.06
	Savings	30	47.61	111	43.51	162	41.15	303	42.42
	Family aid	17	26.98	52	20.384	84	21.34	153	21.42
Position In Business	Owner	33	52.37	158	61.94	281	71.37	472	66.08
	Paid employee/ Apprentice	23	36.50	86	33.72	79	20.07	188	26.32
	Unpaid family worker	7	11.11	10	3.92	35	8.89	52	7.28
	Total	63	100.00	255	100.00	394	100.00	712	100.00
Staff Strength	1	25	39.68	96	37.63	131	33.27	252	35.28
	2-4	30	47.61	99	38.81	181	45.97	310	43.4
	5-7	7	11.11	24	9.41	37	9.40	68	9.52
	≤ 8	1	1.59	25	9.80	37	9.40	63	8.82
	Total	63	100.00	255	100.00	394	100.00	712	100.00
Business Location	Rented shop	41	65.10	131	51.35	298	75.69	470	65.80
	Part of living quarters	3	4.761	41	16.07	26	6.60	70	9.8
	Open shed	17	26.98	17	6.66	15	3.81	49	6.86
	Open space	1	1.59	18	7.06	38	9.65	57	7.98
	On the street	0	0	66	25.87	36	9.144	102	14.28
	Total	63	100.00	255	100.00	394	100.00	712	100.00
DISTANCE OF WORK FROM HOME	0-1km	55	87.29	205	80.36	313	79.50	573	80.47
	1-2km	5	7.94	25	9.80	47	11.94	98	17.10
	2-4km	2	3.174	16	6.27	23	5.84	41	5.73
	Total	63	100.00	255	100.00	394	100.00	712	100.00

Table 5: Spatial Distribution of Employment

The relationships between income levels and informal employment characteristics are further corroborated by chi-square tests as displayed in Table 6. The table shows that there are significant differences in the categories of informal activities engaged, nature of business and type of business registration as well as staff strength.

Pearson Chi Square	***Chi Square Value***	***Degree of Freedom***	***Level of Significance***	***Comment***
Category of Informal Sector	3.365	4	.499	Significant
Nature of Business	22.567	8	.004	Significant
Business Registration	16.171	8	.040	Significant
Source of Business Funding	26.476	10	.003	Significant
Staff Strength	11.931	6	.064	Significant

Table 6: Chi Square test for Informal Employment characteristics and income classification of Respondents

6.4 Determining the Spatial Pattern of Informal Activities in the Study area

To determine the spatial pattern of home based enterprises in the study area, Hypothesis 1 is tested. It states that

H0: Home based enterprises are not evenly distributed within the study area

H1: Home based enterprises are evenly distributed within the study area

The Nearest Neighbour Analysis was used to determine the pattern of distribution of home enterprises in the study area.

The formulae for the Nearest neighbour analysis is as follows Rn = $2\bar{d}\sqrt{\frac{n}{A}}$

Where Rn = Nearest neighbour Index

A = Size of the Area Concerned

$\bar{d}$ = Mean Distance between Points

n = Number of Points

The base map of the study area was generated and the coordinates for all the points where questionnaire administration occurred were imputed. Out of the 712 points located, midpoints of every cluster were identified and polygons generated to determine the distance from the nearest neighbour.

Using the formulae above, the following values were obtained

A = 402637675.457 sq m

$\bar{d}$ = 1134.086 m

n = 101

On computation , the value obtained for Rn = 0.99332.

Rn values range from zero to 2.15. Rn values of between +1.5 and 2.15 signify a significant element of regularity. Significant element of clustering is signified when the Rn value is between 0 and 0.5. Values in between these figures point to a random distribution of identified phenomenon. With Rn value of 0.919, it means that there is no regular pattern to spatial distribution of home enterprises within the study area.

Casual observation corroborates this statistics as the phenomenon was prevalent across the three residential densities in no clear pattern. Clusters of specific trades and services were identified across the neighbourhoods and some clusters had concentration of more than one prevalent HBE.

7 POLICY ISSUES AND RECOMMENDATIONS

The research revealed the ubiquitousness of informal economic activities, particularly home based enterprises, as a major source of employment and income in urban areas. HBEs have provided means of survival to many who would otherwise have been unemployed otherwise. Many have improved their

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capabilities and incomes. This suggests that it is possible for home based economic activities to be the launch pad for upward economic mobility especially for the absolute poor.

The prospects for reducing urban poverty in developing countries depend critically on the overall economic performance of these home based enterprises and indeed the informal sector as it employs a preponderant percentage of the working population. With the requisite support from appropriate authorities, poverty and low capacity for enterprise can be mitigated significantly.

The major policy implications from the findings of this research are therefore outlined as follows:

(1) Enable the Informal Economy

(2) Encourage Collective Action for Informal Enterpreneurs

(3) Articulate the National Poverty Alleviation Policy and Restructure the National Poverty Eradication Programme

7.1 Enabling the Informal Economy

The Informal Economic Sector should be recognized economically as a viable and legitimate means of sustenance. Support for the sector can include creating a new scale for the registration of such enterprises with the Corporate Affairs Commission. This scale must have fewer conditions attached to it and a more flexible regime for operations. Enabling the informal economy will give the practitioners access to credit and thus many will be able to grow from subsistence enterprises to growth enterprises. This will also benefit the government because, according the informal sector legal status renders returns from informal activities taxable.

From the results of the survey, it is evident that entrepreneurs in the informal sector frequently face the problem of acquiring suitable premises and sites for their commercial activities. In addition, restrictive policies of local municipal authorities and planning agencies regarding location amounts to harassment and on other occasions leads to fire hazards, public health hazard and traffic congestion. At other times, there is a lack of basic services - roads, drainage, water, etc. In this connection, especially for the trading sub-sector, efforts could be made to set up small market areas in existing neighbourhoods for the manufacturing and servicing sub-sectors, workshop clusters and light industrial estates located at strategic points in the city can be developed. The advantage of this approach is that firms could be provided with adequate infrastructural facilities, paid for by the artisans in easy instalments and this would also reduce the threat of eviction that most informal sector operators experience and which has an adverse impact on their production and quality of life. Furthermore, the environmental impact of their activities will be better monitored as certain standards will be required such as types and materials of kiosks, sphere of influence and even quality control of their outputs.

7.2 Encouraging Collective Action for Informal Enterpreneurs

The study revealed the importance of their cooperative societies as lenders and protective cover for the HBEs. Collective action and organizational membership have a positive influence on productivity. This calls for government support to relevant collective actions.

Collective action has to be carried out at different levels. At local level, collective action should take the form of cooperatives or associations to increase bargaining power in economic terms and in political participation, and thus to obtain better services which in turn facilitate market access and increase productivity as well as protection. At national level, policies have to be promoted in favour of the sector – from infrastructure to credit, industrial and trade policies.

Cooperatives must have better organization and self-regulation to be able to engage more constructively with government and other development partners, and to increase their power to lobby, negotiate, and influence public policy in favour of their sector. They could pool resources through clustering and other ways of cooperating that foster mutual support to help their businesses grow and mature. They will be better organized and able to access credit from formal financial channels.

Collectively they must curb some of the socially unacceptable strategies that tend to discredit them, such as adulteration, crime, and other sharp practices, and confine themselves to genuine activities for livelihoods.

7.3 Articulating and Implementing the National Poverty Alleviation Policy

The National Poverty Eradication Council must, without delay form the National Poverty Alleviation Policy. This policy must set forth strategies aimed at promoting a high and sustainable rate of economic expansion and job creation through programmes aimed at evolving an enabling environment for poverty alleviation; providing basic infrastructure necessary for the growth of the informal sector; expanding opportunities for the poor to engage in gainful economic activity by widening their access to land, credit and other factors of production; channeling the benefits from increased participation in the world economy towards the poor segments of the society through policies promoting the expansion of labor intensive exports such as agriculture, and a reduction of trade restrictions on consumer goods.

The blue print of the National Poverty Eradication Programme must also be modified and implemented without political interference. Emphasis should shift from ad-hoc measures to developing programmes that will bring about sustainable improvements in the quality of life of majority of the population. Vulnerable groups must be given special concessions such as reduced interest rates for loans for women and identified absolute poor. Those informal entrepreneurs that show innovation and ingenuity must be encouraged through the patenting of their products and legislation that insisits that at least 40 % of government supplies must done by these local merchants.

8 CONCLUSION

Effective urban poverty control can only be actualized through the application of a pragmatic approach involving civic reorientation, urban redevelopment and the entrenchment of a result-oriented system of urban management.

Pro poor planning is a marriage of Community Development and Urban Economic Development. Communities suffering economic insufficiency, stagnation or decline often seek remedies for these shortcomings through strategic economic development planning. Such activity aims to amass within communities and regions the resources needed to insure employment opportunity, to supply necessary public and private goods and services, and thereby to sustain or improve the quality of life

For the future, Pro-poor Planning Strategies must be adopted for the planning of cities and new towns. Physical planning of the city must be placed at the service of the fight against poverty, creating a facilitating environment for the development of informal activities, by delineating certain areas as market areas within residential neighbourhoods, encouraging mixed use development and making provision for light industrial areas to serve cottage industries

This study had discovered that home based enterprises, apart from having a positive effect on average household income also have a positive economic impact on the general welfare of the local neighbourhood. If, in the attempt to improve the housing environment, livelihoods are destroyed through inappropriate attitudes towards home based enterprises, then sustainable livelihoods and indeed sustainable development remain a mirage. On the other hand, if improvement policies assist the viability of HBEs, and accept them as a component in the quality of life in a neighborhood, then settlement improvement and poverty mitigation will be a reality. The resulting economic and environmental dynamics will then help to reduce the unemployment and misery of urban areas.

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🏆 *reviewed paper*

Ivan: Creator of Sustainability in Iranian Old Houses

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1 ABSTRACT

This paper introduces and focuses on an Iranian architectural element which has been designed to have the solutions of human comfort and use and save natural energies. A free and smart element which like a layer in front of the main body of buildings apears and prevents the direct sunshine to the building and like a cover creates shadow and a cool atmosphere in front of the main building and by this way, it has been as the creator of sustainability in Iranian architecture. First of all we will have an introduction and history of this Iranian invention and then we will focus on its climatical values and then its effects on architecture of old houses in Iran.

2 ARCHITECTURE AND SUSTAINABLE ENERGIES

Sustainability and the ways of uses of natural and renewable energies, is one of the most important cases which should be paid attention alot. Houses are one of the main consumers of energy in urban scale which paying attention to their details and the correct ways of their architectural design, can reduce the nonrenewable energy uses and increase the natural energy uses and sustainability. In fact, architecture and a fine design can save energies and human and the correct way of uses of energies can save architecture and human again.

3 IVAN

Before coming to the architectural details of Ivan and its relationship with energy, we will have some descriptions of what the Ivan is in different definitions. In some traditional believes, Ivan is an element to separate the outside and inside of a place or atmosphere [1]. In an other definition, it is like a space infront of a building with some columns [2]. In fact, it is an element to create shadow and was used as a tool to make connection between the house itself and natural atmosphere of outside [Fig.1].

Fig. 1: Ivan, an element of Iranian architecture infront of an old house

It should say that Ivan was not just used as an element of houses. It was also used for some other public traditional and religious buildings of Iran such as mosques or even for some govermental buildings such as palaces, but as its main sustainable effect was shown on houses, this research is focusing on houses and their sustainable potentials. As the history and the researches show, Ivan is an Iranian invention which was used in this country from their ancient kingdoms such as Achamedian and Ashkanian [3], but the main uses of this element in the houses started in Iran in Safavi and Qajar period.

As the main land of Iran includes the hot and dry region, So it was necessary to create some things to provide the coolness and prohibit the hot weather and it has some columns and also it was usually decored by some Iranian decorative organs [Fig.2].

Fig. 2: Ivan, with decorative organs and columns

4 IVAN, ARCHITECTURE AND SUSTAINABILITY

During focusing on sustainablity details of Ivan, we should pay attention to both beauty and functional aspects of it too. Ivan was used as a lateral architectural instrument to increase the beauty of the building, but the main use of that was its functional aspect and its sustainability creating. The South side of houses need to have enough natural light as the living room of Iranian old houses called "Tanabi" is usually designed in this side but in some parts of this hot country this sunshine and natural light can cause some problems and if there is no shell in front of this hot side of houses, inside of houses will be so hot. So, we need to save the natural South light without making inside so hot too [Fig.3].

Fig. 3: The beauty and functional aspects of Ivan

Making somewhere cool or hot needs energy, and this energy should be provided. Iranian traditional architects had tried to use natural energies in their most designs and by this way, they were making a house

or any other building sustainable. Ivan, like a shell in front of the houses, with its climatic effect, creates an environmental conditions and a spatial variety. When it`s in front of a building, as it is not like a rough wall with some simple windows, it invites the natural lights inside as much as it`s possible and by creating the shadow makes the main body of building and also the meddle space cool [Fig. 4].

Fig. 4: Ivan and the meddle space between it and the main body of the building

By designing and using this element, with out burning fossil and nonrenewable energies, Ivan uses natural energies and creates shadow and makes the house cool with out decreasing the light inside.

5 CONCLUSION

Having two or even more benefits together beside each other makes the architectural design process hard, but Ivan makes this request easy. It makes the Iranian old house beautiful, it causes to have the natural light inside and also by using the natural energies and making the building cool causes the sustainablity for Iranian old houses and this traditional element can be used as a pattern for today and also future architectural design to save the energy sources.

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Key Impacts of Economic Integration of Kazakhstan on Spatial Development of Its Settlements

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1 ABSTRACT

This paper aims to show any specific impacts of economic integration of Kazakhstan on its border settlements. Addressing this issue is certainly indicated in view of the potential development of the Eurasian Economic Community (EurAsEC). Over the last few years the EurAsEC member countries have decided on the formation of a Customs Union and a Single Transport Space as parts of the future establishment of a "common economic space" - a single market for goods, investment, and labour.

Economic integration of Kazakhstan might change the distribution of available resources (especially cross-border natural resources) within a country as well as between neighbouring countries, which has positive as well as negative impacts on the development of border settlements.

The positive impact of integration is linked to better access to foreign demand, market potential and development of cross-border network infrastructure. However most of the settlements are still based on an industrial economy of raw-materials and current economic development trends are too remote from being able to satisfy world demands of hi-tech goods. Thus it is difficult to assess which urban and rural market areas of the country could benefit from the Eurasian integration.

The task of planners is to prepare basic spatial models for all settlements' benefits, taking into account key impacts of economic integration.

2 RELEVANCE OF THE STUDY TO THE CONFERENCE THEME

What functions will settlements carry out? How will they depend on external factors like world economic crisis and demographic changes? How can Kazakh modern cities and villages respond better to economic integration processes? How could intensification of exchange of international goods and information, as well as a rise of human mobility due to development of international communication, transport and logistic systems shape our urban and rural areas in the future?

All the answers to the above questions cannot be given at a single city scale. As professional planners we should stop thinking only about "urbanism" or "how to make cities more comprehensive", but try to consider new possibilities of how cities can share their potential and energy with other neighbouring living environments, for example less developed medium-size cities, small towns and villages. This is especially relevant, when building an open economy that affects directy weak urban and rural areas in some developing countries like Kazakhstan which are already losing their economically active population.

The idea of presenting this paper within the framework of the CORP2012 topic named "RE-MIXING the city" is to attract the attention of planners to specific regions comprising new kinds of living areas where functions are remixing at the scale of urban and rural networks.

3 CONCEPTUAL FRAMEWORK

3.1 Introduction to the case study

In the light of the current interdependence between local and global markets, building a competitive urban systems based on the economy of settlements should be a considerable issue at all levels of planning in Kazakhstan.

It is obvious that our living settlements are becoming increasingly sensitive to global trading trends. The 2008 financial crisis, which translated into a global economic crisis, impacted on trade and stopped capital from flowing into some developing countries like Kazakhstan (fig.1). With oil prices dropping, Kazakhstan faced a fall in the value of the exports of its raw materials' from $76.4 billion in 2008 to $48.2 billion in 2009.

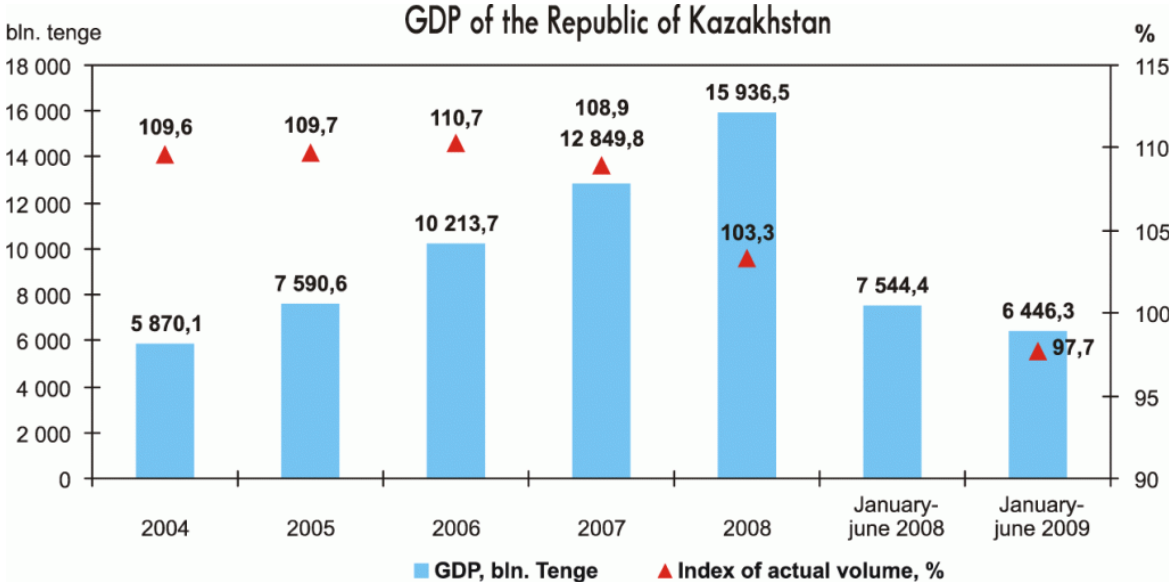

Fig. 1: GPD of the Republic of Kazakhstan.

At the same time, trade relations have become more intense and far-reaching, incorporating areas such as service trade, foreign investment, intellectual property and regulatory regimes. These tendencies are a clear reflection of the growing integration of the world economy and the "internationalisation" of policies that were once considered domestic.

In this regard the government of Kazakhstan is pushing actively a course of integration of the country into global economic processes. Accession to the World Trade Organisation (WTO) has always been and remains a foreign policy priority for Kazakhstan. Kazakhstan has also worked intensely to create a Customs Union, which is viewed as a practical realisation of the idea held by the President of Kazakhstan of economic integration of Eurasian countries similar to the European Union announced by him in the mid-1990s.

All above mentioned facts have resulted in the project named "Assessment of the Influence of Current Economic Integration on Urban and Rural Areas and Their Production Systems of the Republic of Kazakhstan" in the framework of the development of the General Strategy of Spatial Organisation of Kazakhstan. The implementation of this project is presented in this paper.

3.2 Methodological approach

Owing to a shortage of time for the project development and lack of funding for field surveys, our team of experts developed its own methodological approach that helped to concentrate our attention on only key links between external and internal forces of production.

Main technological scheme

The main technological scheme (fig.2) illustrates our general methodological approach to the assessment of the key impacts of the economic integration on urban and rural areas of Kazakhstan.

The first scheme, like the other methodological models, is presented in a geometric form of a circle which helps to strengthen multi-dimensional effects from an outward economic influence on the territorially closed "urban and rural areas and their production systems", located right in the centre of the figure.

The outer grey circle aims to show "main world demand trends" taking into account integration steps already undertaken by Kazakhstan with its neighbouring states in the framework of the Eurasian Economic Community (EurAsEC). Trade and transit potential, as significant world economic tendencies, are also highlighted within the grey circle, where attention is paid to future development of EurAsEC via the establishment of a "Custom Union and Single Transport Space".

Externally impacting key factors of world demands are then compared with current economic development tendencies of the regions, with particular attention to the valuable roles of logistic and transport systems which are physically linking up the living and working environments of urban areas.

Three main levels of economic integration - "spatial", "territorial" and "regional" - are artificially included in the parts of the chart which shows the "current economic tendencies" and the "urban and rural areas and their production system". This was done due to their importance in the development of recommendations and proposals towards building functional linkages between regional urban and rural systems and the world market, following the assessment.

Moreover all proposed recommendations are grouped into three main trends, represented as blue rectangles and placed in the outer grey circle of world trends that offer potential capacities for the domestic production systems to be competitive in the global market.

The first group of proposals named "development of service and trade in services" is concentrated around recommendations of strategic steps for sustainable regional integration, with the help of systematic development of trade potential and spatial integration in response to main trends of world demand.

The second group of proposals is oriented towards "development of export of high quality goods". They take the form of strategic actions aiming at sustainable territorial integration which relies on transit potential, as well as on spatial integration processes.

The most important programmed strategic activities on regional integration and territorial integration form part of the third group of proposals called "cross-border cooperation", where the key role is given to border settlements of Kazakhstan.

Further conceptual models represent the development of the key ideas included in the main technological chart in detail.

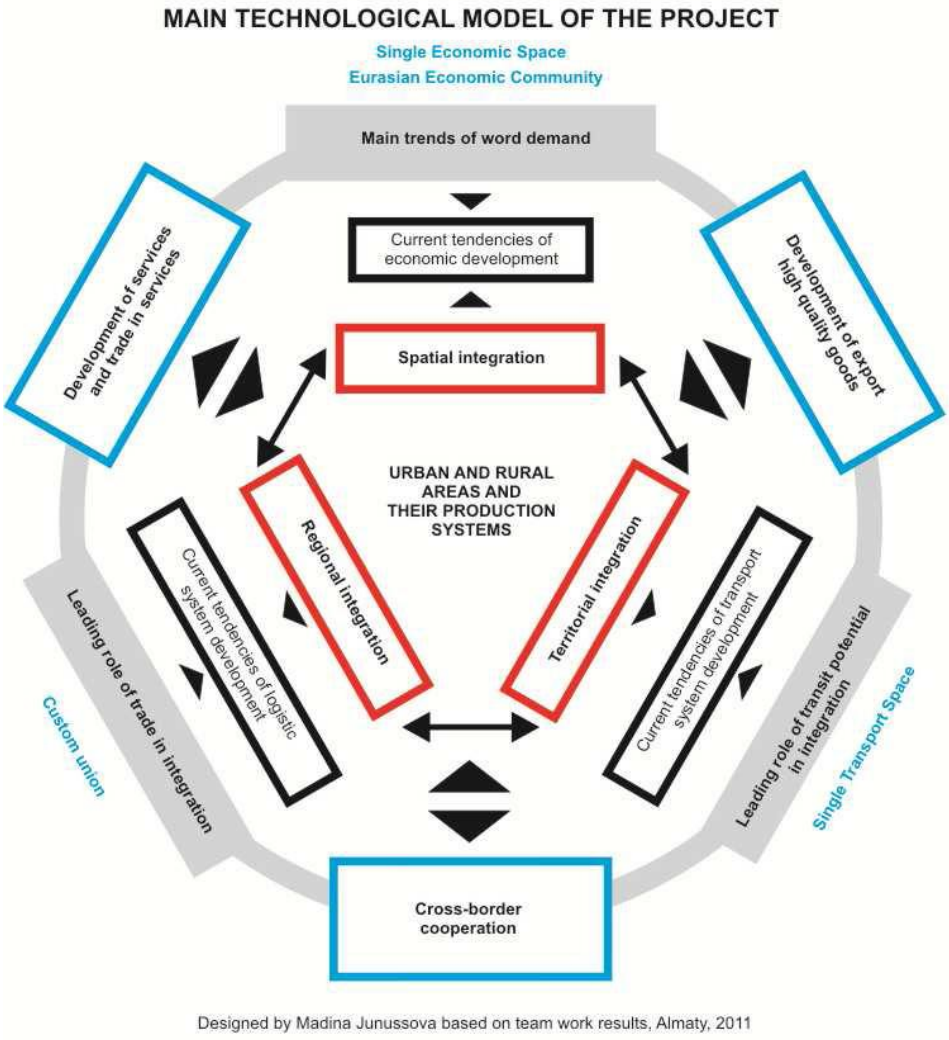

Fig. 2: Main technological scheme of the project.

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Conceptual Model of Projection of World Demand

The first conceptual model (fig.3) displaying projection of the "main world demand trends" based on "current economic tendencies" was developed by researching and selecting relevant comparable indicators which illustrate external and internal trends that could be used to highlight key impacts of economic integration on production components of urban and rural areas.

An example is the confrontation between the world trend of "increasing demand for new, higher quality energy- and resource- efficient products and the current domestic trend of "insignificant growth of the service sector as opposed to the rise of production in the sectors of industry and agriculture". This study was using external market indicators from open sources, such as WTO, EurAsEC and CU databases and compared them with internal market indicators extrapolated from data of the State Agency on Statistics and databases of local regional administration.

On the one hand the results of the above mentioned analysis make it possible to identify the level of sensitivity of each specified region of Kazakhstan to the impact of economic integration. On the other hand the results could serve as a good foundation for the development of recommendations for further research needed to be carried out on these issues within the framework of the long-term project of A General Strategy of Spatial Organisation of Kazakhstan.

In addition, this model is also designed to uncover potential negative effects of spatial integration, such as increasing functional pressure on the transformation of large cities, in particular their continuous growth and territorial expansion. These processes immediately cause segregation and degradation of smaller towns and other settlements that would not be able to obtain any profit from external economic demand, due to their small sizes, isolated locations and low functional and technological capacities.

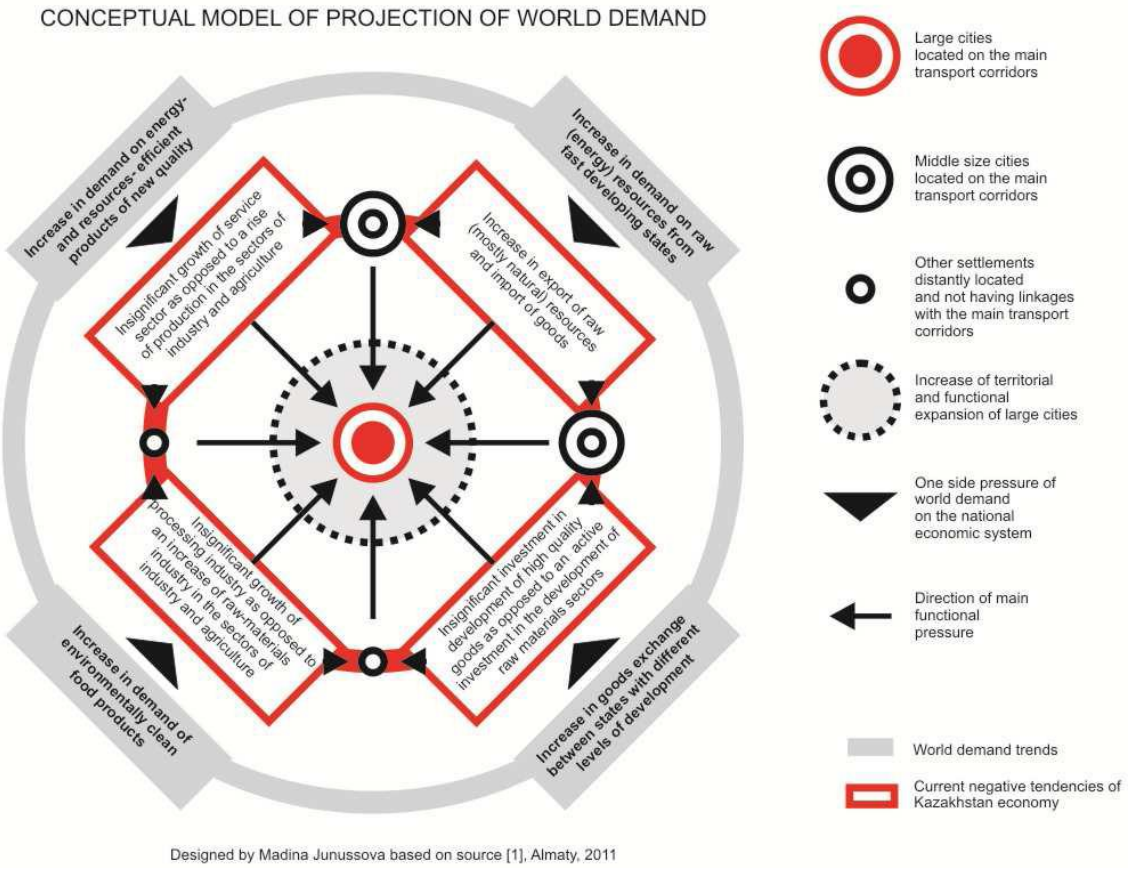

Fig. 3: Conceptual model of projection of world demand.

Conceptual Model of Separation of Key World Trends

The second conceptual model (fig.4) is designed to identify key world trends in line with competitive advantages of Kazakhstan based on its unique geopolitic situation in the heart of the Eurasian continent. These key world trends could be used to transform current negative economic tendencies into positive ones, based on a programmed investment orientation aimed at sustainable development of "territorial systems of

settlements" in Kazakhstan (the term used for the description of interlinked urban and rural areas in the project).

The formation of domestic trading potentials should be based on the development of logistic agricultural and industrial production sectors connected with programmed arrangements of territorial systems of settlements, whereby some functions of large cities are delegated to middle size cities located on the main transport corridors.

The development of such a transit potential is realised through the establishment of a multi-modal transport system which provides better travel conditions for passengers, together with the transfer of other material resources, in accordance with programmed arrangements of territorial systems of settlements, whereby some activities taking place in large cities are transmitted to remotely located medium size and small settlements.

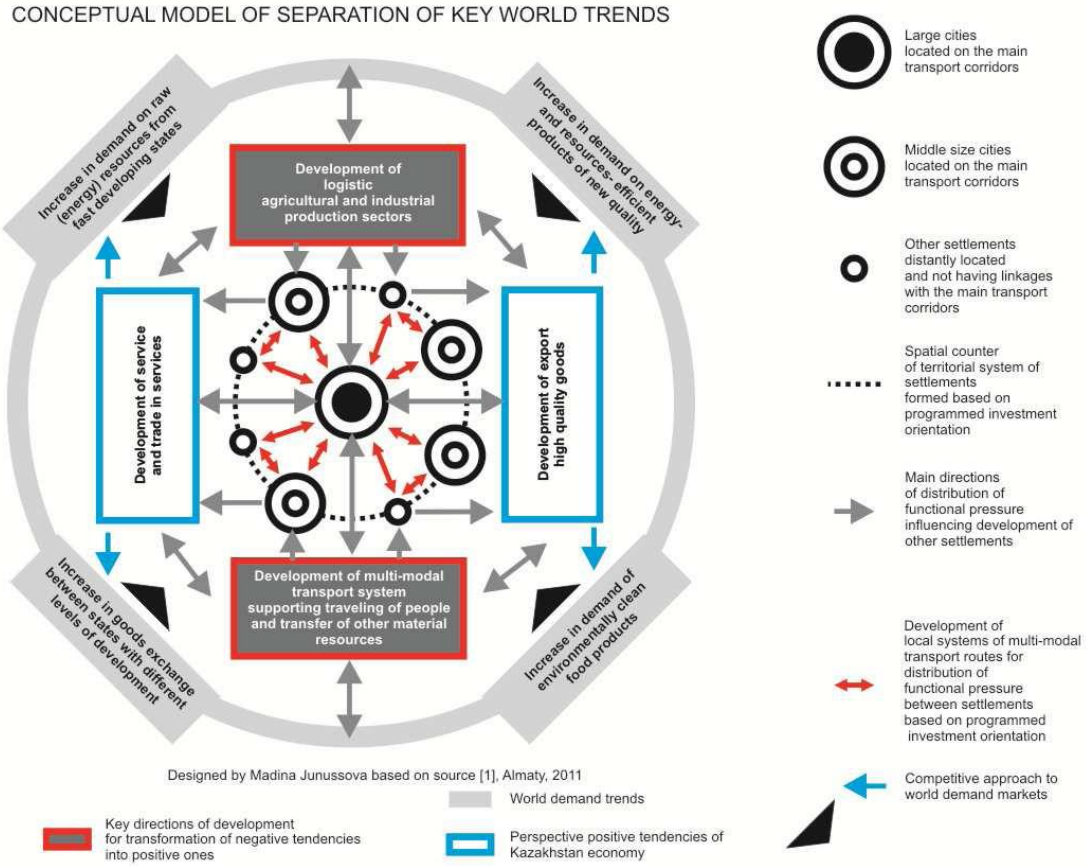

Fig. 4: Conceptual model of separation of key world trends.

4 ECONOMIC INTEGRATION: CURRENT TENDENCIES – WORLD TRENDS – KEY POTENTIALS

4.1 Current Economic Tendencies of Development in Kazakhstan

Kazakhstan keeps staying in a position of key supplier of the world markets with a large amount of raw and precious natural resources. Conversely, the analysis of economic change Kazakhstan shows that during the last 5 years its proportion of GDP indicates an insufficient development of its service sector (fig.5).

Although the country is continuosly investing in its infrastructure its economy remains heavily reliant on natural resources. The production of mining still repesents a donimating sector, with the biggest part belonging to the production of fuel and natural energy resources, particularly the production of crude mineral oil and accompanying gas (fig.6).

Since 2005 the government of Kazakhstan has initiated several state programmes focused on stimulating the innovative economy. The Territorial Development Strategy of the Republic of Kazakhstan to 2015 (adopted in 2006) was one of the first documents with a long term state planning vision taking into account interdependence of local settlements and world market economies (fig.7). However its main planning goal continued to attribute the main advantages to the large cities and the transport routes of national importance

as the main centres and backbone of its spatial economic development strategy with almost no chances for other settlements to participate. According to the Government (Strategic Plan 2020) future industries also should primarily be established in the countries main urban centres, such as Almaty (largest city of Kazakhstan with population about 1.5 million) and Astana (capital of the country), which already benefit from a competitive economy, enjoying separate state budgets, highly skilled human resources and having very attractive work and living places.

Fig. 5: Structure of GPD of the Republic of Kazakhstan.

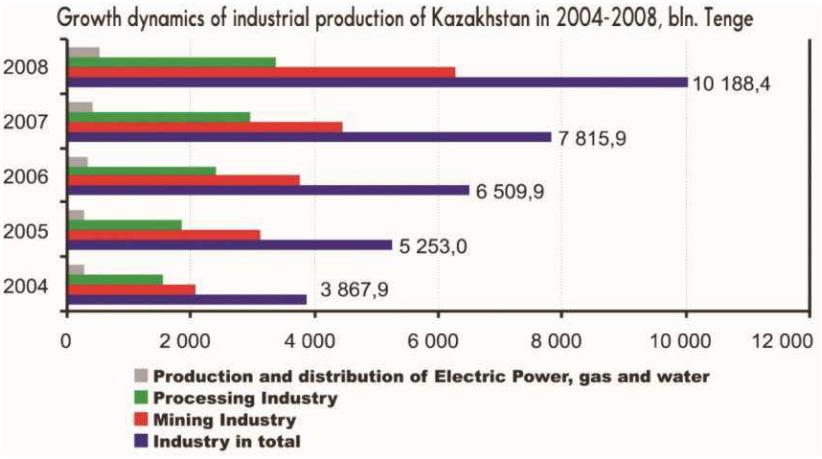

Fig. 6: Growth dynamics of industrial production of Kazakhstan in 2004-2008.

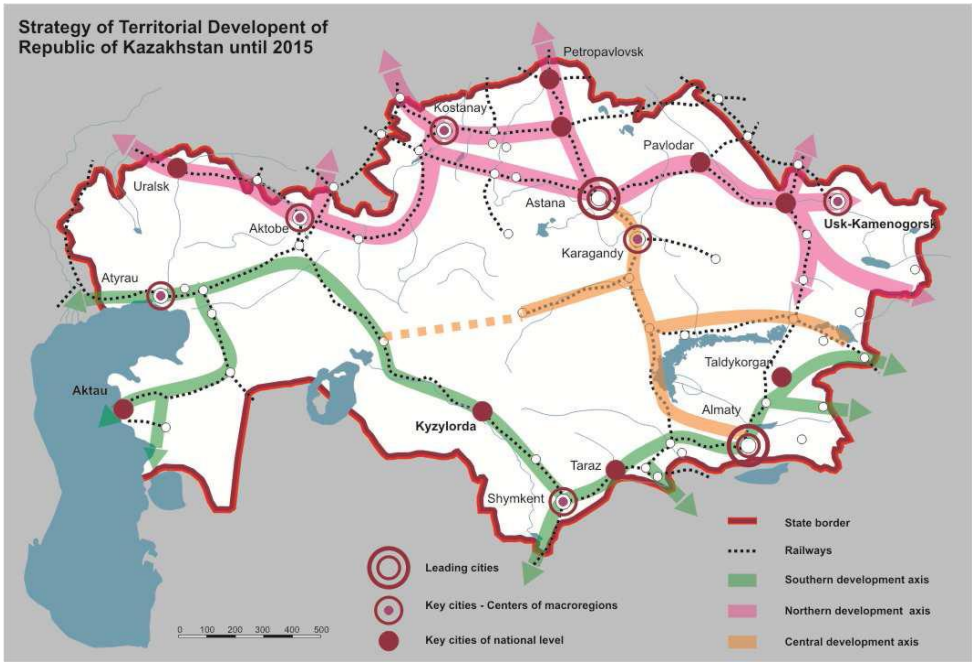

Fig. 7: The backbone centres and development axises of strategic territorial development of Kazakhstan until 2015.

The 2008 Territorial Development Strategy was followed by regional territorial development strategies till 2015, including separate strategies for Almaty and Astana. Only few such regional strategies, like those for the Almaty and Mangystau Regions, considered any impact of the external market forces on the local settlements economies.

Taking into account all the above mentioned currently dominant directions of the development of the state economy, the project team of experts carried out a detailed survey on current economic tendencies of all Kazakhstan's regions, with special attention to urban and rural border areas. This survey resulted in the selection of four main groups of negative trends, namely:

- Insignificant growth of the service sector as opposed to a rise of production in the sectors of industry and agriculture;
- Insignificant growth of processing industry as opposed to an increase of the raw-materials industry in the sectors of industry and agriculture;
- Increase in export of raw (mostly natural) resources and import of goods;
- Insignificant investment in the development of high quality goods as opposed to active investment in the development of raw materials sectors.

4.2 Main World Trends and Kazakhstan Integration Perspectives

The historic formation and development of urban areas of Kazakhstan have a straight link with the establishment of its modern state borders. Owing to this fact more than 80% of Kazakhstan's current population is living within border areas. Almost all transport links are concentrated within border regions widely used as the main international transit corridors serving international trade functions:

- Northern Corridor of Trans-Asian Railway Main (TARM): Western Europe – China, Korean Peninsula and Japan via Russian and Kazakhstan (section Dostyk – Aktogai - Sayak – Mointy – Astana – Petropavlovsk (Presnogorkovskaya));
- Southern Corridor of TARM: South-Eastern Europe – China and South-Eastern Asia via Turkey, Iran, Central Asian states and Kazakhstan (section Dostyk – Aktogai – Almaty – Shu – Arys – Saryagash);
- TRACECA: Eastern Europe – Central Asia via the Black Sea, Caucasus and the Caspian Sea (section Dostyk – Almaty – Aktau);
- North-South: Northern Europe – Gulf States via Russia and Iran, with Kazakhstan's participation in the following sections: sea port Aktau – Ural regions of Russia and Aktau – Atyrau.

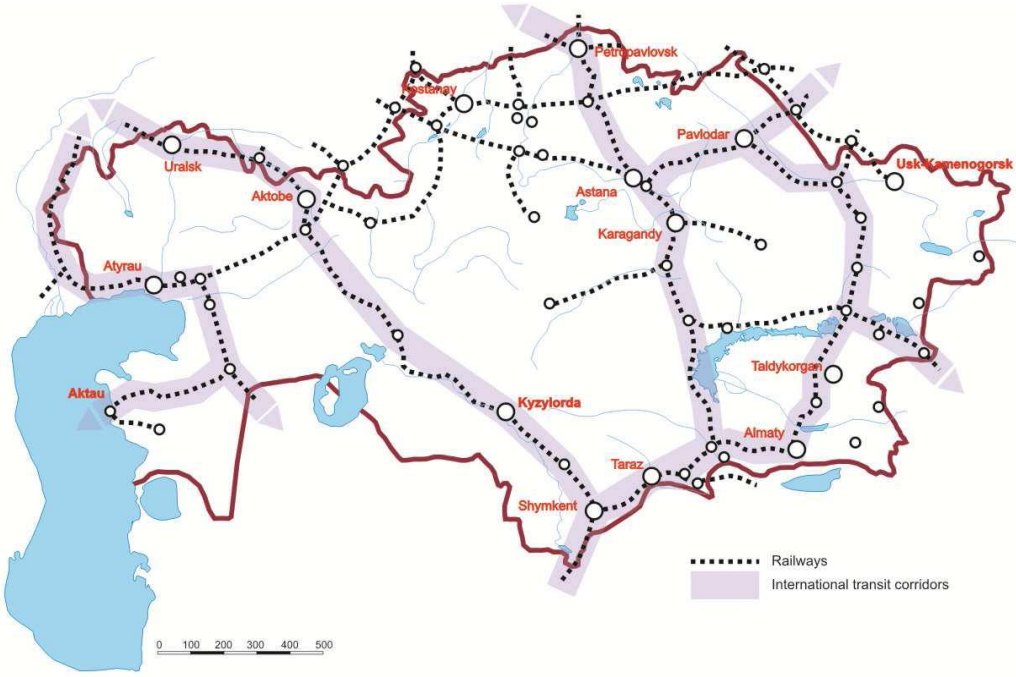

Fig. 8: Main transit transport corridors of the Republic of Kazakhstan.

Located in the centre of Central Asia with no access to open seas (although with access to the western regions of the Caspian Sea) Kazakhstan is highly dependent on its neighbouring states for international trade. This is one of the reasons for Kazakhstan to be an initiator of economic cooperation and integration processes with its close neighbouring countries.

Kazakhstan plays an active role in promoting the Shanghai Cooperation Organisation (SCO). In the past years, economic cooperation within SCO has been developing rapidly which is reflected in interstate trading operations and investment in general. China with its growing economy mostly imports raw materials from Kazakhstan and has a competitive advantage in production due to its low cost labour and huge market size. Currently, China is also intensively investing in the development of its western region Xinjiang bordering with East-Kazakhstan and the Almaty region of Kazakhstan.

Kazakhstan understands the importance of integrating with its other bordering states. It is worth to highlight its economic cooperation with Russia, especially within the framework of the Eurasian Economic Community (EurAsEC). The integration of five member states Belarus, Kazakhstan, Kyrgyzstan, Russia and Tajikistan, EurAsEC, was established with the aim to develop economic cooperation and trade and to coordinate the actions of Community states during growing integration into the world economy and the international trading system,

Although the EurAsEC Customs Union (CU) was adopted by the heads of six member states (6 October 2007) the initial stage of the Customs Union is formed only by three Community countries – Belarus, Kazakhstan and the Russian Federation, with the other EurAsEC members joining at a time when their economies and legislative systems are ready.

Local as well as foreign experts identify many advantages for Kazakhstan's economy to be driven by Eurasian integration with neighbouring Russia. However our study concentrated on the main impacts of Kazakhstan's role as mediator of integrating urban and rural economies into the world economic processes, with special focus on border areas.

Four of the selected main current direction of regional economic development in Kazakhstan mentioned above were used as a starting point to confront them with the most popular world demand trends derived from the latest world wide forecasts. The project team reviewed several reports of different internationally respected organisations like UN, FAO (UN), World Energy Council, World Bank and etc which provide expert views on the future development of world trends until 2050. Almost all the reports identify four main world dominating trends with relevance to Kazakhstan's current regional economic development conflicts:

- Increase in demand of innovative energy- and resource- efficient products;
- Increase in demand of environmentally clean food products;
- Increase in demand of raw (energy) resources from fast developing states;
- Increase in exchange of goods between states with different levels of development.

Due to the fact that two last trends also serve as the main backbones of EurAsEC, further integration through Custom Union - CU (based on free trade) and Single Transport Space - STS (development of common transit transport corridors) could be used as the key tools of territorial and further regional integration as a means to transform a post-industrial location-based economy into an innovative network-based economy.

The EurAsEC Custom Union - as distinct from the previous stage of integration, the free trade zone – presupposes free movement throughout the common customs territory, not only of goods produced therein, but also of goods from third countries freely circulating in the territory. The idea of the development of EurAsEC STS is based on the arrangement of better transportation of cargos, mostly along the existing transport corridors that helps to attract more transit.

As the above mentioned activities of promotion of trade and transit are being implemented without paying much attention to the real future of the simultaneous development of logistic and transportation in response to current development trends of the urban and rural border areas, our team of experts found it vital to propose a conceptual vision of their potential integration (as a positive feedback to the economic integration) (fig.9).

We fully understand that each region of Kazakhstan needs to be analysed in more detail, including field market research and social surveys. Nevertheless, positive effects from the simultaneous development of

logistic (using CU advantages) and multi-modal transportation system (using STS investment) can only be achieved by implementating at least two main steps, namely:

- Involvement of planners in the development of flexible investment programmes at local and regional settlement levels that would aim to keep a balance between production fitting both local and global market demands and helping to find the most appropriate sectors for the introduction of logistic productions;
- Building an appropriate planning platform for merging the state (central) level and regional and local (bottom) level initiatives of economic integration, taking into account the development of competitive urban and rural areas by promoting the construction of inter-settlements high-speed public transport passenger systems.

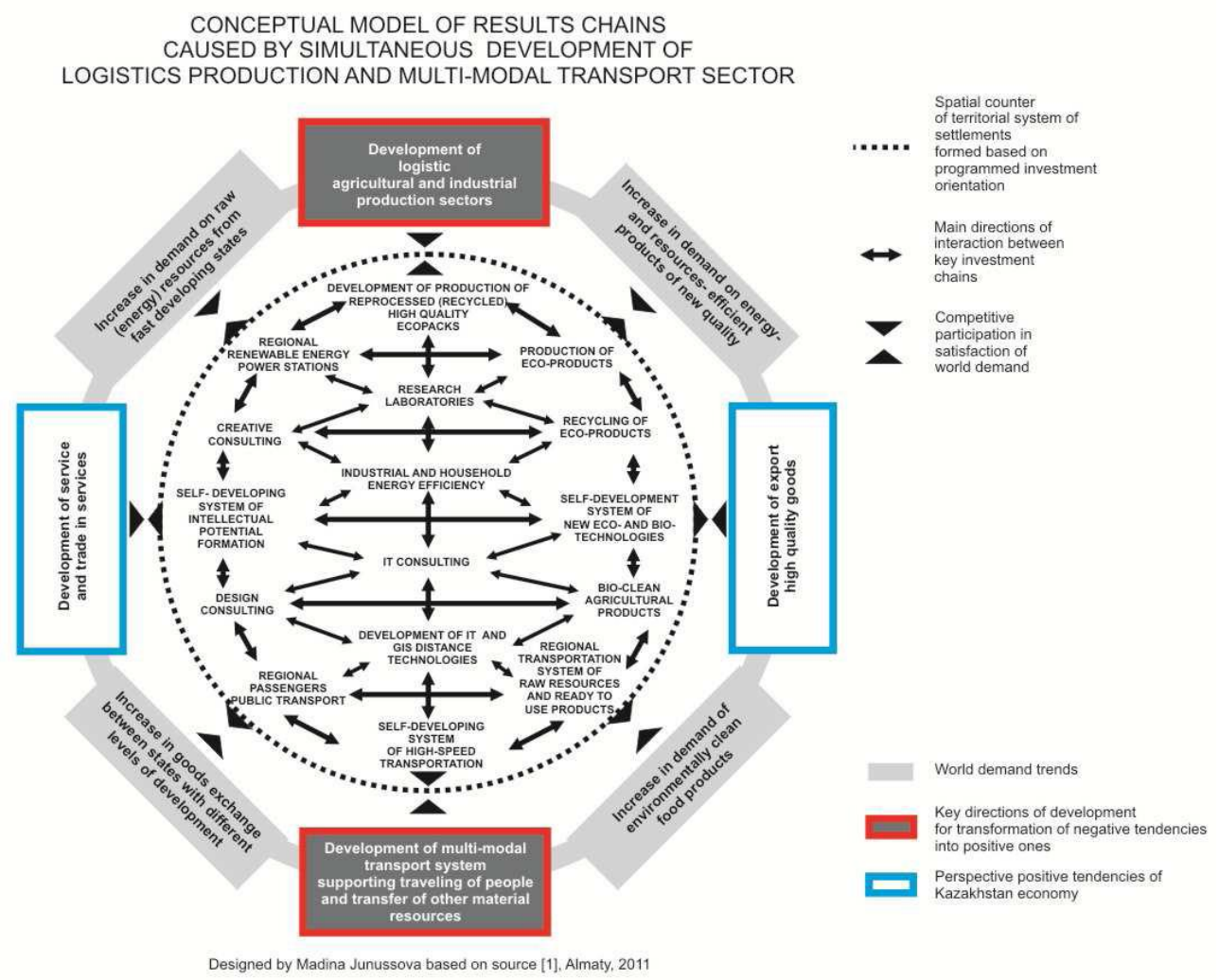

Fig. 9: Conceptual model of results chains caused by simultaneous development of logistic production and multi-modal transport sector.

5 CONCLUSION

With the introduction of EurAsEC Custom Union all production forces of urban and rural areas of Kazakhstan become a part of the wider market. The top level inter-state integration shouldn't be implemented separately from regional and local level integration, as only large scale, technologically and functionally rich systems of the Kazakh settlements could be competitive with the world's largest cities like Moscow.

At present, most of the top-down integration decisions are not fully understood by local administrations in the regions. However there is growing demand for the development of cross-border cooperation between border regions of Kazakhstan and regions of its neighbouring states that could serve as a good base for linking regional and spatial economic integration.

The EurAsEC management committee has a complex structure with many different types of councils responsible for the development of common approaches. However, it is still lacking any initiatives driven by the urgent needs of cross-border local initiatives, like:

- cross-border rivers under pressure from overuse of water and poisoning pollutants;
- cross-border migration with growing numbers of economically active educated population leaving;
- lack of innovative cross-border infrastructure;
- low capacity for the creative use of available natural resources and etc.

In this regard it may be too early to analyse any real positive impacts of economic integration mainly provoked by central level decisions, without any visible support of strong cross-border cooperation in planning a sustainable future for commonly used natural resources and production forces of urban and rural settlements.

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LIMES – Large Scale Innovative and Mobile European Services for Culture Tourism in Rural Areas

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1 ABSTRACT

The Roman Limes is the only European cultural heritage which interconnects ten European countries. Three of these countries have now decided to develop and implement a Mobile Information System for the tourism exploitation and marketing of this cultural heritage. Germany, Austria and Bulgaria will develop a "role model" for adaptation in order to connect all touristic sites in the ten European countries along the Roman Limes via mobile services. Since the Limes is often not accessible or not recognisable, new mobile service applications are vital to create an understanding and awareness of the historical setting that is often in the countryside. Designated target is to advance sustainable tourism and to support the mobility especially in rural European regions by the practical application of highly innovative mobile services. These services will enable information brokering, booking of rooms, travel mobility and additional functions for visitors as well as located people. Technologically it is about the interaction amongst mobile Internet, Global Positioning System, mobile phone camera and social networks. Therefore, a "Limes-App" will be developed including video player, navigation module, social media connection and an Augmented Reality Viewer. The Mobile Information System will base on Limes-relevant data and informations, displayed especially as historical reconstructions and other visualisations. Best practice models in context to the European LIMES project will be made public and applicable for the seven other European countries along the Roman Limes. In addition, the European Union has decided to launch a "data-roaming cut-off safeguard" [European Union 2010] for international mobile use and to cut the prices for calls and mobile Internet step by step in the next few years [European Union 2011]. This results in excellent conditions for the project which will help to valorize the cultural route of the Roman Limes, to capitalise its economic potential and to support sustainable tourism networks and structures in Europe.

2 THE LARGE SCALE DEMONSTRATOR CONCEPT OF THE EUROPEAN UNION

The "Expert Panel on Service Innovation" in the European Union (EU) published a report "Meeting the challenge of Europe 2020: The Transformative Power of Service Innovation". The strategy of Europe 2020 is a smart, sustainable and inclusive growth which in the context of service innovation leads to the vision of a "fundamental system transformation in almost all areas of the economy" [MAYO et al. 2011, p.1]. Technology innovation has to be combined with the development of policy through the lens of the customer. The role of the service element forms an important part of modern business and provides much of the technical and social infrastructure. Innovations in these service systems have the potential to profoundly influence other sectors [MAYO et al. 2011, p.7]. To support innovation in complex conditions the EU has improved the concept of demonstrators. These demonstrators – as innovation management tools – shall "provide a way of de-risking innovation by providing a staged process in which a range of solutions are initially developed, tested and then selected for further rounds of support" [MAYO et al. 2011, p.18]. There are numerous small-scale prototype demonstrators and a smaller number of large-scale near-market demonstrators. "Given the size of the European market, this should provide the basis for European standards to play an important role in developing global standards, thereby ensuring a level playing field for EU firms in global markets" [MAYO et al. 2011, p.18]. For different challenges there will be several demonstrators [MAYO et al. 2011, p.20f]:

- The focus on sustainable communities highlights the importance of ecological change and reflects the need for transition of industrial areas and the development of smart cities.
- The focus on the creation of dynamic regions takes care of the need to improve poorer, remote regions in Europe with particular reference to smart and sustainable tourism.

The focus on sustainable coordinated transport has the target to promote sustainable mobility by the reduction of carbon emission and the improvement of efficiency and predictability of the transport system.

The European Mobile and Mobility Industries Alliance (EMMIA) implemented the concept of large-scale demonstrators to prove the feasibility of exploiting innovative mobile services to foster sustainable tourism in rural areas. In 2011 two large-scale demonstrators were launched by the European Commission's Directorate-General for Enterprise and Industry: The demonstrator "CULTWAyS – CULtural Tourism WAys through mobile Applications and Services" [CAPRA 2011] and the demonstrator "LIMES – Large Scale Innovative and Mobile European Services for Culture Tourism in Rural Areas". The main objectives of the project are

- to network tourism sites along the Limes in all respective countries,
- to develop innovative mobile services along the route which support information, brokering, travel mobility and additional services for visitors as well as local people,
- to support via these services new businesses along the route,
- to create income and jobs for rural areas,
- to make the European identity and the common European history visible and perceptible for visitors from all over the world.

3 MOBILE SERVICE FOR CULTURE TOURISM

3.1 The Limes in the Demonstrator Regions

After defeating the Carthaginians in 241 BC the Romans began to expand their sphere of influence in the western Mediterranean Sea. By striking back the attack of Hannibal in 202 BC the Roman Republic ruled the territory of today's Spain and southern France. From now on the Roman expansion went on towards the east under the pretext of supporting small kingdoms against the attacks of big powers like Macedonia or Syria. Other kingdoms surrendered in preemptive obedience [DEMANDT 2003, p.73f].

Gaius Julius Caesar conquered Gaul in 58-51 BC and was appointed as dictator of the Roman Empire. This empire subsequently expanded until it surrounded the whole Mediterranean Sea. The expansion stopped in "Germania Magna", when the Roman army under Varus suffered overwhelming defeat in the Teutoburg Forest in campaign against the Cherusci in 9 AD. As result the Rhine and the Danube were the natural borders of the northern Roman provinces [DEMANDT 2003, p.79f].

Fig. 1: The Roman Empire at its greatest extent in 211 AD – source: CAVAZZI 2009

In 43-44 AD Britain and in 74-85 AD the territories between Rhine and Danube in today's Southern Germany were brought under Roman rule. To ensure customs revenue and security along the borders the Romans built a visible dividing line, which was built up in the period following. This "Roman Limes" represented the border line of the Roman Empire at its greatest extent until the beginning of the 3rd century AD. Partly it was fortified with walls, towers and forts – especially in Britain (Hadrian's Wall and Antonines Wall) and in today's Germany ("Germanic Limes" and "Raetian Limes"). In fact, the word "Limes" was not only used to indicate the imperial frontier or a fortified border. It was used as an administrative term, indicating a military district, commanded by a dux limitis [ISAAC 1988, p.125ff].

Now the Large Scale Demonstrators of the European LIMES project pick up the northern Roman border line to develop mobile services and revive the intercommunity along the Roman Limes. The three Large Scale Demonstrator Regions in particular are Rhineland-Palatinate in Germany with the "Limes Germanicus", Lower Austria along the Danube and the city of Rousse in Bulgaria, also located at the Danube.

Fig. 2: Limes sights in Rhineland-Palatinate (Roman fort in Holzhausen), in Austria (reconstruction of thermea in Carnuntum) and in Rousse, Bulgaria (Roman fort "Sexaginta Prista"). Sources: JOST 2012, OLSCHINSKY 2011, KABAIVANOVA 2005.

3.2 Requirements of Mobile Services in the Demonstrator Regions

Based on a study of the "Branchenverband BITKOM" 83 % of the German population owns a mobile phone. At the end of 2011 there were about 112,03 million contracts in Germany. This shows that some users have more than one contract (e. g. surf-sticks, tablet PCs). In Germany there are four major mobile network operators [KURTH 2011, p.51]:

- Telekom Deutschland (31,2 % market share)*
- Vodafone D2 (32,9 % market share)*
- EPlus (19,8 % market share)*
- Telefónica Germany O2 (16,2 % market share)*

* retrieved 3rd quarter in 2011

To guarantee a save and fast data transfer rate, it is necessary to have at least UMTS connection (3G-network) at the major stations of the mobile information system "Limes". For textual information the EDGE data rate is adequate, but not for larger data like videos or Augmented Reality applications. As an evaluation of the network coverage in the three partner regions shows, there is a very good 3G-network coverage along the Limes in Bulgaria and Austria. The Limes in Rhineland-Palatinate runs through rural areas, where is often a lack of 3G-networks – so there isn't a well-performing Limes information system verified.[1] Therefore the Limes information system has to offer an open wireless Internet access point (e. g. WLAN) at the main sights. In addition some applications, like videos and textual information, should work offline – the user can download the data at the wireless Internet access points and get the information at places with no mobile internet access or with low network coverage.

The framework of smart phone usage in Bulgaria (only 9 % smart phone users in 2011) requires a mobile information system, which works with a "basic-version" on older mobile phones with only mobile internet access. So the system should base on a mobile website. This also guarantees the function of all kind of smart phone operating systems. Applications like Augmented Reality or offline navigation are only suiting to smart phones and should be part of an additional "App". This "App" should be provided for the operating systems

[1] Own evaluation, based on data of the mobile network operators.

Android OS and Apple iOS – in the three partner regions this operating systems are very popular. Generally, there is still a problem of high cross-border costs for mobile internet usage: Because of the roaming costs, consumers are not willing to use the mobile internet in foreign countries. These problems show that the mobile service that will be developed in context to the LIMES project has to meet several requirements, which are very different from region to region and will hopefully get easier to handle in future.

Certainly, the European Union has decided to cut the roaming costs step by step in the next few years and the mobile network coverage will improve in all European countries [European Union 2011]. Another future perspective are mobile NFC (Near Field Communication) services that are generally able to stimulate future growth by involving transportation, ticketing, retail, access and more. The aspects of "Connected Living" can create new service concepts and business models that are being used to address a range of new markets [GSMA 2012].

New target groups – especially younger generations – can arise because of the majority of young smart phone and mobile internet users. In this context the system has to offer an additional value. Individual tourists need the profound information but also have to be entertained. To develop an attractive application which can be used more than once it has to include a social interaction tool and a playful element. According to the needs of outdoor tourists as well as historically interested culture tourists there should be a kind of "Story" that surrounds the mobile Limes application.

3.3 Contents of the "LIMES-App"

The information of a mobile application called "LIMES-App" has to be suitable for tourists and local people as well. There should be as much interaction as possible, so the users can give an input about gastronomy, hotels or events by rating, commenting, etc. At the same time the quality of information must be guaranteed. Additionally there has to be a booking option for accommodation and the opportunity to navigate to the next points of interest. To make the "LIMES-App" attractive to younger target groups it is planned to implement some playful elements such as collecting aspects or games, which might work on static PCs but evolute their full range of gratification only on-site at the Limes. Other multimedia like videos, 3D-models etc. should be part of the information and entertainment, too. Generally, social interaction is one of the major points the application has to offer to found a kind of "Limes community". In addition, the technology of Augmented Reality can be included for better orientation, navigation and as a playful tool, maybe as Augmented Reality game. In the first step these contents were sorted into four categories, which enable different ways of access to the Limes experience:

- Information about the Limes and additional aspects like weather, public transportation, etc.
- Offers like gastronomy, accommodation, events, etc.
- Social Media for the connection of users via Facebook, Google+, FlickR etc. or a special "Limes community".
- Games that work offline (like people are used to it), but also in combination with social media or Augmented Reality.

Fig. 3: "LIMES-App" ("Dummy"-Version), source: Own figure

4 IMPLEMENTATION AND REPLICATION IN EUROPE

The LIMES project will have extraordinary impact as the project organisation already includes all relevant players Europe wide. Limes representatives of the United Kingdom, the Netherlands, Slovakia, Hungary, Croatia, Serbia and Romania were invited to this proposal for fostering replication and extension of the project outcomes in their respective countries. They will participate in all partner meetings with the task for checking the transfer potential in their countries – either as actors or communicators.

Actually, the Limes is a premium destination for culture tourism although much of its potential has not been exploited so far. This is mainly due to the fact that only a small part of the Limes is accessible at the moment: the Limes runs through rural regions which are not fully developed for tourism. On the other hand, the European Limes countries have numerous museums, historic routes, archaeological sites and hidden places of interest along the Limes. These single places are not networked yet, and binding them together via mobile services offers an outstanding chance for developing especially rural areas.

The European Limes countries are very different in their access to the Limes: The United Kingdom, Austria and Germany represent countries which are very far in their tourism exploitation of the Limes, while especially Eastern countries are at the beginning of the development of tourism activities. Beyond these differences, none of these countries actually seems to have mobile services available for Limes sites in rural areas. The development of these areas is the common goal for all the member states which want to work together in the LIMES project.

Additionally, it is also part of the project to cooperate with other European Large Scale Demonstrators like the project CULTWAyS, which covers the topic of European historical, cultural routes – in particular the Way of St. James in Germany, France and Spain and the Roman Via Claudia Augusta in Germany, Austria and Italy. Overall, the mobile services developed in the context of the projects LIMES and CULTWAyS shall be adoptable for other European regions with other priorities.

5 CONCLUSION

The Limes has a big potential for tourism especially in times of general mobile availability. New ways of interregional communication between tourists and locals in Europe. Social media can bring virtual and real life into rural areas by playfully connecting people, who are more and more used to in smart phones and social media. The target is to create a wide community about the Limes on all leading social media platforms, like Facebook, Google+, FlickR etc. So the users will have the possibility to exchange their experiences at the Limes and the region (for example tips for sights, accommodation, events, etc.).

For the social media application it is useful to create a communication platform for Limes-tourists, Limes stakeholders and other, local people in the region. So on, there will be the possibility that they generate more and more content for the mobile information system and bring and keep the Limes community alive.

Finally, there should be a story told with the Limes application, which is interesting and participative for a lot of people and attracts them to come to the Limes region. At the same time the local people and economy has to be convinced to take part at the Limes community by advertising the system, offering information, sponsoring or participating by a benefit scheme or by offering attractive specials. This will lead to an added value, which satisfies tourists as well as local people and economy.

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Livability and Social Integration vs. Economic Crisis and Trends of Transition: Case Study of Local Planning in Belgrade

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1 ABSTRACT

The paper discusses the negative influence of global economic forces and transition changes against the intention of local municipalities and local inhabitants to achieve better quality of life and better social integration in local environment.

Strong economic crisis affecting cities worldwide and transition trends in post-socialistic countries are the most significant drive force of the development/decline of Serbian cities. It reflects on changing the city structure, lessening the functional diversity and shrinking the public space as most vulnerable and least profitable areas in the city. Public interest and the public space in the current context of legislation, arbitrary treatment of singular locations by some institutions and professionals and pressures of the capital is increasingly losing its significance.

On the other hand, even in such conditions the awareness of local municipalities and local inhabitants about the quality of life as well as about the importance of involvement in participation process as a way to impact local livability has grown during the past decade. Such actions of local community rely upon the strong theoretical background focusing sustainable and integrative urban design approach and protection and enhancement of public space and public realm, as well as upon the principles of social integration and cohesion for the local community.

Following the approach of "learning from mistakes", the paper presents an example of treatment of sports and recreational facilities within residential areas in Belgrade in the current local planning practice, discussing how this treatment can be considered in sustainable way, resisting the transition trends and economic crisis forces and making the local city space more resilient and livable. As a result, this approach also brings other benefits to the city as whole, making planning procedures more effective and sustainable and creating additional value to the city areas.

2 INTRODUCTION

This paper will present one of possible scopes to the current planning practice in Serbia, specially pointing out the investors' attitude about the public space and also the way how local communities try to balance public and private interest. The framework is defined by the socio- economic context and transitional changes in an ex-socialistic country towards market oriented economy.

Though the process of transition lasts for more than a decade, the direction of planning process and effective model for planning practice are not yet clearly defined. Some of the questions still waiting for answers are related to: sustainable framework which 'works' under condition of discontinuity and growth instead of development; experiences from other countries which are not quite transferable; balanced planning intervention in the market in favour of public realm; dilemmas about lessening the public sector, understood as a category inherited from socialism, etc.

We will try to offer some answers analyzing as a case study three sports and recreational areas in Belgrade, not having and ambition to give final answers but to provoke for further discussion. The approach is based equally on ecological, social, economic and institutional sustainability, thus creating conditions for a realistic community development based on the economic resource preservation.

3 PUBLIC INTEREST, PUBLIC LAND USE AND SUSTAINABILITY

The understaning of public interest relies on the premise that public interest has a different understanding, scope and importance in every socio - political environment. The concept of public interest is equally related to land construction land on which it exerts, land use (transportation, infrastructure or recreation areas) or activities of public interest, as is the case with activities related to the environmental protection or cultural

heritage protection. Public interest in Serbia in the situation of a flexible interpretation of the plans, the current legislative context, arbitrary treatment by some of institutions and the pressure of capital is losing its importance.

The basic understanding of the concept of public interest is tied to the notion of public good, which represents the area or activity whose use by individuals or groups does not diminish the possibility of use by another individual or group. By classical definition, private capital is (mostly) not interested for public good.[1]

For socially balanced city, social consensus about definition and coverage of public interest is vitally important, as well as consistent implementation of decisions related to the protection and promotion of public interest within the given limits. Since the city of Belgrade has a legacy in this regard, there is a need for redefining the public interest in areas/purposes/activities that are or have been related to it.

On the other hand, the most important foundation of sustainable development rely upon economic, ecological and social cohesion. Sustainable cities follow an integrated and long-term development that does not question the development of future generations. Among the most important features of the development of sustainable cities are: effective economy, lower external and social costs, social progress and strengthening of the civil society,[2] which together form the basis for long-term qualitative development. At first seen as an approach that is primarily related to environmentally issues, sustainable development of the city today is also based on: quality of life as the most important value, respect for human dimension, comprehensive and integrative approach to development and planning,[3] preservation of natural, economic and social resources for future generations and social equity and cohesion,[4] and many more.

In this light, this paper emphasizes the social component of sustainability through the vision of social balance and social cohesion in the city. City of social balance is equally good for all citizens within possibilities and constraints. The implementation of the concept is conditioned by harmonized needs and interests of all social groups. The concept focuses on the desirable or optimal development of social/public services that are covered by compulsory social care for local community and are mostly treated as non-profitable, such as: (public) education, health, social care, child daycare, culture and sports and recreation.[5] Guaranteed elementary education, primary health care and preschool children care is the level of social concern defined by the international documents (eg. Agenda 21, Habitat Agenda, New Athens Charter, etc.) and by international organizations (UNEP, UN HABITAT, WHO, UNICEF, etc.).

The concept of social cohesion is based on creating the conditions for fulfilling the needs of different population groups, regardless of their political, economic or social power, therefore manifests concern for "non-productive" population groups, such as children, youth, elderly, people with special needs, etc. It can be argued that validation of the concept is based on the quantity of actors which would support it, instead on the power/dominance actors able to impose their model of development. Including a wider range of actors has a strategic importance because it goes beyond short-term effects in the urban space and activities that respond to the trends and uncontrolled privatization processes.[6]

The city of social balance tends to minimize the social inequities which manifest as spatial inequities and make the city territory more inconsistent. By balanced spatial development and social and spatial cohesion, several positive effects can be achieved: minimizing the difference between center and periphery, the development of secondary centers and the optimal equalization of quality of life in the city.[7] The concept gives priority to the public space in the city and does not favor (economic) growth at any cost. Imperfections of market mechanisms, the effects of unlimited economic growth and points of spatial conflict, being the weak points of contemporary city, present the starting point of defining socially sustainable city.[8]

[1] Source: Mihaljević, G. (1992).
[2] Source: REC: www.rec.org/REC/Programs/Sustainable cities.
[3] Source: Centre for Sustainable Development http://home.wmin.ac.uk/cfsd/research.htm
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Operationalization of the principles of socially sustainable city should be expressed through at least:

- Social sustainability and the application of the principle of equality by creating the spatial conditions to minimize social differences and favoring social and territorial cohesion.
- Sustainable urban planning - local planning strategy which take into consideration the welfare of the local economy and population;
- Sustainable land use;
- Institutional sustainability, which includes improvement of procedures and institutional arrangements and introduction of integrated approach.

4 TRANSITION AND THE CONCEQUENCES REFLECTING ON PUBLIC SPACE

The trends of privatization and the encouragement of the flow of capital in transition countries are shaping the understanding of public interest. Local political surrounding is usually strong support to such trends and it is by its nature oriented towards short-term effects and much less focused on long-term strategy of the city development.

Not having intention to elaborate many positive and negative effects of transition in Serbia, we shall review only the significant effects in the public sector. The ownership transformation and privatization of public enterprises and public services, private use of public urban construction land, legislative support for the private ownership of urban construction land and reduced financial support for the public sector are just some of the current changes and problems in the transition period.

In economic terms, the goal of transition should be a provision of conditions for the introduction of organized and systematic market relations, healthy competition and the supply and demand within the framework of welfare state. In the countries with long tradition of market relations, the rules arranging the relationship between private and public sector are defined and respected, as well as the level of state and local government intervention in the market, according to established criteria (although we cannot say that these relations are always fully defined and unambiguous). The fundamental problem arises in the absence of these criteria. Then the solution for the most conflict situations in urban environment between public and private interest is solved in the process of arbitrary and ad hoc decision making. The situation in Serbia, although the transition takes a long time, indicates the lack of criteria and standards and lack of clear policy and strategy development for the public sector and also the propositions under which it can be transformed in the process of transition.

In this context, sustainable planning and market demands in the current urban planning practice in Serbia are generally seen as conflicting concepts that mostly exclude each other. It is very common situation in the urban planning practice that sustainable solutions are usually not interesting to the market and investors, while on the other hand investors' interests in many cases cannot be understood as sustainable. Furthermore, local government generally neglects some aspects of sustainability, such as institutional or economic.

5 TREATMENT OF SOME SPORTS AND RECREATIONAL AREAS IN BELGRADE IN THE CONTEXT OF TRANSITION AND SUSTAINABLE DEVELOPMENT

Trends of the transformation of public urban construction land and public buildings in Belgrade in recent years illustrate the above standpoint. This is particularly visible when it comes to sports and recreational areas which used to be public during the socialistic period. As a case study for this paper three examples of planning treatment for sports and recreational areas in Belgrade will be presented, following the approach of learning from mistakes.

In Belgrade, over more than a decade, we are witnessing an ownership transformation of many health, education, sports, recreation and similar facilities. Privatization of public land and buildings is happening ad-hoc and decisions are made individually and utterly arbitrary. In this way the market behavior in relation to public spaces and facilities, enters "back door", without having analyzed the concept of development or strategic orientation.

We have to emphasize the unjustly neglected fact that we are discussing a very important resource – public facilities infrastructure/network, legacy from different sociopolitical environment. This infrastructure/ network are often overwhelmed by problems related to the maintenance, lack of financial resources and

qualified working staff, nevertheless it is still a relatively diversified and balanced network. Let us mention the fact that many developing countries, with different or similar sociopolitical and economic history does not have such capital (as is the case with many Asian countries).

Of particular concern is the general social approval and support to these models of behavior in space. Public facilities have been transformed for other purposes, privatized and new, commercial facilities have been introduced. Sometimes, they even are not brought to a new purpose. As an argument and justification for such actions, greater efficiency after the ownership transformation, the need for rationalization of some services, high maintenance costs and hiring qualified work force are brought up. This way, the standard of living, which is tihgtly bond to the quality and spatial distribution of public services, and which has already been getting worse for other reasons, is imperiled. Hereby, the essential connections between the public facilities network development and the concept of social cohesion and social sustainability has been left out of sight.

Belgrade has several sports facilities and complexes of national and international importance which are designed for professional sport and big sports events,[9] also more than 25 sports facilities and complexes, dispersed in urban districts and secondary urban centres. Nearly each of the 16 Belgrade municipalities has at least one sports facility. In addition, there are hundreds of sports and children's playgrounds in the city, relatively evenly dispersed. All these facilities were situated on the public urban construction land. Such ownership implied the obligation for the custody and tending by the city government institutions, particularly Belgrade Land Development Public Agency as the main holder. The ownership also obliged for further financial commitments to build, equip and maintain through the Belgrade Land Development Public Agency (using the City budget financial resources), as well as for the City Secretariat for Youth and Sports and Ministry of Education and Sport (Directorate of Sports). (using the State budget financial resources).

On the other hand, Belgrade Land Development Public Agency financed most of Belgrade detailed regulatory plans. These plans should have been defined in accordance with the sports and recreation development policy, the State and local regulations and the ownership status (Since according to The Planning and building Act (2003, Republic of Serbia) all urban plans, including Belgrade General Plan had a power to define public and private ownership over the urban construction land).

Under the conditions of the lack of funds, the City has encouraged private initiative and the ad-hoc solutions. However, to facilitate the financing of sports facilities and complexes by private individuals and firms, the status of the land had to be changed. So the land of complexes with high potential, such as stadiums of Partisan and Red Star sports clubs, received the status of private urban construction land. City Budget and Administration has certainly made a significant benefit by such transformation, understanding it as a short-term action and considering it as an "exemplary market adjustment," but what about the City and its citizens? Belgrade has irretrievably lost a significant part of urban resources – urban construction land, and citizens, to say the least, the ability to influence this process.

A similar trend is established in relation to local/district sports and recreational centers and the need to transform the ownership and the status of urban construction land again occurred. Such was the case with the Sports and recreation complex Olimp, in Belgrade municipality Zvezdara territory. However, given the lower level of attractiveness of these sites and land, no significant interest was manifested in its privatization.

[9] Mentioned categories are defined by the Sports and Recreation Facilities Act (Sl. Glasnik RS 17/96.).

From the long-term point of view, the consequences of the approach “less interest – less action” by the City government is more convenient for the development of the city than it is the case with short term actions and decisions. The problem is, however, that the solutions resulted from the daily political decisions, non-compliant initiatives and in the absence of defined and clear attitude and criteria of city authorities and central government institutions. Inconsistency and lack of communication between different levels of institutions makes their acting quite "unsustainable", creating a gap that will emerge "planning" decisions of very questionable quality.

On the other hand, the citizens and the Administration of the local community of Zvezdara have showed a great interest to keep the Olimp complex as a public facility. During the long and controversial process of designing and adopting the local regulatory plan of the Sports and recreation complex Olimp and the surrounding housing blocks, the citizens have taken the solid and consistent standpoint about the preservation of the local green, sports and recreational areas. Even though the Planning and Building Act (2003, Republic of Serbia) have given the citizens the chance to participate in the planning process only at the moment the draft plan version was almost finalised (that is, during the public review procedure) citizens of the local community of Zvezdara have made a significant pressure to the local and city administration bodies to get involved more often, thus making a great impact on the planned solution. The City municipality Zvezdara supported and confirmed the citizens‘ standpoint by municipal assembly decisions.

After a couple of years of negotiation with the City administration and urban planning bodies, The local municipality administratives of Zvezdara have managed to keep the local sports and recreation complex olimp for its citizens. The status and the ownership over the urban construction land assigned to the sports complex have remained public.

Though the case study of sport complex of Olimp in Belgrade shows that the city administrative bodies lacked the understanding of the citizens’ interest and also had a little respect to the sustainable idea ‘think globally – act locally”, it also tells a lot about the awareness of citizens about their own quality of life and livability. It is specially important having in mind the citizens of Serbia are not yet fully informed or/and educated about the planning process participation and that they are still not involved in great number, although it is an established practice in many countries. The described situation should not be an unusual and extraordinary process, given that the detailed regulatory plan, as the most detailed planning document is the most understandable planning document to ordinary citizen.

The described examples clearly suggest the need for policy development in the field of public service, with careful, systematic and balanced harmonization of private and public sector and also the need for stronger legal and institutional support for participation in the planning process.

6 CONCLUSION

Summarizing, we have recognised the potentials, problems and limitations in the current state of the public sector and public services in Serbia and we point out some directions for solutions.

Potentials are as follows:

- Public services network consisting of many subsystems is in great need of transformation, reorganization and modernization.

- Sports and recreation facilities infrastructure makes it one of the vital segments of future urban development in Belgrade.
- Some of the most important problems and constraints in this field are:
- Public sector and public urban construction land and facilities are exposed to the serious consequences of uncontrolled or poorly controlled development.
- Different and often conflicting aspirations and actions of institutions, as well as different groups of actors.
- Absence of policy development and regulatory fragmentation.
- Arbitrariness in decision-making regarding the development and transformation of public services.
- Future solutions must certainly be based on goals and objectives relating to:
- Development of public services in order to create favorable social environment.
- Availability of public services for all citizens.
- Encouragement of the development of public services since they support the communication.
- Spatial distribution of public services as a way of meeting the needs of population equally.
- Balancing the quality of public services.
- Protection of public spaces and promotion of public interest.
- Minimizing the spatial differences in the development of the city arising from social differences and differences related to the development of public services, thus achieving consistent and balanced development of urban territory.
- Application of the principles of sustainable urban renewal, including social regeneration.
- Overcoming institutional separation of management, planning, funding and implementation in the field of public services.
- The integral part of the solution should be the criteria for qualitative and ownership transformation of public services.

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Mitnahmesysteme als Ergänzung des öffentlichen Personennahverkehrs (ÖPNV) in ländlichen Räumen – das Beispiel „Mobilfalt“

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1 KURZFASSUNG

Schrumpfung und Alterung der Bevölkerung haben vor allem im ländlichen Raum gravierende Konsequenzen für den öffentlichen Personennahverkehr (ÖPNV): Die Schüler als hauptsächliche Fahrgastgruppe des ÖPNV in ländlichen Räumen gehen in ihrer Anzahl deutlich zurück, gleichzeitig werden die Schulwege länger, sodass für die öffentliche Hand die Beförderungskosten steigen. Eine zweite wesentliche Nutzergruppe, die Erwerbstätigen (Berufspendler), nehmen in Ihrer Anzahl ebenfalls ab, sodass insgesamt die Stammkunden des ÖPNV wegbrechen, die Bündelungseffekte entfallen und damit die Systemvorteile des traditionellen Linienverkehrs – die Beförderung großer Fahrgastströme – nicht mehr greifen.

Eine übliche Reaktion auf diese Entwicklungen waren in den vergangenen Jahren vor allem Angebotsreduzierungen und die Einführung bedarfsgesteuerter Verkehre wie Anruf-Sammel-Taxen oder Anrufbusse. Dabei werden Fahrten nur dann durchgeführt, wenn sie innerhalb einer Voranmeldezeit (mindestens 30 bis 60 Minuten vor der gewünschten Abfahrt) angefordert wurden. Ein Nachteil dieser Verkehre ist, dass die Gesamtkosten im Gegensatz zu konventionellem Busverkehr mit der Nachfrage steigen, sodass die öffentliche Hand bei starker Nutzung finanzielle Risiken eingeht.

Andererseits überlagern sich in vielen ländlichen Regionen Abwanderung und Alterung der Gesellschaft. Der daraus folgende Rückzug von Angeboten und Einrichtungen führt zu längeren Wegen. Dies kann insbesondere im Zusammenhang mit zu erwartenden Kostensteigerungen im Verkehr zur Exklusion bestimmter Personengruppen führen.

Vor diesem Hintergrund werden aktuell in mehreren Regionen Deutschlands Ansätze entwickelt, bei denen der ÖPNV durch private Mitfahrgelegenheiten ergänzt werden soll. In diesem Beitrag soll das Projekt „Mobilität im ländlichen Raum/Mobilfalt“ unter Federführung des Nordhessischen Verkehrsverbundes (NVV) vertieft betrachtet werden, dessen Betrieb zum 1. Oktober 2012 in drei Pilotgebieten in Nordhessen starten soll. Bei Mobilfalt wird damit erstmals in Deutschland ein privates Mitnahmesystem in den ÖPNV integriert.

2 HERAUSFORDERUNGEN FÜR DEN ÖFFENTLICHEN NAHVERKEHR IN LÄNDLICHEN RÄUMEN

2.1 Der demografische Wandel in Deutschland

Die Anzahl der Einwohner in Deutschland geht bereits seit 2003 zurück. Laut der 12. koordinierten Bevölkerungsvorausberechnung sinkt die Bevölkerungszahl bis 2060 auf 65 bis 70 Millionen Menschen gegenüber 82 Millionen im Jahr 2008 [STATISTISCHES BUNDESAMT]. Zudem altert die Bevölkerung deutlich, insbesondere steigt der Anteil der Hochbetagten (80 Jahre und älter) von 5 % im Jahr 2008 auf etwa 14 % der Bevölkerung im Jahr 2060.

Dabei unterscheidet sich die Bevölkerungsentwicklung sehr stark zwischen einzelnen Teilräumen, verursacht im Wesentlichen durch Wanderungsprozesse. Während die Bevölkerungszahl bis 2025 in einigen Ballungsräumen wie Köln/Bonn, dem Rhein-Main-Gebiet und im Süden und Südwesten Deutschlands noch zunimmt, sind starke Rückgänge in Ostdeutschland, aber auch in weiten Teilen Westdeutschlands zu erwarten. An Ballungsräumen betrifft dies in erster Linie das Ruhrgebiet und das Saarland, außerhalb der Ballungsräume werden deutliche Bevölkerungsrückgänge in den nördlichen Teilen Bayerns und Hessens, in Südniedersachsen sowie in Süd- und Ostwestfalen erwartet (Abb. 1). Neben der zahlenmäßigen Bevölkerungsentwicklung spielt auch die Alterung der Bevölkerung und die Abnahme der Schülerzahlen eine wichtige Rolle. In vielen ländlichen Räumen überlagern sich die Prozesse der Schrumpfung und Alterung (Abb. 2).

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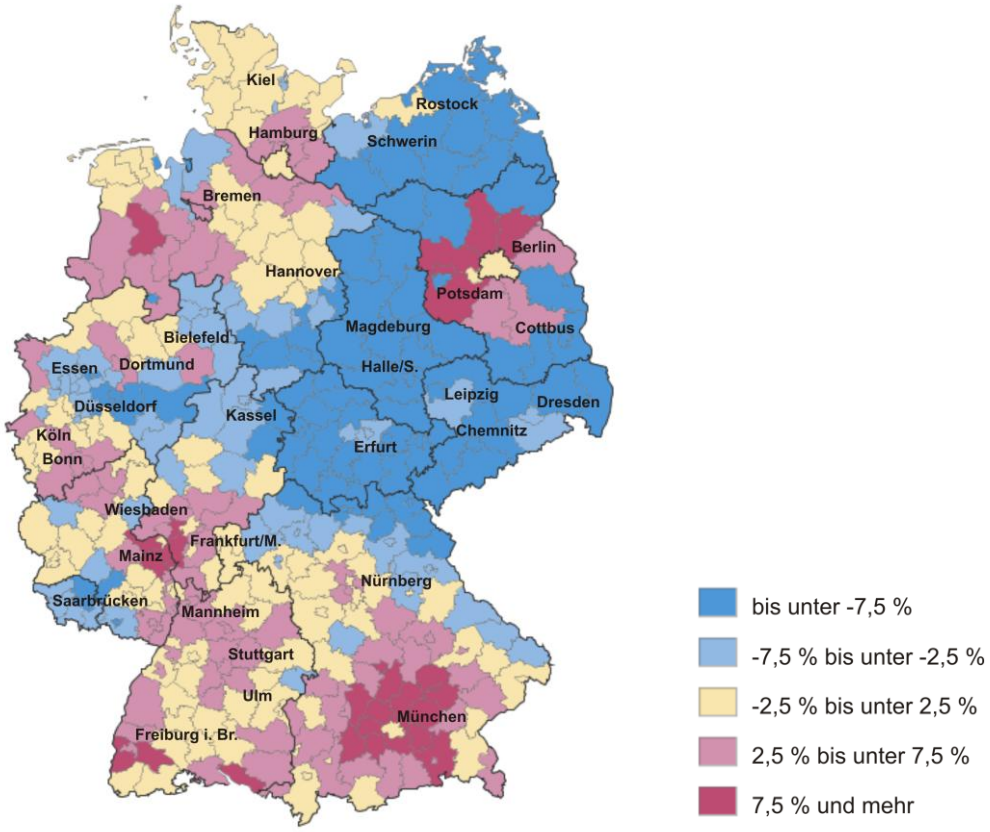

Abb. 1: Bevölkerungsentwicklung 2009 bis 2025 in %, Datenbasis: Laufende Raumbeobachtung des BBSR, Bevölkerungsfortschreibung des Bundes und der Länder, Kartenquelle: BBSR Bonn 2012.

Die dargestellten Entwicklungen haben besonders in ländlichen Räumen Konsequenzen: Zurückgehende Einwohnerzahlen bedeuten, dass die Zahl potenzieller Nutzer von Infrastruktureinrichtungen und Angeboten zurückgeht. Dies kann dazu führen, dass sich Anbieter von Dienstleistungen wie Versorgungseinrichtungen aus dem ländlichen Raum zurückziehen. Beispiele hierfür sind die Konzentration von Einkaufsmöglichkeiten oder der Rückzug von Ärzten auf dem Land („Landärztemangel“). Damit wachsen die Distanzen, die zu überwinden sind [BMVBS 2010:22 ff.].

Dies kann zur Folge haben, dass Menschen, die aus Alters- oder Gesundheitsgründen nicht mehr Auto fahren können und deren Wohnorte durch den ÖPNV schlecht erschlossen sind, vermehrt vom gesellschaftlichen Leben exkludiert werden.

2.2 Entwicklung der Verkehrsnachfrage und Folgen für den ÖPNV

Die geringere Bevölkerungsdichte im ländlichen Raum bedeutet eine geringere Verkehrsnachfrage, die sich zudem weniger bündeln lässt. Das Verkehrsangebot in der Fläche lässt sich derzeit dennoch häufig vor allem durch Linienbusverkehr charakterisieren, der sich im Wesentlichen an den Erfordernissen des Schülerverkehrs orientiert. 70 bis 90 % der Fahrgäste im regionalen Busverkehr sind Schüler [BERTOCCHI 2009]. Dies bedeutet, dass das Verkehrsangebot nur eingeschränkt für andere Fahrgäste nutzbar ist. Gründe sind einerseits die angebotenen Relationen, Linienführungen und Abfahrtszeiten, die auf die Nachfrage und Belange des Schülerverkehrs ausgerichtet und daher für andere Fahrgastgruppen teilweise unattraktiv sind, andererseits fehlen während der Nachfragespitzen oft die Beförderungskapazitäten in den Fahrzeugen für zusätzliche Fahrgäste.

Aus diesem Grund trifft der Rückgang der Schülerzahlen den ÖPNV vor allem in ländlichen Räumen und führt zu Rückgängen der Fahrgeldeinnahmen und staatlicher Zuschüsse. Gleichzeitig ist zu erwarten, dass die Distanzen im Schülerverkehr wachsen, da die Entwicklung der Schülerzahlen eine Konzentration der Schulstandorte erwarten lässt und der Anteil der Abiturienten unter den Schulabgängern wächst [SOMMER 2005].

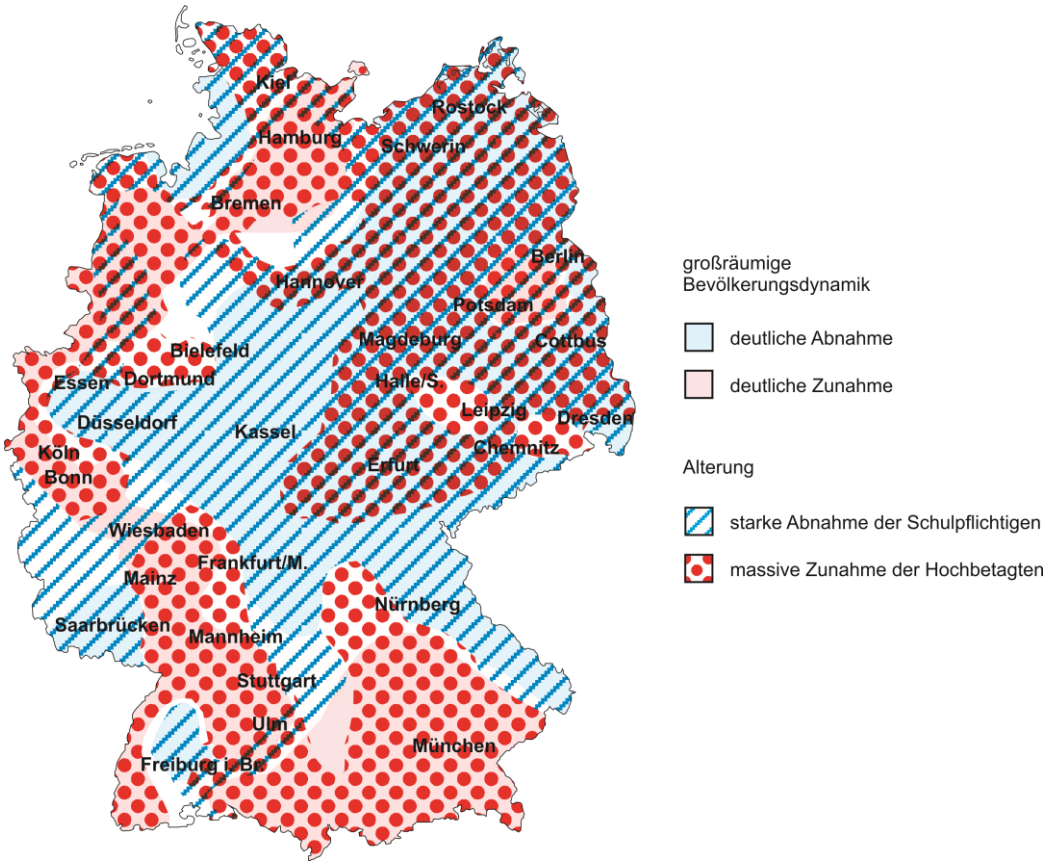

Abb. 2: Ausprägung von Komponenten des demographischen Wandels bis 2025, Quelle und Datenbasis: BBSR-Bevölkerungsprognose 2005-2025/bbw

Da die Zahl der Erwerbstätigen ab ca. 2020 abnimmt und diese Abnahme in ländlichen Räumen überdurchschnittlich verlaufen wird, sind auch im Berufsverkehr kaum Impulse für die Verkehrsnachfrage zu erwarten. Auch die wachsende Zahl der Senioren wird nicht zu wesentlichen Steigerungen der Fahrgastnachfrage führen: Mit dem Eintritt in den Ruhestand gehen die Weganzahl und Weglänge im Mittel zurück, zudem nehmen Führerscheinbesitz und Pkw-Verfügbarkeit bei künftigen Senioren noch zu, sodass die Zahl der sogenannten „Zwangskunden“ unter den Senioren abnimmt [SOMMER 2005]. Aktuell wird zwar eine Zunahme der Verkehrsleistung im ÖPNV bei jungen Erwachsenen beobachtet, allerdings ist dieser Effekt überwiegend in Ballungsräumen zu beobachten [ZUMKELLER et al. 2011].

Ein weiterer Faktor, der dämpfend auf die Nachfrageentwicklung wirkt, ist die künftige Entwicklung der Nutzerkosten des Verkehrs. Laut einer Abschätzung der Mobilitätskosten bis 2030 von InnoZ und WVI GmbH werden die Kosten für die Nutzung sowohl des Individualverkehrs als auch des ÖPNV bis zum Jahr 2030 gegenüber 2008 rund doppelt so stark steigen wie die Lebenshaltungskosten. Ferner ist davon auszugehen, dass aufgrund höherer Ausgaben für Gesundheit das Kostenbudget geringer ist, das für Verkehr zur Verfügung steht und daher die Fahrtanzahl und die Fahrtweiten zurückgehen. Daher erwarten die Autoren, dass es mehr Menschen geben wird, deren Teilhabe an motorisierter Mobilität aus Kostengründen zusehends eingeschränkt wird [HUNSICKER/SOMMER 2009].

2.3 Zwischenfazit

Aus diesen Entwicklungen ergibt sich, dass ein attraktiver ÖPNV mit klassischen Betriebsformen in dispers besiedelten Räumen nicht wirtschaftlich zu betreiben ist und daher Angebotsanpassungen vor allem in Tagesrandzeiten und auf tangentialen Verbindungen notwendig sind. Dies kann jedoch in eine Negativspirale aus Attraktivitätseinbußen und weiteren Nachfragerückgängen führen [BERTOCCHI/WEISSHAND 2011]. Exklusion aus finanziellen Gründen und die Konzentration von Infrastruktureinrichtungen führen dagegen dazu, dass ein ÖPNV-Angebot eine Voraussetzung für gesellschaftliche Teilhabe und ein Element der Daseinsvorsorge ist.

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3 AKTUELLE LÖSUNGSANSÄTZE

Neben verschiedenen Angebotsmaßnahmen im ÖPNV wurden seit den 1980er Jahren und vor allem verstärkt seit den 1990er Jahren verschiedene flexible Bedienungsformen eingeführt, die nur nach Vorbestellung verkehren. Typische Formen sind

- Bedarfslinienverkehre (fester Linienweg, Bedienung nur nach Bedarf),
- Richtungsbandverkehre (genauer Linienweg zwischen definierten Start- und Zielhaltestellen ergibt sich aus den zuvor angemeldeten Zu- und Aussteigewünschen) oder
- Flächenbetrieb (keine Linienwege festgelegt bzw. Zu- und Ausstieg innerhalb eines Bedienungsgebiets überall möglich) [BMVBS/BBSR:5].

Eine Kombination aus flächenbedienenden Bedarfsverkehren und einer (beschleunigten) Expressbuslinie ist der Richtungsband-Expressbus-Betrieb: Dabei wird eine Buslinie durch das Einsparen von Umwegen so beschleunigt, dass sich attraktive Fahrzeiten ergeben, während der nicht mehr vom Expressbus bediente Bereich von einem bedarfsgesteuerten Verkehr bedient wird, der mit der Expressbuslinie an einem Umsteigepunkt verknüpft ist [BERTOCCHI 2009]. Ein weiterer Ansatz ist der Einsatz von Rufbushaltestellen, die nur dann bedient werden, wenn der Bus über einen Rufknopf an der Haltestelle angefordert wird. In Deutschland und Österreich sind derzeit mehr als 50 Rufbushaltestellen in Betrieb [SCHNEIDER et al. 2011].

Der Handlungsdruck, der durch die dargestellten Entwicklungen vorhanden ist, zeigt sich auch darin, dass das Bundesministerium für Bildung und Forschung den von 2001 bis 2004 den Förderschwerpunkt „Personennahverkehr für die Region“ gesetzt hat, in dem in ganz Deutschland verschiedene flexible Bedienungsformen analysiert und evaluiert wurden [BMVBS/BBSR:12f.]. Ein Nachteil von flexiblen Bedienungsformen ist ein finanzielles Risiko in Bezug auf Betriebskosten und Investition in Fahrzeuge. Kosteneinsparungen werden dort, wo der Linienverkehr bereits auf ein Minimum (Schülerverkehr) reduziert ist, nicht erwartet [BMVBS/BBSR:54 f.].

Eine weitere Reaktion auf die Mobilitätsbedürfnisse in der Region ist der Bürgerbus. Träger ist in den meisten Fällen ein gemeinnütziger Verein, der auch die ehrenamtlichen Fahrer der Kleinbusse zur Verfügung stellt. Der erste Bürgerbus in Deutschland fuhr bereits 1985, im Jahr 2010 gab es mehr als 150 Bürgerbusse. Bürgerbusverkehre existieren vor allem in ländlichen Regionen, vereinzelt aber auch in Großstädten [PRO BÜRGERBUS NRW].

Als Mitnahmeprojekte als Ergänzung des ÖPNV sind ein Projekt der Bergischen Universität Wuppertal sowie das Projekt „Carlos“ in Burgdorf (Kanton Bern, Schweiz) zu nennen, die beide allerdings nicht über die Pilotphase hinaus fortgesetzt wurden. Das Projekt „Nimm mit – steig zu“ wurde in den 1980er-Jahren in Niedersachsen als Pilotversuch eingeführt. Es wurden gesonderte Haltestellen für private Mitnahmen unabhängig von vorhandenen Bushaltestellen eingerichtet. Außerdem wurden Ausweise zur Identifikation für Fahrer und Mitfahrer eingeführt. Die Akzeptanz blieb deutlich geringer als erwartet. Das System „Carlos“ basierte auf ortsfesten Säulen, an denen eine Mitnahme zielbezogen angefordert werden konnte. Allerdings war die Auslastung der Säulen deutlich zu gering für einen kostendeckenden Betrieb [VDV 2009].

Darüber hinaus sind aktuell Mitfahrzentralen in der Einführungsphase, die eine Fahrtenvermittlung mittels verschiedener Medien, vor allem Smartphones, und enger Anbindung an soziale Netzwerke im Internet und an Navigationssysteme anbieten. Im Gegensatz zu bereits etablierten Mitfahrzentralen im Internet bieten diese Systeme eine Fahrtenvermittlung in Echtzeit und zielen auch auf die Vermittlung kurzer (auch innerstädtischer) Mitfahrdistanzen ab. Zu nennen sind Anbieter wie „car2gether“ in den Regionen Ulm und Aachen [CAR2GETHER], „flinc“ [FLINC] oder „PocketTaxi“ [POCKETTAXI]. Diese Systeme sind allerdings nicht als Teil des ÖPNV-Angebots konzipiert.

Enger mit dem öffentlichen Nahverkehr verzahnt ist das Projekt “immer mobil”, dessen Feldtest 2011 in Oberbayern durchgeführt wurde. Mit dem Projekt soll die Information über verschiedene Verkehrsangebote verbessert werden. Neben dem klassischen ÖPNV-Angebot wird zusätzlich über Fahrtangebote mit Bürgerbussen oder Sammeltaxen in Echtzeit informiert. Die Ergebnisse des Feldtests und einer Abschlussumfrage werden derzeit ausgewertet [IMMERMOBIL].

4 DAS BEISPIEL MOBILFALT

4.1 Grundkonzept

Die Oberziele von Mobilfalt sind die Erhöhung der Lebensqualität und der Attraktivität des ÖPNV im ländlichen Raum, die Sicherung der Daseinsvorsorge sowie die Erhöhung der Wirtschaftlichkeit im ÖPNV (eine höhere Betriebsleistung zu gleichen Kosten). Diese Oberziele werden anhand von Teilzielen konkretisiert, für die Indikatoren zur Messung der Zielerreichung festgelegt werden.

Das Konzept sieht vor, das vorhandene ÖPNV-Angebot durch private Mitfahrangebote zu ergänzen. Privatpersonen, aber auch Dienstleister wie Pflegedienste, Fahrdienste oder Kurierdienste, die in der Region unterwegs sind, sollen ihre Fahrzeuge effizienter auslasten können, indem sie Personen mitnehmen. Dadurch soll die zeitliche und räumliche Verfügbarkeit des ÖPNV deutlich verbessert werden. Die Integration eines Mitnahmesystems als Teil des öffentlichen Verkehrsangebots ist die Innovation und das Alleinstellungsmerkmal von Mobilfalt.

Mobilfalt-Fahrten sollen vor allem das Verkehrsangebot zwischen Ortsteilen oder kleinen Gemeinden und dem jeweils nächsten Zentrum mit zentralörtlichen Einrichtungen und Anschlussmöglichkeiten an das übergeordnete ÖPNV-Netz ergänzen. Dazu werden einerseits zu vorhandenen Linienbusfahrten zusätzlich Mobilfalt-Fahrten angeboten und neue Linien definiert, die ausschließlich aus Mobilfalt-Fahrten bestehen. In der Regel soll sich aus dem herkömmlichen Verkehrsangebot und den zusätzlichen Mobilfalt-Fahrten ein Stundentakt ergeben, in Schwachlastzeiten teilweise auch ein Zweistundentakt. Es handelt sich also um ein bedarfsgesteuertes Verkehrsangebot, das fahrplan- und haltestellengebunden ist und auch als Fahrplantabelle dargestellt wird. Der Ein- und Ausstieg soll an bestehenden Bushaltestellen und zusätzlich einzurichtenden Mobilfalt-Haltestellen möglich sein.

Damit die Nutzung von Mobilfalt für Anbieter von Fahrten und für Mitfahrer so sicher wie möglich ist, ist vorab eine Registrierung erforderlich. Die Anbieter von Fahrten sollen aus Sicherheitsgründen erst nach einer Überprüfung durch die Gemeindeverwaltungen in den Pilotgebieten Mitfahrten anbieten können.

Die Fahrtauskunft und Buchung erfolgt internetgestützt über ein IT-gestütztes Buchungs- und Abrechnungssystem, das für Mobilfalt entwickelt wird. Mit diesem System können sowohl Fahrer eine Fahrt anbieten als auch Mitfahrer sich über Fahrtmöglichkeiten informieren und Fahrten buchen. Darüber hinaus sind Buchungen telefonisch oder im persönlichen Kontakt auch über eine Mobilitätszentrale in der Kreisstadt Eschwege möglich. Die Fahrtvermittlung zwischen Fahrer und Mitfahrer soll automatisiert und in Echtzeit ablaufen.

Als Anbieter, Vermarkter und Koordinator von Mobilfalt tritt der Nordhessische Verkehrsverbund (NVV) auf. Wer Mobilfalt als Mitfahrer innerhalb der Pilotgebiete nutzen will, bezahlt an den NVV einen Fahrpreis von 1 Euro je Fahrt. Gibt es für eine bestimmte angefragte Fahrt keine Mitfahrgelegenheit, stellt der NVV eine Ersatzbeförderung mit Taxen sicher („Mobilitätsgarantie“), die den Fahrgast ebenfalls je 1 Euro je Fahrt kosten soll. Wer im Rahmen von Mobilfalt jemanden mitnimmt, erhält vom NVV eine streckenabhängige Kostenbeteiligung. Die Zahlung des Fahrpreises und die Auszahlung der Kostenbeteiligung erfolgt über das Buchungs- und Abrechnungstool.

Das Buchungs- und Abrechnungssystem enthält auch eine Bewertungsfunktion, mit dem Fahrer bewertet werden können. Dies dient der internen Qualitätssicherung.

Zur Identifikation zwischen Fahrer und Mitfahrer und gegenüber der Mobilitätszentrale soll eine Mobilfalt-Card im Scheckkartenformat eingeführt werden. Die Mobilfalt-Card ist als Marketinginstrument ausbaufähig, denkbar sind Kooperationen, etwa in Form eines „Mobilfalt-Rabatts“ bei verschiedenen Partnern.

Ein ähnliches Projekt wie Mobilfalt ist im Odenwaldkreis in Südhessen („Odenwaldmobil“) geplant. Dort sollen ebenfalls private Mitnahmen das Verkehrsangebot ergänzen. Allerdings besteht ein Unterschied zu Mobilfalt im vorgesehenen Fahrtenangebot, das bei „Odenwaldmobil“ keine Abfahrtszeiten für die privaten Mitnahmen vorab festlegt, sondern die Abfahrtszeiten sich aufgrund des Mitfahrtenangebots ergeben. Ein weiterer Unterschied ist eine Preisdifferenzierung, abhängig von der zeitlichen Flexibilität der Fahrtwünsche. Bei Nutzung eines Linienbusses sollen für den Fahrgast geringere Kosten als bei Inanspruchnahme einer Taxibeförderung entstehen. Derzeit werden noch wirtschaftliche und rechtliche Fragestellungen geklärt, ein Termin für die Betriebsaufnahme ist noch nicht bekannt [OREG].

4.2 Projektpartner

Mobilfalt wird vom Land Hessen im Rahmen der „Nachhaltigkeitsstrategie Hessen“ gefördert. Die Federführung bei „Mobilfalt“ hat der NVV. Als Aufgabenträger für den regionalen Busverkehr arbeiten die drei lokalen Nahverkehrsorganisationen im Projekt mit, in deren Zuständigkeitsgebiet die Pilotgebiete liegen. Das Fachgebiet Verkehrsplanung und Verkehrssysteme der Universität Kassel übernimmt im Projekt Mobilfalt die wissenschaftliche Begleitung.

Die Ausarbeitung der Fahrtenangebote in den Pilotregionen erfolgt durch zwei Planungsbüros. Ein wichtiger Beitrag, um Akzeptanz zu erreichen, ist die enge Zusammenarbeit mit Bürgermeistern, Kommunalpolitikern und sogenannten Starthelfern. Diese Starthelfer sind engagierte Bürger, die vor Ort für Mobilfalt werben und Teilnehmer gewinnen sollen.

4.3 Bedienungsgebiete

Mobilfalt soll in drei Pilotgebieten in Nordhessen erprobt werden (Lage siehe Abb. 3, Strukturdaten siehe Tab. 1). Das nächstgelegene Oberzentrum ist die Stadt Kassel mit rund 195.000 Einwohnern.

Die Stadt Niedenstein liegt ca. 24 km südwestlich vom Kasseler Zentrum und grenzt an die Stadt Baunatal (27.811 Einwohner), in der sich ein VW-Werk mit mehr als 13.000 Beschäftigten befindet. Zwei Buslinien bedienen die Stadt.

Das zweite Bedienungsgebiet umfasst die Gemeinden Herleshausen, Nentershausen und die Stadt Sontra, die einen „Zweckverband Interkommunale Zusammenarbeit“ bilden. Herleshausen und Sontra haben jeweils einen Bahnhof, der im Stundentakt bedient wird. In den drei Gemeinden verkehren außerdem elf Buslinien.

In der Stadt Witzenhausen gibt es einen Bahnhof in der Kernstadt, der zweimal stündlich bedient wird, und einen Bahnhof im Stadtteil Gertenbach, der stündlich bedient wird. In der Stadt verkehren acht Linien, davon sind zwei Linien ein Stadtbussystem mit Ringverkehr in der Kernstadt. In Witzenhausen befindet sich ein Fachbereich der Universität Kassel mit 817 Studierenden [UNIVERSITÄT KASSEL], darüber hinaus ist die Stadt ein regional bedeutender Gewerbestandort.

Für die Pilotgebiete Herleshausen/Nentershausen/Sontra und Witzenhausen hat das Hamburger Büro Gertz Gutsche Rümenapp (GGR) eine Untersuchung der Erreichbarkeit wichtiger Ziele mit dem ÖPNV, differenziert nach Zeitfenstern für verschiedene Wegezwecke, durchgeführt. Darin ergab sich unter anderem, dass die Erreichbarkeiten vormittags am besten sind, abends jedoch außerhalb der Zentren und abseits von Bahnstrecken nahezu keine ÖPNV-Angebote bestehen. Ganztags deutliche Erreichbarkeitsnachteile wichtiger mittelzentraler Orte aufgrund langer Reisezeiten wurden für die Umgebung von Sontra festgestellt [VFR WERRA-MEISSNER].

Pilotgebiet	Einwohnerzahl (30.06.2011)	Fläche [km^2]	Einwohnerdichte [Einwohner/km^2]	Anzahl Ortsteile inklusive Hauptort
Niedenstein	5.273	30,41	173	5
Witzenhausen	15.378	126,69	121	17
Zweckverband Interkommunale Zusammenarbeit	13.765	227,87	60	
- Herleshausen	2.925	59,52	49	10
- Nentershausen	2.887	57,06	51	6
- Sontra	7.953	111,29	71	16

Tab 1: Einwohnerzahlen und Fläche der Pilotgebiete, Quelle: [HESSISCHES STATISTISCHES LANDESAMT]

4.4 Evaluationsbeitrag der Universität Kassel

Die Evaluation gliedert sich in die Prozessevaluation und die Wirkungsevaluation. Die Prozessevaluation fokussiert auf die Mittel und Abläufe, durch die eine Maßnahme umgesetzt wird. Sie bezieht sich auf alle Umsetzungsebenen einer Maßnahme und beobachtet alle Schritte der Maßnahmenkonzeption und -umsetzung. Die Wirkungsevaluation misst und bewertet die Effekte einer Maßnahme anhand eines Zielsystems.

Ziel der Evaluation ist es, Empfehlungen zu geben und die Chancen einer erfolgreichen Umsetzung durch Berücksichtigung der Rahmenbedingungen zu erhöhen. Außerdem sollen Erkenntnisse gewonnen werden, um übertragbare Empfehlungen für ähnlich strukturierte Regionen zu geben.

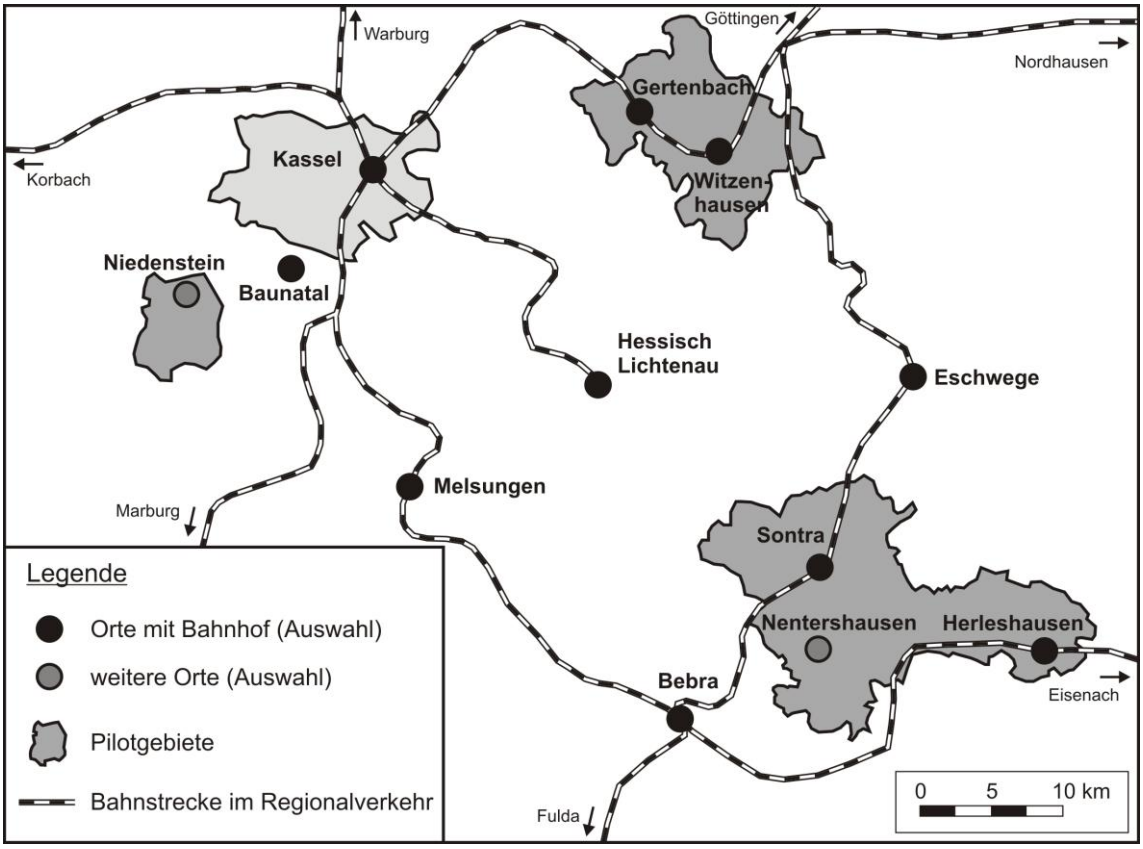

Abb. 3: Lage der Pilotgebiete von Mobilfalt, Quelle: eigene Darstellung

Prozessevaluation

Während der Konzeptphase arbeitet das Fachgebiet Verkehrsplanung und Verkehrssysteme der Universität Kassel bei der Aufstellung des Zielsystems mit und begleitet fachlich die Erstellung der verkehrlichen Konzepte. Zudem führt das Fachgebiet mit Versuchspersonen einen Test des Anmelde- und Buchungstools durch, bei dem die Bedienbarkeit und die Prozessgestaltung des Tools geprüft werden (so genannter Usability-Test). Die intuitive Bedienbarkeit ist ein wichtiger Aspekt bei der Entwicklung des Tools, um keine Zugangsbarrieren für wenig interneterfahrene Menschen aufzubauen.

Im Kontextmonitoring sollen relevante Änderungen externer Rahmenbedingungen auf das Projekt identifiziert auf ihren Einfluss auf den Erfolg von Mobilfalt untersucht werden. Diese Rahmenbedingungen lassen sich in ökonomische (z. B. Kraftstoffpreise), politische und soziale Rahmenbedingungen (Änderungen bei den Akteuren vor Ort) unterteilen. Sie werden kontinuierlich während der gesamten Projektlaufzeit erfasst und hinsichtlich ihrer jeweiligen Relevanz beurteilt.

Während der Testphase wird die Nutzung des Systems kontinuierlich beobachtet: Aus den Daten des Anmelde- und Buchungstools lassen sich quantitative Merkmale der Nutzung auswerten, so z. B. die Entwicklung von Anzahl und Struktur der Nutzer (registrierte Fahrer und Mitfahrer, Nutzungshäufigkeiten nachgefragter Relationen und zeitliche Verteilung der Fahrtwünsche). Die „Aussteiger“ aus dem System (Personen, die nicht weiter an Mobilfalt teilnehmen wollen) werden befragt, um die Ursachen für den Ausstieg zu erfahren und aufgrund dieser Information das Mobilfalt-Konzept und die Umsetzung zu verbessern. Zusätzlich werden ausgewählte bevölkerungsrepräsentative Gruppen (ÖPNV-Kunden und Nicht-Nutzer, differenziert nach Merkmalen der Soziodemografie und des Verkehrsverhaltens) mehrfach während der Projektlaufzeit befragt. Die Ergebnisse dieser Befragungen und die Daten aus dem Anmelde- und Buchungstool fließen nicht nur in die Prozessevaluation, sondern auch in die Wirkungsevaluation ein.

Wirkungsevaluation: Ermittlung verkehrlicher, sozialer und wirtschaftlicher Wirkungen

Neben den oben genannten Daten soll darüber hinaus eine kombinierte Online- und schriftlich-postalische Befragung etwa ein Jahr nach Aufnahme des Mobilfalt-Betriebs durchgeführt werden. Damit sollen unter anderem das realisierte Verkehrsverhalten, aber auch Einstellungen und Kenntnisse zu Mobilfalt und zur Nutzung des ÖPNV erfasst werden. Dadurch sollen Verhaltensänderungen durch Mobilfalt erfasst werden.

Schließlich folgt die Untersuchung der Wirtschaftlichkeit nach betriebs- und volkswirtschaftlichen Kriterien. Betriebswirtschaftlich spielen vor allem die Kosten für die Entwicklung des Abrechnungs- und Buchungssystems und die laufenden Kosten für Mitnahmeentschädigungen und Ersatzbeförderung sowie für Marketing eine Rolle. Ferner sollen die Erlöse abgeschätzt werden. Diese Aufgabe erfordert unter anderem eine Abschätzung des zusätzlichen Verkehrs im ÖPNV, der durch Mobilfalt induziert wird. Dies bedeutet, dass Wirkungen auf den übrigen ÖPNV mit einbezogen und erfasst werden müssen. Diese Wirkungen könnten Steigerungen der Fahrgastzahlen im übrigen ÖPNV durch verbesserte Erreichbarkeit von ÖPNV-Knoten, aber auch Kannibalisierung des bestehenden ÖPNV durch Mobilfalt-Fahrten sein.

Ein aus wissenschaftlicher Sicht sehr wichtiger, jedoch auch komplexer Punkt ist die Abschätzung volkswirtschaftlicher Nutzen. Eine wichtige Rolle wird dabei die Erfassung und Beurteilung der Nutzen sein, die durch das verbesserte ÖPNV-Angebot und damit durch Möglichkeiten zur Teilhabe entstehen.

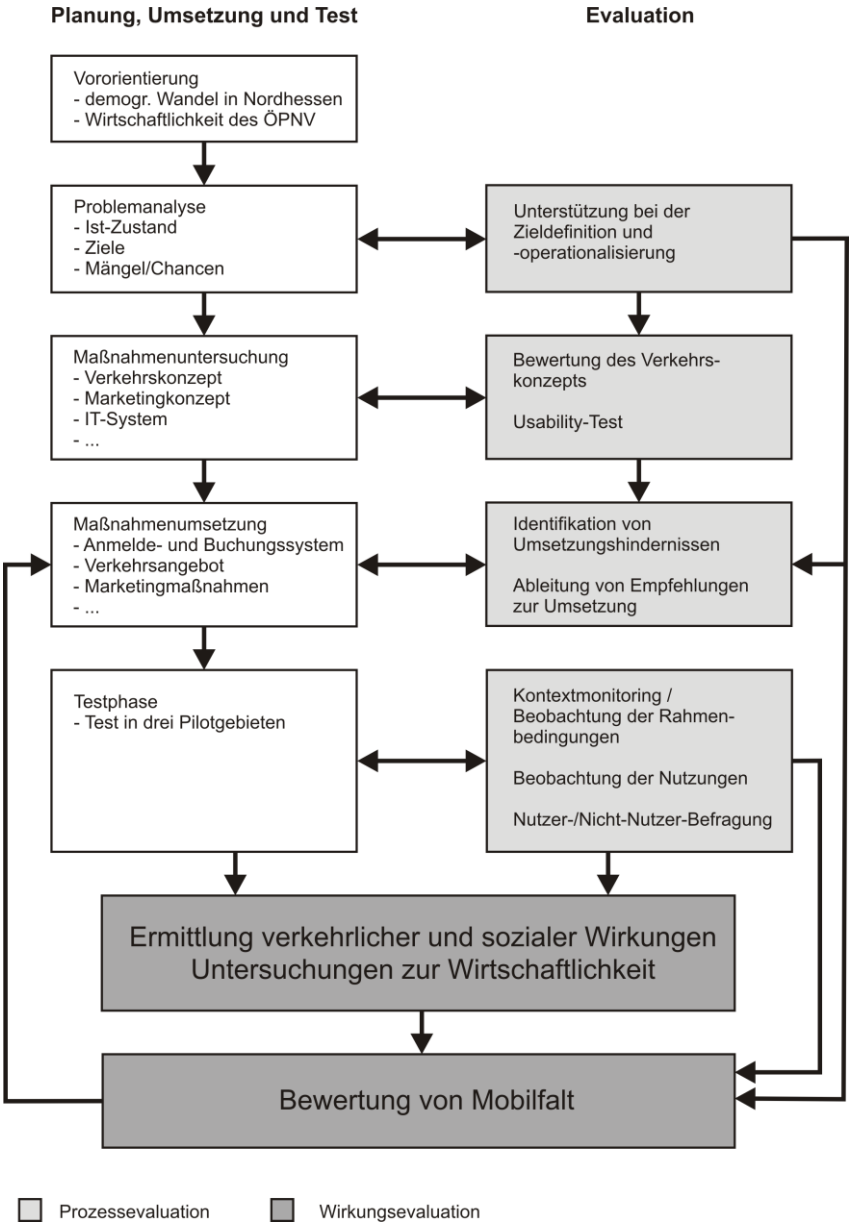

Abb. 4: Prozessevaluation und Wirkungsevaluation in Planung, Umsetzung und Test von Mobilfalt. Quelle: eigene Darstellung

5 AUSBLICK

Derzeit werden die Fahrtangebote von Mobilfalt im Detail geplant. Während der Planung werden die Starthelfer in den Pilotgebieten als Multiplikatoren eingebunden. Sie spielen eine zentrale Rolle im Marketingkonzept, das neben klassischer Werbung und Öffentlichkeitsarbeit auf die Wirkung von Multiplikatoren setzt. Ziel ist, damit einerseits eine ausreichende Zahl von Fahrtanbietern zu finden, andererseits aber auch eine hohe Nutzung sicherzustellen.

Parallel dazu läuft die Implementierung des Buchungs- und Abrechnungssystems, dessen Bedienbarkeit die Universität Kassel in einem Usabilitytest untersuchen wird.

Der Betrieb von Mobilfalt soll in den drei Pilotgebieten zum 1. Oktober 2012 starten. Die Pilotphase soll bis Ende 2014 andauern, dann werden erste Ergebnisse der Evaluation durch die Universität Kassel erwartet.

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🏆 *reviewed paper*

Mixed Building use Promotes Mixed Urbanity: Insights from Historical Use-neutral Architecture

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1 ABSTRACT

Starting from the idea that we no longer want to go on with the separation of housing, working and leisure within the city and its quarters—as it had been codified by the Charta of Athens and in succession by many legal advices, like the development, land use and master plans of the different cities; but which in the end leaded to dormitory suburbs, nightly depopulated business district and almost deserted urban open spaces, that redundantly have to be dumped to the overwhelming traffic (the other outcome of urban functional separation)—we deeply consent that *remixing* is the adequate answer. The newly planned and developed city quarters all over Europe—like HafenCity Hamburg, Seestadt Aspern—represent this new approach.

This *remixing* has to be enabled not only within the quarter or within the upper and lower levels of a house—by putting a certain number of shops underneath a traditional residential building on top—but it actually has to be enabled throughout *the whole building* and throughout every single building. And the mix has to be really richly varied and flexible at any time of the buildings' lifespan. Units shall be used as apartments and after some years—if the tenants or owners change, or if the residents' perspectives have changed—the units shall be easily converted into offices or studios or even gymnastic halls and restaurants.

The architectural concept that offers the solution to this task does not have to be complex nor does it have to be expensive. Actually Vienna already disposes such an architectural structure that evidently does fulfil the mission: The *Gründerzeit architecture* easily performs the task of being use-neutral.[1]

Fig. 1: Gründerzeit houses in Viennas 9th district © Angelika Psenner

These properties, built between 1848 and 1918, currently command a high value in the real estate market, reflecting a lively demand for both the buildings and the flats. This fact is surprising given that the drawbacks of these historic buildings are well known. That would be:

- Densely built-up areas: The GZ districts lack a sufficient balance of accessible outdoor recreation areas.[2]
- High vacancy rate on the ground floors.[3]
- Expensive overhead, high maintenance costs, and sparse population.

Therefore, what is it that accounts for the high market value of GZ buildings? First of all the generous ceiling heights have to be mentioned. Typically measuring between 3.20 and 4 metres—on ground floors, up to 5 metres—they basically constitute the framework for the 'grand and lordly' façades. The extravagant floor

[1] One quarter of the apartments in Vienna is located in GZ buildings. (see also: Psenner, 2011a, 196)
[2] Psenner, 2011b, 1122ff
[3] Detailed articles by the author on this issue: Psenner, 2012, 2011a, 2011b, 2005, 2004

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height also allows for diverse use: the modular and small-scale structure of the units can be merged or separated as required, while at all times conserving the well-balanced spatial proportions.

Right from the beginning, GZ buildings were used for both living and working; And to this day they accommodate uses as diverse as apartments, hotels, offices, kindergartens, cinemas, churches, fitness centres… even boulder climbing halls are situated in GZ houses.

1.1 Research question

What motivated investors to place so much importance on high ceilings – in spite of the fact that GZ buildings are said to be the prototypes of profit-driven capitalistic ideas? How have the high ceilings paid their way? What did their profit-value consist in?

By quoting original literature of the time the paper will offer a most astonishing answer to this question and with this a new approach to the ongoing discussion about the value of use-neutral architecture.

2 INTRODUCTION: THE VIENNA GRÜNDERZEIT BUILDING

2.1 Apartment Buildings as Objects of Speculation

The Gründerzeit period is marked by an unrestrained unfolding of the liberal-capitalist spirit that drove the industrialization of the Habsburg Monarchy. While housing previously had been an occasional source of income for large property owners, it was during this period of economic liberalism that it became a full-blown object of speculation.[4]

One of the conditions that allowed for this extraordinary building boom was the so-called Grundentlastung (agrarian reform), implemented in the years following the abolition of manorialism in 1848. Aristocracy lost ownership of most of their land, which reduced their economic influence and in consequence led to a boost in the real estate market.

A second condition was *migration*: within eight decades Vienna's population grew from 440,000 in 1840 to 2,238,545. Most of the population was absorbed within the suburbs, where the population grew from 242,000 in 1870 to 1,011,000 in 1910 (Bobek, Lichtenberger, 1978, p. 30-31), resulting in an excessive demand for and overcrowding of apartment buildings. In 1894, the Viennese Architect Lothar Abel (1841-1896), published a widely read article about the overwhelming "housing question": *"Das gesunde, behagliche und billige Wohnen" ("Healthy, Comfort¬able and Affordable Living").*

So-called building speculation, which considers a house not as a property but as a commodity, is the real cancer of our current art of building. These speculators start out by calculating the rent that they want the house to yield (...). In order to obtain this rent, the building costs are set at a certain level, and this level must not be exceeded under any circumstances. (...) Normally the price obtained does not buy very much, and this is compensated for by economizing in the building's masonry, its wooden structures, etc., just as much as is required for the initial calculation to work. Moreover, since the building does not yield any rent while being constructed, it must be completed with a time that is too short for it to be proper and solid. (Abel, 1894, p. 132-133)

2.2 Living and Working in a Gründerzeit Building

Bobek and Lichtenberger's standard work *Wien: bauliche Gestalt und Entwicklung seit der Mitte des 19. Jahr¬hunderts* (Vienna: Architectural Form and Development Since the Mid Nineteenth Century) offers illuminating data that provide a view of living conditions in the apartment buildings:

In 1869, 72 % of all apprentices and 22.9 % of the workers lived in their respective employers' buildings. Consequently, the proportion of non-family residents (workers, lodgers, so-called Bettgeher,[5] apprentices) in a household was as high as 42.6 %. 55.1 % among the 179,388 industrial employees had no apartment of their own, they were lodgers or Bettgeher in their employers' households.[6]

[4] In 1860 Vienna had half a million inhabitants and 8,493 landlords (Fellner, 1860, p. 5.), whereas at the height of the Gründerzeit period (1870–1890), 18.9 % of the residential buildings in the city and its suburbs yielded such high returns that the owners were able to live on this income alone (Bobek, Lichtenberger, 1978, p. 38).
[5] Literally 'bed goer'; lodgers sharing the same bed in day and night shifts.
[6] Bobek, Lichtenberger, 1978, p. 35-38.

The economic structure of Viennese GZ-industry was dominated by small businesses, which were all based in residential buildings. Only a few among the businesses covered in the 1869 business census had more than 10 workers—and only businesses located in the suburbs (like beer breweries) had more workers.[7]

Generally apartment buildings were used both for *living* and working. Yet, even on the *bel etage* itself 'stately', sizeable apartments existed next to offices of doctors, *lawyers*, factory-owners, and so forth.

Use-neutral Gründerzeit Architecture

Given their historical use, GZ buildings must be considered as beeing *use neutral*: they served both as residences and workplaces—largely due to the fact that in the 19th century there was little separation between living and working. The residents' way of life always comprised every possible form of expression: the 'residential' quarters were used for eating, sleeping, cooking, working, etceteras.[8]

For our purposes, the question of the 'hardware' is of interest: the scope of possibilities that GZ architecture was—and still is—capable of providing. Use-neutral and open-use architecture is primarily defined through a flexible room model[9] and adequate ceiling heights. The flexible room model secures the possibility of adaptation: a renovation can be carried out—and even reversed—at any time. Tenants and owners can thus design apartments and workplaces according to their own ideas and needs. In some cases, when the ownership permits it, apartments can be joined together, transgressing allotment boundaries. When smaller units are merged into a large space, it is the generous ceiling height of GZ buildings that ensures adequate room proportions. In this way, a GZ apartment building can accommodate spacious, prestigious offices for lawyers, for instance, as easily as day care centres for kids, coffee houses, community centres, yoga schools, and so forth—they all find their place in the GZ structure. At the same time, the supply of smaller housing units has again increased in order to accommodate the increasing number of single-person households. High ceilings allow for the creation of large units while also retaining the possibility of returning to a smaller scale.

So how did this happen? What motivated investors to place so much importance on high ceilings while GZ buildings are said to be the prototypes of unlimited profit-driven liberalistic-capitalistic ideas?

3 ON THE GENEALOGY OF THE VIENNESE GRÜNDERZEIT BUILDING: THE HISTORICAL DEVELOPMENT OF THE GRÜNDERZEIT BUILDING STRUCTURE10

3.1 Building Height and Ceiling Height

The total height of the average GZ building was originally set at 4 storeys. From 1868 on, 5 storeys were allowed—including a mezzanine[11] and the ground floor; additionally, these 5 storeys were limited with a

[7] The 1859 Trade Act resulted in a liberalisation of what previously had been a guild-controlled industrial structure. With the new act, taking up a trade required only registration with the authorities and was otherwise free of restrictions. There were only 14 trades that required a business permit. Even though the stock crash of 1873 resulted in a return to a guild-based approach to the economy, the economic structure remained dominated by small businesses.

[8] Moreover, the apartment building harboured people of different social strata: members of the bourgeoisie, factory owners, intellectuals, entrepreneurs, craftsmen, handymen, day labourers...all lived under the same roof. Communal life was ordered by rigorous behavioural codes and strict hierarchies. Still, everyone used the same entrance and the same stairway—a circumstance that met with disapproval in some countries and social circles. The explanation for this dense intermingling of social strata, unique in Europe, rests in a mix of socio-historical, economic, and cultural factors—a discussion exceeding the scope of this paper.

[9] This aspect is not addressed here as there already exists a wide range of publications, e.g. Erich Raith, Stadt-morphologie, 2000.

[10] In Vienna, construction regulations were introduced in 1829. In 1830 the first building regulation act was issued. The regulations written by von Mühlböck in 1843 (the contents of which coincided with those of 1830) represented the construction decrees then in force in 8 topics, 3 sections, and a total of 30 articles. The Gründerzeit period underwent a total of 4 different issues of the applicable building regulations. As mentioned, the first regulations were issued in 1830, followed by a second one in 1859 and a third one in 1868. The latter comprised as many as 93 articles and was amended in 1870 in response to the changes required by the introduction of the metric system. The last relevant issue of the building regulations was released in 1883 and for the most part remained valid up until the first third of the 20th century, with one amendment enacted in 1890.

[11] In his PhD dissertation, *Graz, Strukturwandel einer Stadt im Lichte ihrer Bauvorschriften (1856-1968)* Peter-Heinz Marauschek attributes the existence of the mezzanine to a circumvention of the article 17, according to which "new

total height of 13 fathoms (equivalent to 23.77 metres). When the metric system was introduced in 1870, the maximum building height was increased to 25 metres. The building regulations of 1881 allowed 0 metres for the upper edge of the flooring of the uppermost floor. Also coinciding with the introduction of the metric system, the minimum ceiling height was increased from 2.74 (circa 1843 and 1868) to 3 metres.

Taking these different conditions into account and assuming a ceiling structure of approximately 40 centimetres, a discrepancy among the various height requirements becomes apparent—a discrepancy that circumscribes the actual excessive storey height without, however, explaining it. It is becoming clear that the ceiling heights of 3.20–4 metres (more on the ground floor) characteristic of the Viennese Gründerzeit building cannot be accounted for on the basis of building regulations. Instead, a formula is revealed, that is, the difference between the maximum building height (25 metres) and the largest allowed number of storeys multiplied by the minimum ceiling height (5 x 3.40 = 17 metres).[12]

What motivated speculating investors to incur this additional expenditure?

3.2 Ceiling Height Value in Public Health Economy

By the late nineteenth century, GZ Vienna was considered to be particularly densely populated. Additionally, Vienna had been repeatedly afflicted by epidemics, which drew considerable attention to the sanitary problems in the city's apartments. Time and again 'physicists' and doctors were invited to participate on commissions in order to draft expert opinions regarding public health care, and subsequently, to aid the reform of building regulations. Examples include the 1882 *"Bericht des Ausschusses der k.k. Gesellschaft der Ärzte zur Berathung der Reform der Wiener Bauordnung"* (report of the Imperial Medical Society on Suggestions for a Reform of Vienna's Building Regulations), and Carl Haller's lecture, held in 1864 on behalf of the Imperial Society of Physicians in Vienna with the title *"On the Ventilation of our Apartments"*.

Research on sickness and mortality in our capitals…has shown that the course, the direction, and the duration of our most common epidemics are most evident at locations without a sufficient renewal of the air, and that improvements—such as they are manifest in the great successes of our charitable construction societies—do the most towards changing that situation. This research has also revealed that the dominant disease of our time, tuberculosis, which reaps away the most beautiful among our youths, and often also the blossoms of our intelligence with its cruel hand, killing 6000–7000 people in Vienna every year, has its main source in an insufficient breathing process. (Haller, 1864, p. 16)

When one compares the living situation in five of Europe's largest cities, the enormous influence that apartments have on the moral and physical condition of the population becomes mathematically evident. As mentioned previously, there are 7 persons to one building in London, 35 in Paris, 58 in Berlin, 52 in St. Petersburg, and none less than 59 in Vienna. As the number of inhabitants per house increases, mortality also increases, for out of 1000 people 24 die in London, 25 in Berlin, 28 in Paris, 41 in St. Petersburg and 47 in Vienna. (Abel, 1894, p. 347)

The theories about 'systematic air renewal' and 'ventilation' merit special reference. Developed by Paul Traugott Meissner, professor of technical chemistry in Vienna, it was received and disseminated as a "path-breaking thesis" across Europe.[13]

Of air layers in inhabited rooms there are always three, that is, the lower one, on the floor of a room, where carbonic acid, the heaviest among the gases make-up the air, will accumulate, in as much as through the breathing process so much of it is given off that it can no longer be bound by the atmospheric air. This is a

buildings (...) may only be built four storeys high: Evidently, the preferred way of circumventing this norm was via the entresol (mezzanine)—a low in-between storey located between the ground and the first floor, or between the uppermost floor and the roof—which had to be considered a storey in the terms of the 1868 law." (Maruschek, 2010, p. 98) Other theories attribute the mezzanine to the storey tax, to be circumvented by the terms 'mezzanine' or 'entresol'. This is an assumption for which no evidence has so far been found: documentary research at the City of Vienna's departments for legal matters of construction (Municipal Department 64) and for accounting and fees (Municipal Department 6) as well as in the city archives yielded no results.

[12] In relation to this consideration, the maximum allowed upper edge of the uppermost floor (20 metres) must be juxtaposed to the calculated height of 4 x 3.40 = 13.60 metres.

[13] "Die Ventilation und Erwärmung der Kinderstube und des Krankenzimmers", (Ventilating and Heating Nurseries and Sickrooms), 1852. (Research on ventilation has also been carried out by Eugène Peclet, Pat Arnott, and David Boswell Reid.)

case that frequently occurs in souterrain and basement units. Furthermore, the middle air layer will take up the lighter atmospheric gases, and finally on top of those there will be the even lighter putrid gases, mainly nitrogen and all the carbohydrates. Most of the ventilation installations siphon off the uppermost layer of air, which results in a continuous exchange of air in the room. (Abel, 1894, p. 227)

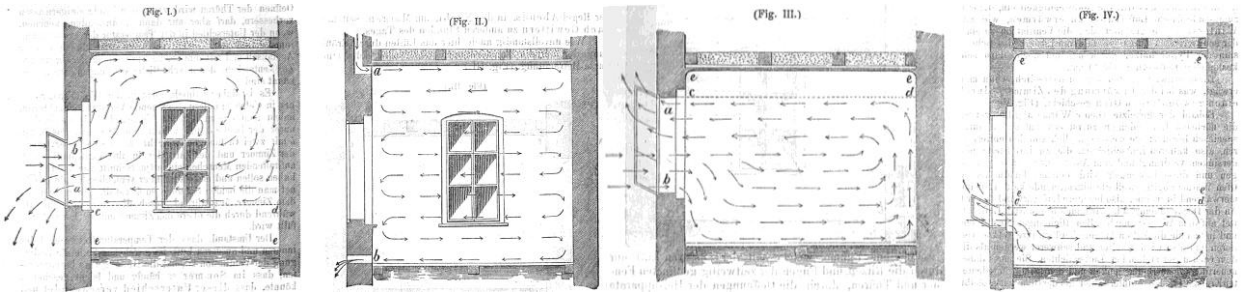

Fig 2: theories on ventilation, according to Carl Haller, 1864, p. 25-31

Returning once more to the harmful effects of putrid air, there can be no doubt that it gives rise to the most problematic of health disorders. Even when the degree of contamination does not reach very high levels, it is the permanence of the effect of the room air that will increase the propensity for illnesses: a poor diet, anaemia, and the like—we can easily tell these things by the room dweller's pale complexion. (Alsberg, 1882, p. 32)

The concept of 'air layers' led to specific advice for architects and builders:

As is known, high rooms are much healthier than low ones, because in the former the air will always be pure, and high rooms can accommodate a greater volume of air on the same amount of surface.…However, in the case of finer residential building's elegant rooms one must not fail to consider the architectural conditions, and one will therefore give smaller rooms a lower ceiling than large ones. All the while, one should not have rooms with a ceiling lower than 3 metres, especially when the room also serves as a sleeping room, in part because it would be unhealthy and there would be a lack of air supply, in part because of the danger of fire, as lamps placed on the table and the heat of the fireplace would then be too close to the ceiling. (Abel, 1894, p. 276)

From this point of view, small children were thought to be particularly at risk, which is why the practise of mounting cradles and children's beds on high base frames became widespread:

Fig 3: children's furniture; left: lowered cradle from the Biedermeier era (around 1820/1825) (Pressler/Straub, 1991, p. 94), right: child bed with high base from the Gründerzeit era (around 1860) (Ottillinger, 2006, p. 134)

Another highly dangerous effect of contaminated room air is that in children it very often causes scrofula as well as increasing the propensity to catarrhs, the English disease (rickets), and similar conditions, thus paving the way for later infirmity already in childhood. (Alsberg, 1882, p. 32)

A further health and sanitation argument in favour of high ceilings was made in connection with 'scientific explanations' of the salutary effects of light and sunshine:

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Looking now at the effect of the illumination from the façades and the windows, we notice that the same amount of light entering through the windows will create a better illumination of the rooms where the ceilings are higher and the buildings less deep.…In buildings with small apartments, a ceiling height of circa 3 metres corresponds to a depth of approximately 10 metres, while buildings with large apartments have a depth of circa 12 metres with a ceiling height of circa 3.6 metres. The lower floors of a building usually have higher ceilings, and rightly so, as this allows the limited light supply to be largely compensated for by better conditions inside the building. (Serini, 1913, p. 9)

Against the background of these arguments, it also becomes clear why the windows in Gründerzeit buildings were made both as high and narrow as possible, and why a greater ceiling height is required on the ground floor. Even though the building regulations stipulated a ceiling height of 'only' 3 metres, there was a general recognition that heavily used rooms—considering a per-head-space requirement of 4 square metres (!) – required a large air volume. Health considerations along with the desire for sufficient light must, therefore, be seen as the reason for the familiar and excessively high GZ rooms.

3.3 The Market Value of Ceiling Height

"Whenever I consider purchasing something, I must know its value at least approximately in order not to be deceived." (Řibřid, 1913, p.3)

From our current understanding, the original, historic value of a GZ property is not easy to comprehend. However, economic perspectives from the period offer insight into this phenomenon; for instance, in the book of architect and city-employed builder L. Kurzweil: *Wert- und Rentabilitätsberechnung von Zinshaus-Realitäten; Mit besonderer Berücksichtigung der Amortisation* (*Calculation of Value and Cost-effectiveness of Apartment Buildings, with Special Consideration of Amortisation*). Kurzweil intended the book as a "Ratgeber für Hauskäufer, bzw. – Verkäufer, für Architekten, Baumeister, Hausadministratoren und sonstige Interessenten" (guide for buyers and sellers of houses; architects, builders, building administrators, and other interested parties). Using complex tables, the author computes purchase value, depreciation, and total fees[14] (taxes, charges, dues, etceteras), based on the various rental tax regulations that applied to the buildings.

According to Kurzweil, the price of a property was determined by three different factors: simply put, one could say that the value of a property was determined by the value of the *building lot*, the so-called *building value*, and the *earning rate* (resulting from the rental income). "The earning value by itself does not represent the value of the building….The true value of a building is determined by adding up the value of the building lot with the building value and the earning value, and then dividing the total by two." (Řibřid, 1913, p.13).

Consequently, the **estimated value of a property** is the result of the mean value between the cost of production (value of the lot and the building) and the earning value. Thus, it is not the rental income alone that determines the value of a building.

Land Value, Building Lot:

In addition to its size, the value of a building lot is determined by its location and its shape (configuration).

Configuration: Small and shallow real estate lots achieved a lower sales price than wide lots of medium depth—in other words, pieces of land that were suitable for the construction of double blocks. Deep lots were considered less desirable because of the unfavourable ratio between the high rated front building and the low rated apartments of the back building. (Bobek/Lichtenberger, 1978, p. 50). What mattered was primarily the width of the main building front: a wide front combined with a shallow lot depth was considered a desirable building lot configuration. (see Řibřid, 1913, p.8) "As is known, we determine the value of an apartment by the number of its street-side rooms." (Abel, 1894, p. 301)

Location: In his 1901 analysis "Die Entwicklung der städtischen Grundrente in Wien" (The Development of Urban Land Rental in Vienna), Paul Schwarz finds a marked decline in land prices towards the urban periphery. This concentric structure was overlaid by sectors with (greatly) increased land prices. The western and north-western sections of the city, between the Vienna valley and the Danube canal, were considered particularly expensive, while districts such as Margareten met with little demand (Schwarz, 1901, cited in

[14] For example, there was a fee for a 'vault guard' (responsible for publicly accessible street level and basement spaces) that operated in the first district only. Depending on the location and type of the buildings in question, the fee was divided into four categories ranging from 6 to 44 crowns.

Bobek/Lichtenberger, 1978, p. 50). The reasons for this are to be found in the city's topographical building history[15] as well as the stage of completion of the urban transit infrastructure.[16]

Building Value:

The building value is determined by the size of the built-up surface, by the building materials, as well as by the number of storeys and the exterior and interior fittings. Naturally, the more abundant these fittings, the higher the building value will be. (Řibřid, 1913, p.8)[17]

The evaluation was, thus, based on the number of square metres of built-up surface, and on a specific multiplier for the fittings. The design of the façade played an important role in this, too.[18] There were other designations at work as well: "basic one-story buildings", "more elaborate buildings", with basements, without a souterrain, without a mezzanine, with hard floors on the street side, and soft floors on the yard side, and so forth. Furthermore, buildings were differentiated by "elegant interiors: hard floors on all storeys, kitchens with firebrick floors, the whitewashing of the walls done with more than three cartridges; apartments of three or four rooms on the lower floors" and finally those "equipped with all comforts". In the case of the latter, the definition presumes that "everything be: lavishly decorated and furnished" with "elegant business parlours, and furthermore a souterrain, a mezzanine, and an attic with a laundry".

In the case of a single-floor building, 1 square metre of building surface is valued with 498 crowns. For additional floors, more is calculated, that is, 80 crowns for the second floor, 77 for the third, 73 for the fourth, and 42 crowns for rooftop artist studios. In the case of corner buildings, 6 % is added to the square metre value. (Řibřid, 1913, p.9)[19]

Many of the early Gründerzeit buildings—particularly in the main commercial streets, where they often lasted less than 50 years—were replaced by the turn of the century (1900).

Return on Investment, Rental Rates

The actual rental income, that is, the return on investment, accounted for a small part of a property's value, and was by no means as central as one might assume from today's point of view. Moreover, it was a known fact that rental income reports were manipulated through the distinction between gross returns and net income:

In order to correctly determine the gross return, it is not sufficient…to merely look at the tax declarations, for these may be incorrect for a number of different reasons; they may state too high or too low of an income and thus not correspond to the actual state of affairs.…Moreover, it often happens that building proprietors seeking to sell their buildings try to increase the rents—even if only for a short period of time—without consideration as to whether such inflated rents can be maintained in the future. (Řibřid, 1913, p.11)

The net income resulted from the gross returns from rental payments less the housing rent tax (after substracting the tax benefits[20]), reduced by all additional charges and dues (provincial, municipal, schooling,

[15] Aside from the all-determining topographical factors, the main radial roads played a particularly important role in the Viennese case.

[16] In the early Gründerzeit there was no public transportation in the city. A record in 1850 identifies 700 rented two-horse carriages and 60 wagons (so-called Zeiselwagen). The first horse-drawn railway was inaugurated in 1856. In 1872, 900 fiacres, 1100 one-horse carriages, and 960 horse-drawn wagons were registered.

[17] The construction time for a "normal or slightly better, multi-storey building" is estimated to be 1.5 years—that of a two-storey building, 1 year. (Řibřid, 1913, p.6)

[18] It seems all the more odd that in the 1950s and 60s removing facade ornaments was promoted by the city by means of the law. Evidently, decorative facade plastering had lost its importance in the post-war period and, being out of step with current notions of architecture, were often viewed as bothersome. In the same period, the old buildings in German cities underwent what was called *Entstuckung*, or de-plastering.

[19] The building value also included the so-called Interkalare, the loss of interest on capital during construction. The law of 9 February 1892 (Imperial Legal Gazette #37) introduced a 24-year rent tax exemption for the construction of "healthy and inexpensive" apartments for labourers, indicating only two requirements: apartments underneath street level were excluded from this tax exemption, while the minimum size for one-room flats was 15 square metres, and multi-room flats 40 square metres, with 30 square metres and 75 square metres being the respective upper limits. Another law on tax exemption for workers' homes was passed in 1903 (Imperial Legal Gazette #6, 1903), this time with detailed requirements. (Marauschek, 2010, p. 6)

[20]

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etc.), reduced by the amortisation of the construction capital, that is, the time dependent devaluation,[21] reduced by the cost of building maintenance, fire insurance, chimney sweeping fees, building administration (including an apartment for the concierge), floor lighting, and finally the cost of vacant apartments or shops.

3.4 The Stadthaus-Image as Market Value

The *Stadthaus* (urban building), through its vocabulary of forms, catered to certain perceptions of value, which in turn co-determined its market value. It distinguished itself clearly from the rural or single-family home. Consider the following experimental scenario: in what way does the façade of a GZ apartment building change if its height is reduced (while the vocabulary of forms remains unchanged)? The images reflect the problem: the one on the left is the original, while on the right the building has been reduced to 17 metres, applying the minimum ceiling height of 3 metres required by the building regulations. The clumsy proportions are much closer to the formal expression of a country house. Even though this building would meet the building regulations, it would hardly have been perceived as 'valuable'.

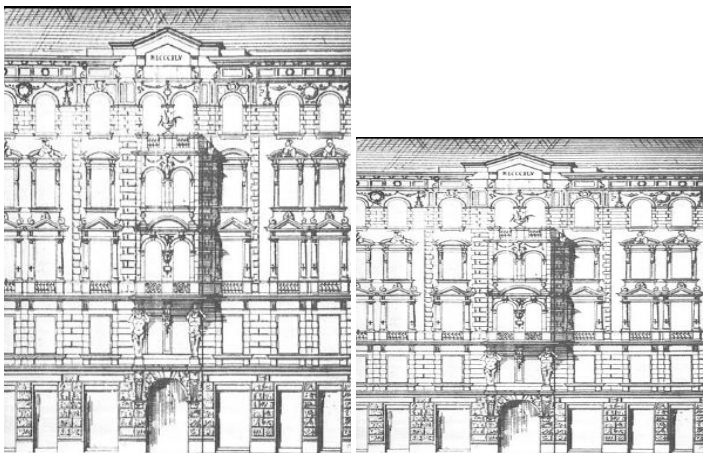

Fig 4: Front of a four-storey apartment building from the high Gründerzeit. Original picture (left): Bobek/Lichtenberger, 1978, p. 120

The rich and magnificent façade is the cheese with which to catch the mice. One must not hold this against the builders, even though they may often be pointed at as scapegoats when they abet construction speculation. (Abel, 1894, p. 227)

Most of the apartment buildings are erected with the intention to accommodate as many tenants as possible, while decorating the façade with all kinds of terracotta or cement ornaments, such as can readily be obtained from factory storehouses. (Abel, 1894, p. 99)

Furthermore, in this little book [note: the treatise by Eitelberger and Ferstel, critiziced by the author] the modern apartment building-monsters are accused of feigning a palace-like appearance, without having the essential attributes of such a grand building, which is only a way of expressing how regrettable it would be if the countryman ever reached a level of wealth that would allow him to afford himself a stately home with high ceilings and windows, instead of his seven-shoe high thatched hut, for he would then, in spite of the architectural oddities that such buildings will always retain, still come closer to the wealthy citizen, or even the lordly manor. Besides, such frivolous builders are also accused of being extravagant and vain enough to install double doors and Venetian blinds, while the tenants are accused of requesting the same, which are sheer luxury and fitting for a palace, but not a townhouse! (Fellner, 1860, p. 10)

Attempting to establish through research the reasons for the excessive ceiling heights of the Gründerzeit buildings has been demanding. Apparently, we are looking at knowledge that was immanent in a system or within society; in other words, its content was considered so obvious and 'logically evident' that it was deemed unnecessary to make it explicit.

A **'valuable' building of this period necessarily had to have a 'stately' appearance,** because the value hierarchies of the Gründerzeit were influenced by the bourgeois ideology of the Vormärz period. The latter was oriented towards neo-classical images and details as well as elements of the Renaissance with a preference for triangular, segmented gables, and **'stately' sizes and proportions.**

[21] Buildings constructed with fire-proof materials were expected to last 130-150 years, those with standard materials 70 to 100 years. Currently the amortisation period for new buildings is 66.67 years. (Standard, 2011, p. 11).

Whenever the architectural forms of the Gründerzeit were questioned by contemporaries, it was not because of the ceiling height.[22] After all, the necessity of high ceilings had been 'scientifically proven' (see the previous section on air layers and ventilation), and furthermore, the added cost of constructing high ceilings, being covered by higher return on investment and the greater market value it generated, did not actually to add to the costs.

Who has not observed the practices of our local masons! Several workers stand in one place, duly lining up the bricks one after the other; once they have thus completed a row, there are hands who bring in the liquid mortar, applying it upon and between the seams by using large spoons. The complicated process, requiring much supervision but little action, is completed…. (Velleman, 1872, p. 62)

In his 1872 treatise "Die oeconomische Bedeutung der Bauordnung in Oesterreich" (The Economic Significance of Building Regulations in Austria) architect and engineer G. Vellemann identifies what he considers to be adverse conditions in the construction industry. Looking at his meticulously recorded price lists, it becomes evident that during Vienna's GZ period, masonry work was carried out consistently by day labourers, keeping the price per cubic metre of walling exceptionally low.

4 CONCLUSION

The Gründerzeit apartment building represents an architectural form of use neutrality that is empirically evident. Its openness to different forms of use, historically proven and established over the decades of its existence, is based on the following attributes:

- a simple and flexible room model
- high ceilings
- high perception of prestige (value) reflected in fittings, ceiling height, and façade

The market value of the GZ building was originally also determined by its prestige value, that is, by its fittings and details. Such symbols of prestige have remained in demand until the present, expressing themselves in the materials used (hard wooden floors, double wing doors, etc.) and in particular in a 'stately' façade. What seems to matter most with regard to the latter are not the plaster ornaments, but out-of-proportion ceiling heights.[23] Thus, ceiling heights that seem above-average from our point of view, and for which sanitary considerations are co-responsible, are ultimately also an investment.

The fallout of economic and financial crises has lead to a re-discovery of Vienna's apartment buildings as objects of investment.[24] While the demand for this investment had its peak about two years ago—and major institutional investors have since pulled out of the active buyers' market—a lively interest in apartment buildings remains.

Even without elaborating on economic factors such as income, old-age provision, reinvestment of earnings, etceteras, the appeal of the Gründerzeit apartment building can be described in terms of a *variable* based on *subjective* preferences. Today it is the Gründerzeit building's generous offering of space that is the real reason for the renewed interest in it as a 'commodity'. This is true, not least of all, because it offers the possibility of open-ended usage, thus catering to a wide range of interested parties, rather than limiting itself to a specific segment of the market.

Current architectural forms lag behind this kind of thinking. We are continuing to build apartment and office buildings as entities separate from each other, and with a maximum ceiling height of 2.50 metres.

[22] Instead, the general line of argument called for low-rise garden cities as in Britain. This type of criticism was expressed, for example, by the architect and Senior Building Official Professor Leopold Bauer (1872-1938), by the architect Lothar Abel (1841-1896), and by the lawyer and politician Erich Koch-Weser (1875-1944), who praised the virtues of the English, Dutch, and Belgian "small building", and considered the "large building", that is, the tenement house, as the root cause of his era's housing problems. Moreover, he was of the opinion that "everything that constricts the city—for example, greenbelts and the like—had to be avoided" since they created a lack of space that caused houses to "stretch upward".

[23] GZ buildings keep their value even when plaster decorations are removed—a practice promoted by the city administration in the post-war years in the name of progress and modernity.

[24] Prices on the apartment building market have consistently been rising since 1988, with the exception of a few intervals. (Standard, 2011, p. I 11)

Given the circumstances discussed here, an updated interpretation of building regulations is required—one which might bring the vision of a mixed-use and compact urban structure within reach.

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Mobile Digitalisierung von Baulücken – Baulückenerfassung mit GIS, iPad und Geoweb

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1 ABSTRACT

Tablet-PCs wie das iPad bieten für die (Stadt-)Planung eine Vielzahl an neuen Möglichkeiten – wie etwa zur Optimierung von Organisations-Prozessen, Visualisierung von Geodaten und Datenbearbeitung. Intuitive multi-touch Steuerung, große Bildschirme, mobiles Internet, digitale Karten und Funktionserweiterungen via Apps erlauben die Erfassung, Darstellung und Bearbeitung von Geodaten vor Ort.

Baulücken stellen für viele Gemeinden und Städte ein Handlungserfordernis dar, da sie das Ortsbild stören und (zumindest teilweise) Kosten verursachen. Andererseits stellen sie ein großes Potential für die Nachverdichtung und funktionale Ergänzungen dar. Die Herausforderung ist dabei eine genaue, schnelle und korrekte Datenerfassung und -verarbeitung. Eine Ortsbegehung ist neben der Luftbildanalyse zur Überprüfung der im Voraus gewonnenen Erkenntnisse unumgänglich.

An dieser Stelle liefern Karteneditoren auf Smartphones und Tablet-PCs einen neuen Lösungsansatz. Sie ermöglichen eine Digitalisierung von Punkten, Linien oder Flächen und den zugehörigen Informationen direkt über den Touchscreen während der Ortsbegehung. Durch eine Echtzeit-Synchronisation mit digitalen Karten (z.B. Google Maps), stehen diese georeferenzierten Informationen direkt mit Abschluss der Digitalisierung auf dem PC im Büro bereit und können dort weiter verarbeitet, sprich ins verwaltungsinterne GIS eingepflegt werden.

Im Rahmen eines Studienprojektes an der TU Kaiserslautern am Lehrstuhl für Computergestützte Planungs- und Entwurfsmethoden (CPE) und einem Kooperationsprojekt mit der Gemeinde Haßloch (Pfalz) sowie der Verbandsgemeinde Deidesheim wurde ein Brachflächenkataster sowie eine Methode zur mobilen Bestandsaufnahme entwickelt und in der Praxis getestet. Beispielhaft werden in diesem Paper der Funktionspluralismus anhand eines konkreten Beispiels und der damit verbundene methodische Mehrwert für die Planung an der Erfassung von Baulücken gezeigt.

2 EINFÜHRUNG

Baulücken stellen für viele Gemeinden und Städte ein Handlungserfordernis dar, da sie ästhetisch beeinträchtigend wirken („das Ortsbild stören“) und für die Gemeinde Kosten verursachen können. Andererseits stellen sie ein großes Potential für die Nachverdichtung und funktionale Ergänzungen dar. Vor dem Grundsatz der Innenentwicklung und dem 30ha-Ziel ist eine bestandsorientierte Stadtentwicklung strategisch sinnvoll.

Hierfür ist eine genaue Kenntnis über die aktuelle Baulückensituation innerhalb eines Gemeindebereiches von Nöten. Die Herausforderung besteht darin, Daten über die Quantität (die Anzahl der im Gemeindegebiet befindlichen Baulücken) sowie die Qualität (die charakteristischen Eigenschaften) zu sammeln und zu verwalten. Eine der wichtigsten Methoden zur Verwaltung von Brachflächen ist die Erstellung von sogenannten Brachenkatastern (vgl. Streich 2011, S. 27). Diese Register oder Geografischen Informationssysteme (GIS) helfen, die erfassten Informationen zu verwalten, zu analysieren und fortzuschreiben. Aufgrund der Analysefunktionen von GIS stellen digitale Brachflächenkataster die Basis für ein umfangreiches Flächenmonitoring dar, um strategische Handlungen und Maßnahmen im Sinne eines nachhaltigen Flächenmanagements zu definieren.

Im Rahmen der Verwaltungsmodernisierung wird eine kontinuierliche Verbesserung der Verwaltungsabläufe angestrebt. Um die moderne Verwaltung zu erreichen, wurden für Rheinland-Pfalz acht Modernisierungsfelder definiert (ISIM 2012). Das durchgeführte Projekt steht hierbei im Kontext der Modernisierungsfelder „Planungs- und Prozessoptimierung“ sowie „eGovernment“ und soll Methoden und Techniken für eine Verwaltungsvereinfachung entwickeln.

3 TECHNISCHE GRUNDLAGEN

Der Einsatz von mobilen Geräten stellt einen Mehrwert für die Planung dar, da die aufgenommenen Informationen direkt vor Ort digitalisiert und die Attribute digital eingegeben werden können. Dementsprechend werden zunehmend mehr mobile Geräte bei Bestandsaufnahmen eingesetzt. Der Fokus in dem durchgeführten Projekt lag in der Nutzung von neuen multifunktionalen, mobilen Geräten wie Smartphones und Tablet-Computern.

Es kamen iPhone und iPad, beides Produkte von Apple, zum Einsatz. Im Gegensatz zu rein GPS-gestützten Geräten zur digitalen Bestandsaufnahme bieten diese Geräte den Mehrwert, dass sie multifunktional einsetzbar sind (Textbearbeitung, Präsentationen, Kommunikation, Foto-Slideshows, Datenbearbeitung, etc.). Für Planungsbüros relativieren sich damit die hohen Anschaffungskosten (etwa 500 – 600 €), da sie einen erweiterten Funktionskatalog als bei reinen GPS-Geräten erhalten.

Als Karteneditor wurde My Maps Editor von NextBusinessSystem Co., Ltd. in der Version 4.1 installiert, der bei iTunes kostenlos downloadbar ist (und aktuell in der Version 4.43 vorliegt).[1] Die Internetverbindung erfolgte über eine monatlich buchbare Datenflat von 1 GB (Kosten 9,90 €). Das Datenvolumen reichte für das Projekt vollkommen aus.

Die Grundstückflächen wurden in dem Geografischen Informationssystem Quantum GIS bearbeitet, das als kostenfreie Open-Source-Version unter der GNU-General-Public-Lizenz[2] zur Verfügung steht. Diese wurden im *.kml-Format exportiert und in den My Maps Editor integriert, sodass die Bearbeitung ermöglicht wurde.

4 ANWENDUNG IN DER PRAXIS – DAS BEISPIEL HASSLOCH

Im Rahmen des Projektes wurde für die Gemeinde Haßloch ein Baulückenkataster entwickelt. In einem ersten Schritt wurden unterschiedliche Baulückenarten definiert, die Bestandsaufnahme durchgeführt und anschließend das Baulückenkataster mittels einem GIS aufgesetzt.

4.1 Definition von Baulückenarten

Um Baulücken hinsichtlich ihrer Eigenschaften und Potentiale voneinander zu differenzieren, wurden sie im Rahmen des Projektes in verschiedene Kategorien unterteilt. Dies ist wichtig, um die jeweils verschiedenen Möglichkeiten zur Weiternutzung und damit verbundenen Anforderungen genauer zu definieren. Die nachfolgende Abbildung zeigt die vier definierten Arten von Baulücken und ihre spezifischen Eigenschaften.

	Klassische Baulücke	Geringfügig genutzte Fläche	Fläche mit Entwicklungs-potential	Gewerbebrache
unbebaut	✓	(✓)	✓	✓
Planungsrecht vorhanden	✓	✓	✗	✓
Erschließung gesichert	✓	✓	✗	✓
keine Boden-ordnung notwendig	✓	✓	✗	✓

Abb.1: Definition von Baulückenarten und ihre jeweiligen Eigenschaften für die Gemeinde Haßloch (eigene Darstellung).

Zwischen den Arten Klassische Baulücke und Geringfügig genutzte Fläche besteht nur bezüglich der aktuellen Nutzung ein Unterschied. Geringfügig genutzte Flächen weisen aktuell eine Nutzung auf, die allerdings einem Bauvorhaben oder einer anderen Nutzung jederzeit problemlos weichen könnte. Demnach vermitteln diese beiden Baulückenarten das typische Bild einer Baulücke: Eine weitestgehend leere, brach liegende Fläche in der Nachbarschaft eines bebauten Gebietes. Geeignet sind diese beiden Arten zur Nachverdichtung durch Wohnbebauung, aber auch zur Gestaltung von hochwertigen Freiflächen (Grünflächen, Spielplätze, etc.) im Sinne der Innenentwicklung. Flächen mit Entwicklungspotential unterscheiden sich in ihren Eigenschaften hingegen deutlich von den beiden vorigen. Insbesondere die

[1] http://itunes.apple.com/de/app/my-maps-editor/id389114621?mt=8, Zugriff am 25.02.2012.
[2] http://www.gnu.org/copyleft/gpl.html, Zugriff am 25.02.2012.

Baureife ist hier noch nicht gegeben. Diese sind in der Regel große, zusammenhängende, unbebaute Flächen, die nicht im bebauten Zusammenhang stehen. Eine solche Fläche ist beispielsweise eine Außenbereichsinsel im Innenbereich. Gewerbebrachen unterscheiden sich hinsichtlich der Rahmenbedingungen (BauNVO) für die spätere Nutzung von den anderen Baulücken und kommen damit lediglich für Interessenten in Frage, die eine entsprechende gewerbliche Nutzung der Fläche anstreben (vgl. Broschart et.al. 2011a).

4.2 Erstellung des Baulückenkatasters

In einem nächsten Schritt wurde das Baulückenkataster auf Basis des Geoinformationssystems Quantum GIS erstellt. Dieses sollte folgende Zwecke erfüllen:

- Erfassung von Brachflächen innerhalb des Untersuchungsgebietes,
- Verlässlichkeit und Vollständigkeit der Daten,
- Visualisierung der Informationen in einer geobezogenen Darstellung.

Zudem sollten Datensätze in unterschiedlichen Zeiträumen erstellt werden, um die Brachflächenentwicklung retrospektiv darstellbar zu machen und verschiedene Datensätze für ein langfristiges Monitoring zur Verfügung zu haben. Hierfür waren mehrere Schritte notwendig.

Identifikation von Verdachtsfällen – Auswertung von Luftbildern

Zunächst wurden potentielle Brachflächen, sogenannte „Verdachtsflächen“, durch eine Luftbildanalyse und die Auswertung der Liegenschaftskarte definiert. Aufgrund fehlender Aktualität sowie möglicher Fehler in der Interpretation ist hierbei nur eine grobe Einschätzung möglich, die im Nachgang überprüft werden muss. Außerdem können nicht alle aufzunehmenden Attribute über die Luftbildanalyse erfasst werden. Weitere Informationen zur Beschaffenheit der Baulücke müssen deshalb bei der Bestandsaufnahme vor Ort erfasst werden.

Verifizierung vor Ort – Mobile Bestandsaufnahme

Die Verdachtsfälle wurden durch eine vollständige Begehung des Untersuchungsgebietes verifiziert und ergänzt. In Kleingruppen wurden sämtliche Brachflächen aufgenommen und den vier Baulückenarten zugewiesen. Hierbei wurden die Daten auf iPhone und iPad gespielt, sodass diese Daten vor Ort zur Verfügung standen.

Auf diesen mobilen Geräten können existierende Katasterdaten, wie bspw. Grundstücke, aus dem GIS exportiert, überspielt und zur Bearbeitung bereitgestellt werden. Mit Google Maps als Viewer (aber auch mit anderen Programmen problemlos möglich) können diese Daten georeferenziert angezeigt und bearbeitet werden. So können die im Vorfeld herausgefilterten Verdachtsflächen direkt in der Karte verzeichnet werden. Dies erleichtert zum einen die Überprüfung und ermöglicht die digitale Änderung und Ergänzung von Attributen (z.B. zu Nutzung, Lage, Besonderheiten). Grundstücke, die sich als Baulücke erweisen, können mit ihren Attributen verifiziert und weitere, die im Voraus nicht als Verdachtsflächen aufgefallen sind, einfach ergänzt werden.

Abb.2: Linkes Bild zeigt die Standortermittlung mittels GPS (vgl. blauer Punkt) und Flächendigitalisierung vor Ort mittels Karteneditor (blaue Fläche). Rechtes Bild veranschaulicht die Eingabemöglichkeiten in die Attributtabelle (eigene Darstellung).

Die Geräte können auch zur Navigation und als Straßenatlas genutzt werden. Ein weiterer Vorteil ist, dass mittels des installierten GPS-Moduls der eigene Standpunkt immer nachvollziehbar ist (Geo-Ortung). Das sogenannte Tracken erlaubt außerdem die Aufzeichnung der gesamten Wegstrecke, was die Nachverfolgung der gesamten Ortsbegehung und hiermit das Erkennen von nicht erfassten Gebieten ermöglicht. Die dabei erzeugten Geodaten helfen weiterhin, Fotos, die während der Bestandsaufnahme gemacht werden, zu georeferenzieren (das sogenannte Geotagging). Mittels Timestamp (der exakten Zeitangabe) können Geokoordinaten und Fotos zusammengefügt werden, sodass alle Fotos genau ihren Aufnahmestandpunkten zugeordnet werden können.

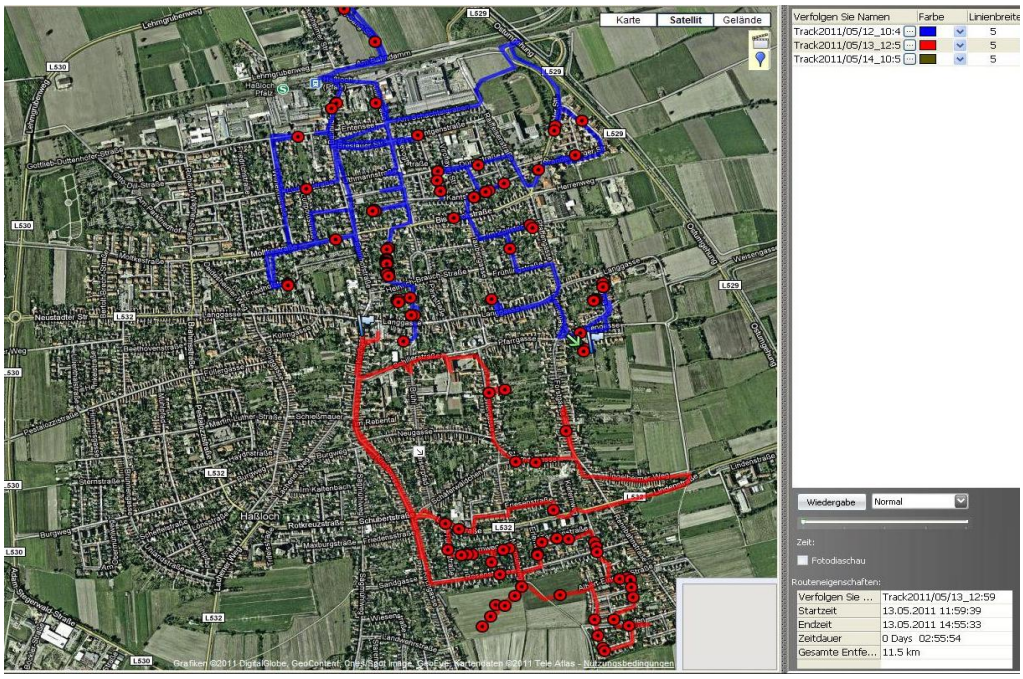

Abb.3: Beispiel für per Tracking aufgezeichnete Wegstrecken bei Bestandsaufnahme (eigene Darstellung).

Demnach integrieren iPad und iPhone mehrere Aspekte in sich, die für eine Bestandsaufnahme wichtig sind. Sie helfen bei der Orientierung (Standortermittlung, Navigationssystem, integrierter bzw. online abrufbarer Stadtplan mit Luftbildern), ermöglichen eine Flächendigitalisierung sowie die Datenbearbeitung (Ergänzung und Änderung von Attributwerten) und bieten die Möglichkeit des Trackens der Wegstrecken sowie des Geotaggings. Zudem liegen all diese Daten digital vor und können dank mobilem Internet direkt mit der Datenbank synchronisiert werden.

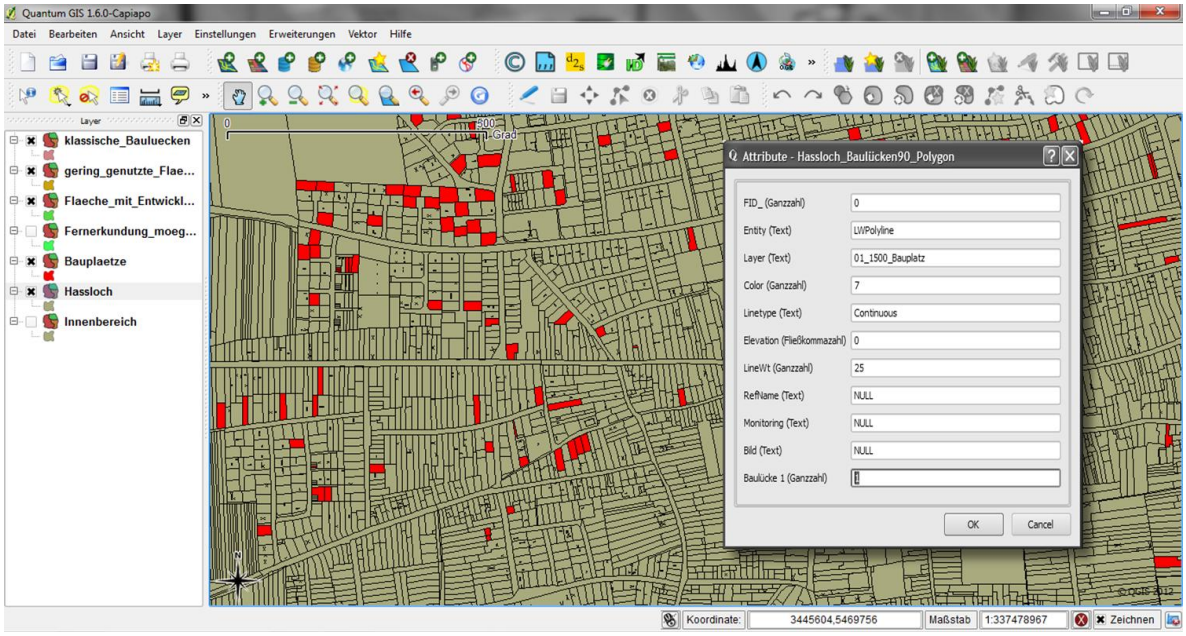

Abb. 3: Dateneinpflege ins Desktop-GIS

Datenbearbeitung – Dateneingabe am GIS

Aufgrund der mobilen Bestandsaufnahme mittels Tablet-PC liegen die Informationen in digitaler Form vor. So können durch die Verknüpfung mit der Datenbank die Daten digital überspielt werden. Allerdings war die Übernahme der Attribute in das GIS aufgrund des protypischen Verfahrens nicht möglich, sodass nun zwei Datensätze vorlagen. Dementsprechend mussten die georeferenzierten Daten mit der im Desktop-GIS vorliegenden Liegenschaftskarte abgeglichen werden. Die aufgenommen Attribute wie bspw. der Straßenname müssen manuell eingepflegt werden. Dazu werden in der Attributtabelle des GIS die entsprechenden Informationen der jeweiligen Baulücke zugeordnet und eingegeben. Hierdurch wird es möglich, im GIS eine Fläche auszuwählen und sich per Mausklick die Informationen und Eigenschaften zu dieser Fläche in der Attributtabelle anzeigen zu lassen. Auf diese Weise fließen alle aufgenommenen Informationen an einer Stelle zusammen und liefern so die Grundlage für ein umfassendes Flächenmonitoring.

Auswertung und Analyse – Das Baulückenkataster

Die im GIS zusammengeführten Informationen stehen nun der Gemeinde für die Auswertung und Analyse bereit. Alle Baulücken wurden mit folgenden Attributen aufgenommen:

- Grundstücks ID
- Adresse (Straßenname und Hausnummer)
- Fläche
- Nutzung (falls vorhanden)
- Baulückenart
- Bodenrichtwerte
- Lage im Geltungsbereichs eines Bebauungsplans

Des Weiteren wurden Fotos der jeweiligen Baulücke aufgenommen und im Nachgang mit den GPS-Wegstrecken synchronisiert. Die Funktionalität des GIS erlaubt Abfragen und die Erzeugung von thematischen Karten. Zudem wurden im weiteren Verlauf ein im *.pdf-Format vorliegendes Baulückenkataster von 1990 digitalisiert, so dass für die Jahre 1990 und 2011 die Daten der Baulücken vorliegen. Dies ist die Grundlage für ein langfristiges Monitoring und ermöglicht die Auswertung über die Veränderungen in der Anzahl, Größe, Lage von Baulücken zwischen 1990 und 2012. Diese analytischen Möglichkeiten sind der strategische Mehrwert, den ein solches Kataster bietet.

Visualisierung und Kommunikation – Konzept für ein Baupotentialkataster

Der Mehrwert der erhobenen Informationen besteht nicht nur in der Nutzung für verwaltungsinterne Fachplanungen, sondern eignet sich gut für die Kommunikation mit der Öffentlichkeit. Zum einen könnte von Seiten der Verwaltung Interesse hinsichtlich der Präsentation der erfolgten Arbeit bestehen, zum anderen kann hiermit ein Informationstool erstellt werden, welches für Bauinteressierte eine wichtige Informationsbasis wäre. Die Veröffentlichung von Flächen, die für eine Bebauung zur Verfügung stehen (Baupotentialflächen) erleichtert Bauinteressierten das Auffinden von für sie interessanten Flächen und kann im optimalen Fall die Verwaltung entlasten, indem erste Anfragen (zu Lage, Größe, umgebender Bebauung, Bodenrichtwerte) nicht mehr telefonisch beantwortet werden müssen, sondern transparent im Internet abrufbar sind. Dementsprechend wurde das Konzept eines Baupotentialkatasters entwickelt und in technischer Hinsicht überprüft.

Bei der angedachten Veröffentlichung von Daten sind die Themen Datenschutz und persönliche Rechte zu beachten. § 200 Abs. 3 des Baugesetzbuches definiert die Voraussetzungen, unter denen spezifische Informationen in einem sogenannten Baulandkataster veröffentlicht werden dürfen. Demnach kann die Gemeinde sofort oder in absehbarer Zeit bebaubare Flächen in Karten oder Listen auf der Grundlage eines Lageplans erfassen, der Flurstücksnummern, Straßennamen und Angaben zur Grundstücksgröße enthält. Diese Flächen können sodann in den Karten oder Listen veröffentlicht werden, sofern der Grundstückseigentümer von seinem Widerspruchsrecht keinen Gebrauch macht. Die geplante Veröffentlichung hat die Gemeinde einen Monat zuvor öffentlich bekannt zu geben und die Grundstückseigentümer auf ihr Widerspruchsrecht hinzuweisen (Stüer 2009:612).

Da die Zielgruppe eines Baupotentialkatasters nicht Experten, sondern Bürger und damit mehrheitlich Laien in Bezug auf GIS sind, sollte eine höchstmögliche Benutzerfreundlichkeit (Usability) erreicht werden. Aus diesem Grund eignen sich für eine Veröffentlichung allgemein gebräuchliche und kostenfrei zugängliche Programme. Dies können digitale Karten wie Google Maps und OpenStreetMap oder auch virtuelle Globen wie Google Earth sein (vgl. Höffken 2011). So können die Daten im *.kmz-Format auf der Webseite der Gemeinde zum Download angeboten werden, wodurch sie von Interessierten heruntergeladen und in Google Earth betrachtet werden können. Mittels Programmierschnittstellen (APIs) können digitale Karten direkt auf der Webseite der Gemeinde eingebunden werden, und stehen damit zur freien Betrachtung bereit.

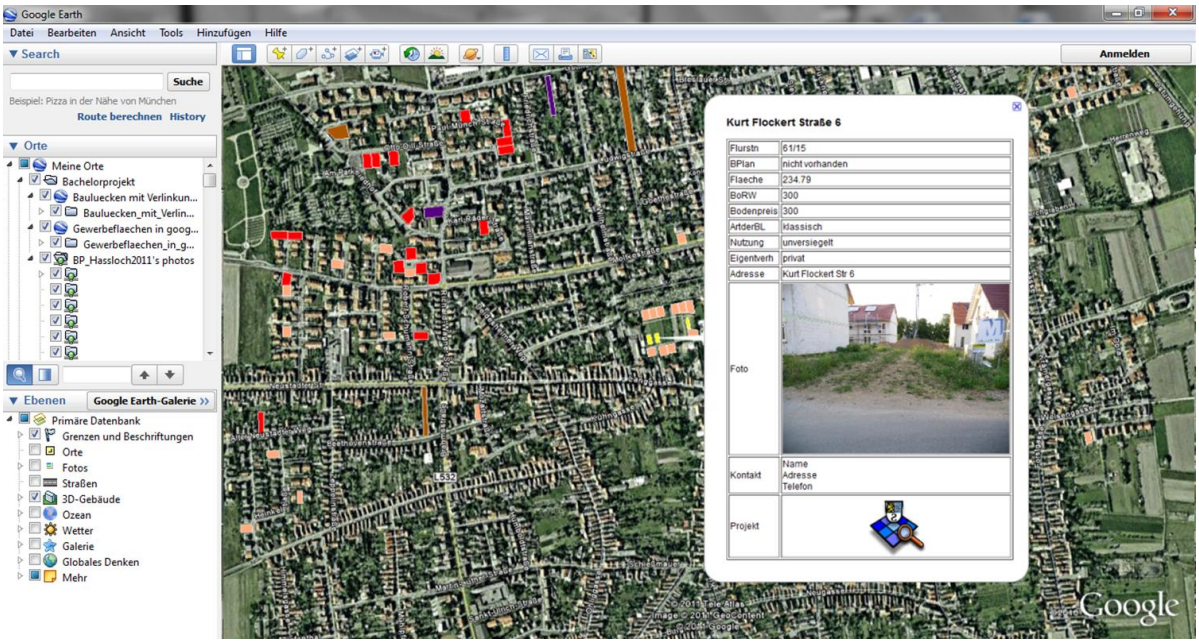

Abb. 4: Prototypisches Beispiel für die Bereitstellung der Baupotential-Information mittels Google Earth (eigene Darstellung).

4.3 Fortschreibung

Die Flächen innerhalb eines Gemeindegebiets unterliegen ständigen Entwicklungen: Durch den Abriss von Gebäuden entstehen neue Baulücken, vorhandene Baulücken können durch eine Bebauung geschlossen oder mit einer sonstigen Nutzung versehen werden. Um die Aktualität der Baulückenerfassung für die Gemeinde dauerhaft gewährleisten zu können, ist eine Fortschreibung des Katasters unumgänglich. Die Herausforderung liegt darin, die in der Gemeinde eingehenden Informationen zu Bebauungen, Zwischennutzungen, Abrissen etc. zu bündeln und kontinuierlich in das vorhandene GIS einzuspeisen, damit der Datensatz fortgeschrieben wird und aktuell bleibt. Im Rahmen des Projekts wurde ein idealtypisches Ablaufschema entwickelt, welches versucht, auf Basis der aktuellen Verwaltungsabläufe den Informationsfluss zu optimieren und die Fehlerquote zu reduzieren (vgl. Broschart et.al. 2011b:82).

Die konkrete Umsetzung ist allerdings nicht nur eine Frage des Work-Flow-Managements und der Prozessgestaltung, sondern eng mit technischen Fragen verbunden. Denn der angestrebte Informationsfluss muss seine technische Entsprechung in Form von zusätzlichen Attributwerten in der Datenbank, weiteren inhaltlichen Ebenen und neuen Menüpunkten (z.B. Häkchen für „Abriss erfolgt“) finden. Dementsprechend ist ggf. neben der Fachstelle auch die IT-Abteilung für die technische Anpassung des GIS mit einzubeziehen.

4.4 Zwischenfazit

Das erstellte Baulückenkataster liegt nun der Gemeinde vor und erfüllt die in 3.2 definierten Zwecke. So wurden durch Vorauswahl und Ortsbegehung alle Brachflächen innerhalb des Untersuchungsgebietes erfasst, und die Kategorisierung sowie vollständige Erfassung garantieren die Verlässlichkeit und Vollständigkeit der Daten. Diese liefern damit ein zutreffendes Bild der aktuellen Situation (sowie der von 1990) und sind in einer geobezogenen Darstellung aufbereitet worden, um eine verständliche Visualisierung der Informationen sowie lage- und themenbezogene Abfragen zu ermöglichen. Das Baulückenkataster muss nun von der Gemeinde in ihr GIS implementiert und fortgeführt werden. Zudem wurde ein einfaches und nutzerfreundliches Konzept zur Bereitstellung der Baupotentiale entwickelt.

5 METHODISCHE ERKENNTNISSE UND WEITERER ENTWICKLUNGSBEDARF

5.1 Methodisch-technische Erkenntnisse

Datenerfassung

Die Bearbeitung der Daten erfolgte zunächst mit Quantum GIS. Die exportierten Daten wurden auf die mobilen Geräte exportiert und in den My Maps Editor eingespielt, auf dem eine Bearbeitung möglich war. Dementsprechend konnten vor Ort die digitalen Informationen bearbeitet, gelöscht und ergänzt werden, da eine Punkt-, Linien- und Flächendigitalisierung vor Ort möglich ist. Die Vorteile des iPads waren:

- Lange Akkulaufzeit (bis zu 8 Stunden)
- Integrierter GPS-Empfänger (zur eigenen Standortsuche, Tracking der Wegstrecken, Geotagging der Fotos)
- Nutzung von online Kartendiensten wie Google Maps, aber auch die offline Nutzung von Geodaten und Luftbildern
- Gute Bedienbarkeit, also eine hohe Usability (Touch-Screen, guter Workflow, Systemstabilität)
- Schnellstart-Funktion (kein Hochfahren des Systems notwendig)
- Kostenlose Apps (im untersuchten Fall die Nutzung von My Maps Editor. Allerdings gibt es hier noch viele weitere Apps, die weiter entwickelt werden; zudem werden durch die Community immer neue Tools entwickelt, sodass langfristig noch viele weitere Funktionen und Apps zu erwarten sind.)
- Praktisches Format (relativ flach und handlich; dementsprechend besser zu transportieren, als die etwas „klobigen“ GPS-Geräte)
- Großer Bildschirm

Für Smartphones zeigte sich, dass sich der kleine Bildschirm für eine länger dauernde Nutzung z.B. bei einer umfangreichen Bestandsaufnahme nicht eignet. Allerdings haben Smartphones den Vorteil, dass sie aufgrund ihrer Größe leichter zu transportieren sind. Als dauerhafter Begleiter, eignen sie sich gut, um einzelne Nachbearbeitungen zu realisieren. Der My Maps Editor ermöglichte den georeferenzierten Import, Bearbeitung und Export. Zudem ist die Software kostenlos nutzbar.

Dateneingabe ins GIS

Die erfassten und korrigierten Daten konnten digital ausgelesen und im *.kml-format exportiert und georeferenziert in das GIS eingelesen werden, was die weitere Datenbearbeitung vereinfachte. Aufgrund der Verknüpfung mit der Datenbank via mobilem Internet konnten die Daten im Cloudcomputing-Verfahren aktualisiert werden.

Zwar ist es möglich, die erfassten Attribute direkt in das GIS zu importieren. Allerdings können die neuen Attribute mit dem bestehenden Datensatz nicht aktualisiert werden, da die Attribute nach aktuellem Stand nur unsortiert in einem Bemerkungsfeld aufgenommen werden können. Die Zusammenführung beider Datensätze muss demnach manuell erfolgen, was sich als zeitaufwendig herausstellte. Dieser „Flaschenhals“ reduziert den potentiellen Zeitgewinn.

Datenverwaltung im GIS

QunatumGIS eignet sich, um die Daten entsprechend der Anforderungen zu bearbeiten und zu analysieren. Zudem existiert die Option, die Daten in unterschiedlichsten Formaten zu exportieren, womit die Weiterbearbeitung und Visualisierung ermöglicht wird. Damit ist Quantum GIS ein gutes, kostengünstiges und vielseitiges Tool.

5.2 Weiterer Entwicklungsbedarf und methodische Herausforderungen

Trotz der zahlreichen genannten Vorteile gibt es weiteren Entwicklungsbedarf in technischer und methodischer Hinsicht. Insbesondere ist hierbei das Problem der Synchronisation von bestehendem Datensatz im GIS und dem bei der Bestandsaufnahme neu erzeugten Datensatz zu nennen. Inwieweit dies von NextBusinessSystem Co., Ltd. realisiert wird, ist nicht bekannt. Dementsprechend wird im Rahmen des DFG-geförderten Forschungsprojektes am Fachgebiet CPE „Städtebauliche Methodenentwicklung mit

GeoWeb und Mobile Computing“ nach alternativen Apps gesucht und die Entwicklung eigener Apps angestrebt. Dies wäre auch im Sinne einer langfristigen Fortschreibung ein wichtiger methodischer Baustein.

Zudem wird angestrebt, die alternativen Möglichkeiten zu Google Maps, insbesondere von OpenSource Projekten zu erforschen. Hierbei scheint der Einbezug von OpenStreetMap vielversprechend. Gleichzeitig sollen im weiteren Verlauf auch andere Betriebssysteme als das IOS von Apple genutzt werden. Insbesondere das Open Source Betriebssystem Android bietet hier viele Möglichkeiten und offenere Programmierschnittstellen. Dies könnte langfristig Lizensierungsvorteile zu dem sehr restriktiven Apple-System bieten.

Ein wichtiger, nächster Schritt ist die methodische und technische Optimierung der Fortschreibung des Katasters. Die bereits realisierten, technischen Möglichkeiten haben sich als gut und vielversprechend für neue Wege der Bestandsaufnahme herausgestellt. Die Fortschreibung ist bisher nur konzeptionell entwickelt worden. Neben der technischen Umsetzung muss ein Verfahren entwickelt werden, welches in die bestehenden Verwaltungsabläufe integriert werden kann. Dies betrifft bspw. Fragestellungen, wie die technische Ausstattung, Möglichkeiten zur Webseitenintegrierung, die Schulung von Mitarbeitern in Bezug auf neue Techniken und Methoden sowie technische Implementierung in die bestehenden Verwaltungs-Systeme. Dies soll in weiteren Kooperationsprojekten mit Kommunen erfolgen. Auch datenschutzrechtliche Fragen bei Nutzung von Cloud-Computing-Diensten und Applikationen sollen im weiteren Verlauf genauer beleuchtet werden.

6 AUSBLICK – NÄCHSTE SCHRITTE

Die neuen technischen Möglichkeiten erlauben die Entwicklung ganz neuer Verfahren und Konzepte. So ist ein interessanter Ansatz, die Ergänzung des aktuellen Baulückenkatasters durch Crowdsourcing-Verfahren. Dabei wird unter Crowdsourcing das Auslagern einer Tätigkeit an eine (große) Gruppe von Leuten verstanden, was durch die interaktiven Möglichkeiten des Web 2.0 nun einfacher möglich ist (vgl. Höffken, Streich 2011). So kann die Fortschreibung der Daten kontinuierlich erfolgen, indem sie nicht mehr zentral von einer Stelle aus durchgeführt wird, sondern von vielen Teilnehmern kollaborativ erfolgt. Im Gegensatz zur zentralen Gesamterfassung werden an dieser Stelle nur noch Veränderungen einzelner Baulücken punktuell aufgenommen. Um den Nachbearbeitungsaufwand zu minimieren und die Aufnahme der Baulücken für Jedermann möglichst einfach zu gestalten, empfiehlt sich der Einsatz vorgefertigter Formulare anstatt der bisher eingesetzten „Notizfunktion“ im My Maps Editor. Realistisch wäre bspw. die Entwicklung einer App, mit der Verwaltungsmitarbeiter neue Baulücken (bzw. deren Nutzungsänderung) direkt via Smartphone einpflegen könnten. Eine passwortgeschützte Zugangsberechtigung erlaubt die Nutzung nur durch autorisierte Mitarbeiter, sodass keine Falschinformationen entstehen. Hierbei läuft eine Kooperation mit dem Deutschen Forschungszentrum für Künstliche Intelligenz (DFKI) in Kaiserslautern, welches die RADAR-Plattform (Resource Annotation and Delivery for Mobile Augmented Reality Services) entwickelt hat, die sich für den Zweck einer Baulückenmeldung per Crowdsourcing-Verfahren eignen würde (vgl. Memmel 2011).

Abb. 6: Beispiel für die Visualisierungsmöglichkeiten mittels Augmented Reality (eigene Darstellung).

Fernerhin bieten Smartphones neue Möglichkeiten zur Visualisierung von Baulückeninformationen. Mit Augmented Reality-Browsern könnten die Baulücken und ihre Eigenschaften als digitaler Inhalt georeferenziert als Realitätsüberlagerung dargestellt werden. Die Informationen können vor Ort, leicht verständlich visualisiert werden. Insbesondere die AR-Darstellung eignet sich zur Visualisierung von möglichen Bebauungen oder zukünftigen Zwischennutzungen mit 3D-Gebäudemodellen.

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Modelling Affective Responses to Space

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1 ABSTRACT

Most geospatial applications rely on objective GIS data to provide services and decision support. These objective GIS data store abstractions of the real world, especially focusing on physical features. However, research on environmental psychology suggests that all stimuli, including large-scale environments, are perceived not only according to physical features, but also in terms of people's affective responses towards them (Russell, 2003). These responses may influence a person's behavior and decision-making in space. For example, some environments might be experienced as stressful with the consequence of avoidance; others might lead to preference and approach (Kaplan & Kaplan, 1989; Nasar, 1984). Although it is well accepted, that people's wellbeing and behavior is influenced by external cues, subjective geo-information has not yet been incorporated in existing geospatial applications, such as in navigation support. Therefore, we propose that in order to provide better services, geospatial applications need to consider people's affective experiences in space. This paper will give an introduction into types of affective responses and methods available to indicate them. We will report on results from our ongoing research project, which aims to model people's affective responses to urban space, and to incorporate this affective data into navigation services for pedestrians.

2 INTRODUCTION

A number of studies in the field of environmental psychology indicate that characteristics of indoor and outdoor environments influence people's wellbeing (Ulrich, 1984; Kaplan, 1993; Hartig & Staats 2006), preference (Nasar, 1984; Kaplan & Kaplan, 1989), satisfaction (Hur et al., 2010), and evoke behavioral changes in space, such as social interactions and intensity of land use (Sullivan et al., 2004), perceived walkability (Leslie et al., 2005; Schmidt et al., 2011), and walking route choices (Zacharias, 2001; Borst et al., 2008).

Data about people's preferences and avoidances of environments may be applicable in various fields of research - one of which is navigation. Borst et al. (2008) studied route choices of elderly people in relation to environmental attributes. Their findings suggest that people do not simply decide for the shortest route, but that decisions in space are influenced by various characteristics of the environment, such as parks, slopes, trees, front gardens, or shops. Consequently, data about people's perception of space can be used to better predict people's route choices, and support spatial behavior in a realistic, user-oriented way (Borst et al., 2009). However, people's perception about environmental characteristics have not yet been incorporated into navigation services. In order to offer services that more adequately support and suit users' needs and preferences, data about people's perception of and feelings in space must be collected. Such subjective data can be assessed through various approaches, such as self reports, physiological recordings, or field observations. Recently, with the ubiquity of smartphones and increasing interests on Web 2.0, researchers start to explore using smartphones as an instrument to collect users' subjective responses about and in space.

In our current project EmoMap, we will use this new approach to gather emotional responses evoked by the environment. Using smartphones enables people to report about their perception of space anytime and anywhere. In our project, we treat affective responses to space as fundamental information approach for geo-spatial applications. We will model affective responses to space by quantifying people's perception of the affective qualities in the environment. For gathering these affective data, we aim to make affective experiences in space easily reportable, and to automatically link these responses to the physical environment. By incorporating the collected data into services for enhancing navigation for pedestrians, we will examine its usefulness in the future.

This paper will report on results from our ongoing research project, which aims to model people's affective responses to urban space, and to incorporate this affective data into navigation services for pedestrians. We

will introduce types of affective (emotional) responses and methods available to indicate them, as well as give an overview about the state of the art of cognitive and emotion mapping, and related work.

3 AFFECTIVE RESPONSES TO SPACE

Stimuli and environments, all are perceived not only according to physical features, but also in terms of a person's affective response towards them. According to Russell (2003) some affective response is always present within a person, either perceived as neutral, moderate or extreme. When affect is in the foreground – due to its intensity or due to situational cues -, it can be consciously experienced as pleasant or unpleasant and form the basis of an emotional experience (Feldman Barrett et al., 2007; Russell, 2003). When affect is milder, it influences conscious experience and behavior in a less direct way. In this case, background affect is experienced as property of the person's environment (Russell, 2003; Feldman Barrett et al., 2007). These two affective states - emotions and affective qualities - are common approaches for investigating affective responses to space. Both affective states have the same common ground, but are experienced differently. Russell (2003) aptly describes this difference as hot experience for emotional reactions, versus cold experience when perceiving affective qualities.

3.1 Emotions

Emotions are complex and multifaceted phenomena. Due to its complexity and connection with other processes, emotions are among the most challenging phenomena in psychology. Until today there is no general agreed-on definition, which can clearly mark off emotions from other affective states. Psychologist offer not one but a variety of definitions, each addressing different components of emotions. However, on its very basis, Feldman Barrett et al. (2007) define emotions as intentional states that are about something, emerging from basic processes.

Emotional reactions can be examined in multiple ways: as subjective feelings, expressive reactions, cognitive performance, motivational changes, behavioral, and physiological reactions. The fact that emotions are a complex construct and cannot be measured directly, but only be indicated through their manifestations, lead to various approaches. In general, methods for indicating a person's emotional response can largely be divided into three most common categories: (1) self reports, (2) physiological methods, and (3) behavioral observations. Feldman Barrett et al. (2007) stress that self reports are the most direct way to gather information about a person's internal state. Self reports, such as verbal descriptions or judgements (e.g. questionnaires or interviews) however are subjective by nature, with its advantages and drawbacks. Physiological recordings through sensors on the other hand, provide an objective measure to affective responses (e.g. electrocardiogram, electromyogram, galvanic skin response), with the advantage that the person does not even have to recognize the physiological changes. Recorded data is used as indicator of emotional reactions, with the drawback that high arousal may or may not be caused by an emotional experience. Behavioral observations have similar advantages and disadvantages as physiological measurements; observed re-actions may or may not be due to a person's affective reactions caused by the environment. Without any interpretation, the data collected from physiological recordings and behavioral observations may be insufficient to precisely discern a person's affective response. However, there is no one agreed-on empirical solution about the components that indicate emotional experiences best.

3.2 Affective quality of the environment

Another way to approach affective responses to space is by handling its affective qualities (cold experience). Affective qualities are experienced as properties of the external world, commonly described with affect-denoting adjectives such as hectic, exciting, or beautiful. These affective qualities are verbally attributed to a place, but have the ability to change a person's affective feeling of pleasure or displeasure (Russell & Pratt, 1980; Russell, 2003). According to Russell (2003), the perception of affective qualities is an ubiquitous process. People evaluate and judge their surroundings routinely, at any time. In contrast, emotional experiences are rather infrequent, triggered by intense or situational cues. Myrtek (2004) reports that among emotional experiences the most often reported one was the experience of no emotion (58% of females, 72% of males).

One approach to quantify affective qualities of environments is by using semantic differential scales (Osgood et al., 1957). A Semantic Differential (SD) provides a list of affect-denoting adjectives on a bipolar rating

scale, designed to measure the connotative meaning (subjective associations) towards a given object, event or concept.

4 FROM COGNITIVE MAPS TO EMOTION MAPPING

In 1948 the concept of cognitive mapping was first introduced by the psychologist Edward C. Tolman. His experiments with rats indicated an ability for memorizing locations and spatial orientation. Tolman (1948) concluded that not only rats, but also humans may be able to develop an inner picture of the external world (a cognitive map), which help guide the individual in space. Researchers from various fields started to explore cognitive processes, such as the cognitive representation of spatial content, which until then were believed to be sealed within the individual (in a black box). In the 1950s this development mounted in the so called Cognitive Revolution.

In 1960 the urban planner Kevin Lynch introduced first ideas on how people perceive and organize spatial information as they navigate through space. According to Lynch's research (1960), key elements of the cognitive representation of space are paths, boundaries, districts, nodes, and landmarks.

About 20 years later Downs and Stea (1982) examined people's mental representation of space and found various distortions of mental maps. Downs and Stea (1982) conclude that cognitive maps do not show realistic images of the external world, but indicate how people believe the world is like. Potential factors which deviate cognitive maps from reality may not only be physical barriers, and semantic unity, but also emotional involvement and attitudes (Carbon & Leder, 2005). These subjective, emotional attitudes towards space were examined by Matei et al. (2001). On the basis of cognitive maps from individuals about the perception of comfort and fear in the city on Los Angeles, one aggregated, cognitive map was generated (Matei et al., 2001). Matei et al. (2001) were not only among the first who added this kind of collective, subjective layer to maps, but they also created one of the first digital map visualizations of feelings. Even though the map reports on the emotional perception (comfort and fear) of Los Angeles, it can only be considered to be a mental or cognitive map, but not an emotion map. Due to the method of retrospective self reports, the data collected may provide more insights into people's perception, in terms of opinions and prejudices, about space than about how people feel in space when they are physically there.

Among the first, the artist Christian Nold (2008) explored emotional responses in space. In his art project BioMapping participants are instructed to re-explore their local area, carrying mobile devices with them. One of the device measures the participant's galvanic skin response (GSR), indicating a person's emotional arousal. Additionally, a GPS device automatically refers the participant's position to a geographical location. As a result, an emotion map visualizes points of high and low arousal experienced in space, and reporting on the contributions of each participant (see Fig.1). However, to generate meaningful maps, the physiological data collected automatically, must be interpreted retrospectively (not every arousal indicated an emotional experience).

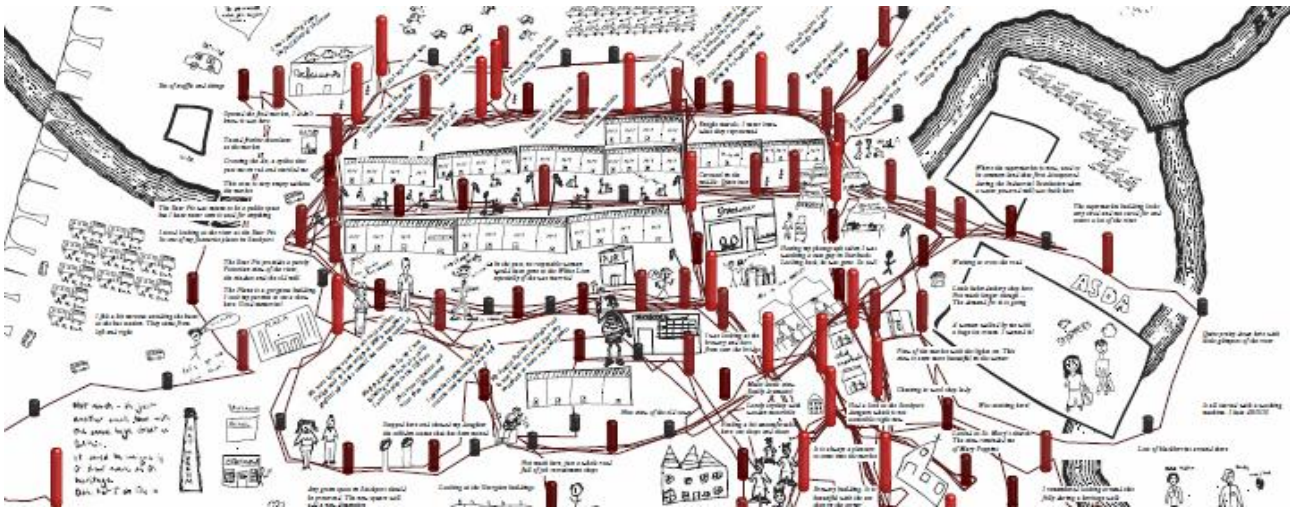

Fig. 1: Stockport emotion map by Christian Nold (2008). The higher the bars the higher arousal was measured. Textual descriptions and drawings were added retrospectively by the participants.

Recently, with the ubiquity of smartphones and increasing interests on Web 2.0, researchers start to explore using smartphones to capture users' self-reported affective responses. With smartphones the contributions can be easily linked to a person's geographic location. Current services, which ask for the user's feelings by using smartphones, as well as safe information about a persons location (by asking the user about the location or by storing the geographic information automatically), are:

- The service "Mappiness" developed by MacKerron and Mourato (http://www.mappiness.org.uk) is part of a research project, asking its users via smartphones to rate how happy, relaxed, and awake they are (on an eleven-point Likert scale). Some additional questions are asked (e.g. for current company and activities). The user's current position is stored automatically. The collected data are based on self reports. However, the benefit of using smartphones for gathering affective data, seems to be a quite promising one. Until today 48274 participants are reported on their website, indicating that a large number of contributions may be gathered easily.
- The smartphone application "Glow" (http://glowapp.com) asks the users to rate how they feel on one to five stars. The user's location is stored automatically. Personal results as well as the aggregated data of all users are displayed as heat maps with a color range from blue (awesome) to red (not so awesome).
- "Track Your Happiness" (https://www.trackyourhappiness.org/) is a research project by Killingsworth from Harvard University that aims to investigate causes and correlates of happiness. This research aims to understand what factors affect people's happiness in their daily lives. Information is gathered (on a webpage via smartphone) about a person's current happiness, and related to current activities, location, company, time of day, etc.
- "CaptureEmo" (http://www.capturemo.com/) is an instrument, which aims to assess people's emotional experiences about environments. A picture, sound recordings or a video of environments can be labelled emotionally (such as happy, interested, disgusted, etc.). However, the instrument is not a location based service. The only reference of the location is the picture or recording itself.

Present location based services for collecting emotional experiences in space tend to focus on various affective states of the users, but not necessarily on a momentary affective experience caused by the spatial surroundings. It can certainly be the case that the feelings reported by these services are influenced by a person's current environment, but not inevitably. To get clearer data it may therefore be necessary to address this issue by asking the user more specifically, such as "How does the environment make you feel?" instead of "How are you?", or as Russell (2003) suggests to have people evaluate an environment's affective qualities.

5 EMOMAP PROJECT

Research in one of our previous projects suggests environmental factors, such as safety, convenience, and attractiveness, to be relevant for the perceived route quality in pedestrian navigation (Schmidt et al., 2011). Although these factors are not emotions itself, they are affective evaluations caused by the environment.

In our current project EmoMap, we aim to gather emotional responses evoked by the environment. These emotional responses to space will be therefore modelled as a person's evaluation of affective qualities. We will ask users to evaluate the environment by ratings instead of asking them for their emotions directly. By doing so, we will direct a person's attention to the environment. We expect the collected data to be – at least to some extent - "cleaned" from non-spatial feelings of the person. According to Russell (2003) affective qualities are routinely evaluated anytime. We therefore expect to collect data, which is easily reportable by anyone, and present at any time (contrariwise to emotions, which occur rather infrequent, and which are evoked by intense external and internal cues).

For gathering this affective information, we will use a crowd sourcing approach to get a high volume of data. Self reports are the most promising method, since people can simply and freely contribute via their own mobile application any time and anywhere. People's perception of affective quality will be measured by implementing a Semantic Differential (SD), invented by Osgood et al. (1957), into a mobile application. This approach provides a list of affect-denoting adjectives on a seven-point rating scale. Using SD for our research, integrated into smartphones, brings several advantages:

- Subjective data: SD bases on self-reports and therefore no additional retrospective interpretation of data is needed.
- Simple integration: The instrument can be easily integrated in mobile phone devices. Anyone with a smartphone can contribute.
- Geo-referenced data: Contribution will automatically be stored geo-referenced. with a coordinate, obtained from GPS, and according to time of the day.
- Equipment: A smartphone is the only device needed. It can easily be carried, and is not an additional burden or creates an "unnatural" test setting for the user.
- Time-efficiency: SD provides a quick measurement for evaluating affective quality in space.
- Comparability: Different environments, as well as one place at different times can be compared.

By gathering affective responses in space with mobile devices, we expect an efficient, real-time collection of data, evoked by realistic scenarios, and therefore leading to results with high ecological validity. Within this project, this data will be used to create an emotional city layer, which will depict people's perception of space. This affective data will be the basis of a navigation service, which aims to better suit and predict people's behavior in space.

5.1 Inventory of affective qualities

In order to measure people's affective experiences in space, we first had to collect and specify affective parameters relevant to space. By using a multistage method, we obtained affective experiences related to space through several iterations:

Focus group

In a first step, a set of 39 affective qualities was compiled from affect-denoting terms found in literature. A focus group of non-experts (N=9; 5 females, 4 males) selected all relevant terms from the sets, as well as amended missing or inaccurate ones, resulting in a new sample of 67 affective qualities related to space (34 positive and 33 negative terms).

Online questionnaires

In a next step, online questionnaires were carried out, with the aim to reduce the affective parameters complied in the focus group to the most important ones. Participants were invited by social media and mailing lists. In the online questionnaire, participants were asked to select all of the parameters experienced in the urban environment of Vienna.

Among the 102 subjects (MeanAge= 34.4, SD=12) who completed the online questionnaires, exactly half of them were females, respectively males (n=51). Chi-square analyses showed a highly significant difference in the selection of positive affective qualities (χ^2= 309.007; df= 33). The standardized squared residuals indicate seven parameters, which were selected significantly more often: divers, lively, interesting, safe, upkeep, atmospheric, and beautiful. For negative affective qualities, chi-square analyses indicate a highly significance of the five parameters busy, noisy, hectic, stressful, and dirty (χ^2= 550.578; df = 32; $p < 0.001$).

Data aggregation

To reduce redundancies, the 12 parameters selected in the online questionnaire were further aggregated according to their synonyms, resulting in six environmental attributes (traffic, people, noise, attractiveness, diversity, safety). We added one more factor to our model, even though it has not shown to be significant. We added the attribute "smell" to our preliminary emotion model to find out whether smell was an important environmental aspect, which may had not been selected due to the fact that the questionnaires were conducted indoors. The resulting 7 aggregated parameters form the elements in our hierarchical preliminary emotion model, which is the basis for the geo-referenced collection of affective responses in space.

Preliminary emotion model

The hierarchical structure of the model considers people's emotional granularity, which are interindividual differences in the ability of characterizing affective experiences as broad affective or discrete terms

(Feldman Barrett et al., 2007). On two levels, the model serves as the basis for the geo-referenced collection of affective responses in space:

(1) Level of broad affect. On the first level, people can rate how pleasant or unpleasant the environment is experienced. This broad affect is considered to be reportable by any individual, independent of culture and age (Feldman Barrett et al., 2007; Wierzbicka, 1999; Russell, 2003).

(2) Level of distinct affective environmental qualities. This level asks for ratings about the current environment, regarding the categories of traffic, noise, smell, people, safety, attractiveness and diversity (on a seven-point scale, ranging from -3 to +3). This level of distinct environmental qualities provides more detailed information about characteristics of the environment.

5.2 Location model

In order to link people's affective responses to space, a location model was needed. For providing a suitable location model, we analyzed different check-in applications, such as Foursquare and Facebook Places. They link users' check-ins to place labels, each of which basically has a latitude/longitude pair (i.e. a point) and a name. However some places are hard to be named. In our current location model we link reported experiences as points to a location, which will be automatically obtained from GPS devices. In the future, we may also allow users to link their emotions to points, lines (along street network), and polygons. For each object, only the geometry is stored.

6 WORK IN PROGRESS AND CONCLUSION

After implementing the preliminary emotion model into a prototypical mobile application, the usability, as well as the emotion and location model is currently examined by using the application in the study area of Vienna. First results from people's affective responses to space are visualized in Figure 2. The colored points represent the geo-coded affective responses from eight participants (4 females, 4 males), bright red indicating places where people feel uncomfortable, dots in dark green indicating comfort. Depending an the zoom level, the data will be displayed as aggregated content with numbers of contributions provided, or as individual contributions.

Preliminary results from user's responses and correlations between the parameters suggest to aggregate, and further reduce the number of parameters. Due to the relatively small screen of smartphones, the information being displayed is limited. Consequently, a further aggregation of the parameters to their core will not only allow an even faster and non-redundant contribution, but will avoid the information overload.

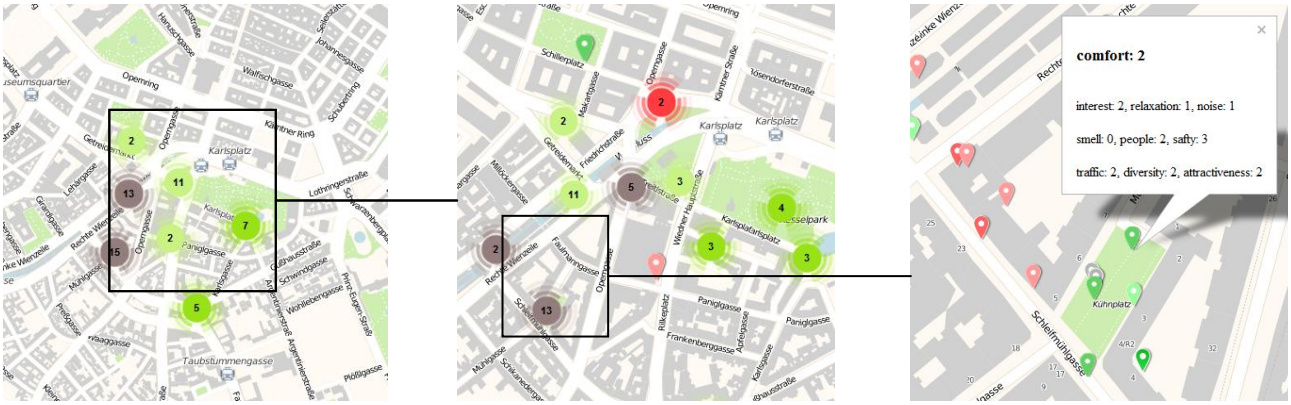

Fig. 2: Emotion maps of Vienna. Depending an the zoom level, the data is displayed as aggregated content (with numbers of contributions provided) (left and center) or as individual contributions (right). Red dots indicate discomfort, dark green dots represent comfort. Map source: cc-by-sa OpenStreetMap - contributors, 20.02.2012.

In the future, we will use the option of volunteered geographic information to collect affective responses to space. In order to illustrate the importance of affective experiences in space, the data collected in the current project will be aggregated, resulting in a collective affective map-layer, and further be used for enhancing navigation systems for pedestrians. Route suggestions based on subjective information about space will be provided, and its usefulness as well as users' satisfaction evaluated.

However, applications will not be restricted to navigation services only. The data will be stored in an open online database (OpenEmotionMap.org), which will be open for other usages and disciplines. We expect the

inclusion of this affective layer will bring benefits to different disciplines, not only in Information and Communication Technology, but also Urban Planning, Architecture, and Policy Making.

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Möglichkeiten der ökonomischen Bewertung des Verlusts der Nacht

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1 EINLEITUNG

Im Forschungsverbund Verlust der Nacht, der vom deutschen Bundesministerium für Bildung und Forschung seit 2010 für drei Jahre gefördert wird, setzt sich ein interdisziplinäres Forscherteam aus den Natur-, Technik-, Geistes- und Sozialwissenschaften mit den Ursachen und Folgen der zunehmenden künstlichen Beleuchtung des Außenraums auseinander. Vor etwa 200 Jahren wurde die erste öffentliche Gasbeleuchtung in London installiert. Seitdem hat sich die Nutzung der städtischen Nacht, die erst durch künstliches Licht in der Breite möglich wurde, massiv verändert. Im Rückblick wurde nicht nur dem Leben im öffentlichen Raum und der Industrialisierung mehr Dynamik verliehen, sondern schlussendlich der Weg in die 24-Stunden-Gesellschaft geebnet. Die heutige Form der Urbanität in hochentwickelten Gesellschaften ist ohne Straßenbeleuchtung, Lichtwerbung und Lichtinszenierung kaum zu denken, gerade in der jüngeren Vergangenheit hat sich das Ausmaß privaten und gewerblichen Lichts im Außenraum massiv erhöht. Das wurde in den letzten Jahrzehnten auch von den planenden Professionen erkannt. So sind seit den 1990er Jahren in zahlreichen Städten Lichtmasterpläne und Lichtkonzepte entwickelt worden. Der soziale und ökonomische Fortschritt im Zuge von Modernisierungsprozessen ist jedoch meist auch mit sozialen und ökologischen Kosten verbunden. In diesem Sinne werden in unterschiedlichen Zusammenhängen zunehmend die negativen Folgen der Lichtverschmutzung diskutiert. Im Rahmen des Forschungsverbundes werden nun einzelne Aspekte des Verlusts der Nacht in insgesamt vierzehn Teilprojekten aus unterschiedlichen Blickwinkeln vertiefend betrachtet. Diese reichen von der historischen Genese künstlicher Beleuchtung im Raum Berlin-Brandenburg bis zur Untersuchung der Auswirkungen auf einzelne biologische Spezies.

Das Teilprojekt, dem das vorliegende Papier entstammt, geht der Frage nach, wie sich die positiven und negativen Auswirkungen der nächtlichen Erhellung des Außenraums ökonomisch bewerten lassen. Dabei zeigt sich, dass nur sporadisch Vorarbeiten geleistet wurden, auf die sich das Projekt berufen kann. Aufgrund der verhältnismäßig geringen externen Kosten, die als Folge von Lichtverschmutzung vermutet werden, fand das Thema in umwelt- und wohlfahrtsökonomischen Untersuchungen bisher kaum Beachtung. Bei grober Betrachtung stehen der Nutzen der Ermöglichung wirtschaftlicher und gesellschaftlicher Aktivität und der Inszenierung des Stadtraums den Kosten der Beeinflussung biologischer Rhythmen und des Verlusts der Sichtbarkeit des nächtlichen Sternenhimmels gegenüber. Die Komplexität der Aufgabe besteht zunächst darin, ein disperses Feld mit ebenso heterogenen Erkenntnisständen zusammenzuführen. Die genauen Folgewirkungen der nächtlichen Beleuchtung sind dabei noch weitestgehend ungeklärt. Die ökonomische Bewertung selbst steht darüber hinaus vor nicht unerheblichen methodischen Herausforderungen. Offensichtlich ist daher, dass zumindest zum jetzigen Zeitpunkt die einzelnen Nutzen- und Kostendimensionen des Verlusts der Nacht keinesfalls abschließend monetarisiert werden können. Vielmehr ist ein notwendiger erster Forschungsschritt, die einzelnen positiven und negativen externen Effekte zu benennen, zu ordnen und zu präzisieren. Diese Taxonomie der wichtigsten Nutzen- und Kostendimensionen soll eine fundierte Grundlage für eine ökonomische Bewertung des Verlusts der Nacht schaffen. Schlussendlich sollen die Analysen im Rahmen des ökonomischen Teilprojekts einen Beitrag zur Entwicklung von Empfehlungen für einen zielgerechteren Einsatz von nächtlicher Außenbeleuchtung leisten.

In diesem Beitrag wird der derzeitige Forschungsstand im Rahmen der Erstellung der Taxonomie vorgestellt. Grundlage der vorliegenden Überlegungen ist eine strukturierte Literaturrecherche, die in eine Datenbank mit über 2000 Einträgen aus der einschlägigen deutschsprachigen und internationalen Fachdiskussion mündete. Auf der Basis der Literaturauswertung werden der aktuelle Wissensstand diskutiert und weitere Forschungsbedarfe aufgezeigt. Der Aufbau des Beitrags orientiert sich dabei weitestgehend an der vorläufigen Gliederung der Taxonomie. Zunächst werden die Nutzendimensionen der künstlichen Beleuchtung des Außenraums besprochen und ihre Bewertungsmöglichkeiten diskutiert. Anschließend werden in der gleichen Form die relevanten Kostendimensionen besprochen. Das Papier schließt mit einem

Ausblick auf die weiteren geplanten Forschungsschritte und einer zusammenfassenden Problematisierung der Möglichkeiten einer ökonomischen Bewertung des Verlusts der Nacht.

2 NUTZEN DER KÜNSTLICHEN BELEUCHTUNG DES NÄCHTLICHEN AUßENRAUMS

Die Verwendung künstlicher Lichtquellen hob in den Städten den starken Kontrast zwischen Tag und Nacht auf. Der Nutzen der künstlichen Beleuchtung des nächtlichen Außenraums spiegelt dabei im Wesentlichen die Funktionen der einzelnen Lichtquellen wider. Auer (1997) unterscheidet als Quellen der nächtlichen Außenbeleuchtung in der Stadt die fünf elementaren Lichtmarken Ordnungslicht, Werbelicht, Festlicht, Wohnlicht und Arbeitslicht, die er „den fünf Stadtfundamenten“ (S. 8) Zitadelle, Markt, Tempel, Wohnquartiere und Arbeitsstätten zuordnet. Erst in den 1990er Jahren entwickelte sich zur systematischen Ordnung dieser Lichtquellen das Planungsfeld der Lichtplanung. Als Ordnungslicht lässt sich aus heutiger Perspektive das gesamte Feld der öffentlichen Straßen- und privaten Verkehrsbeleuchtung betrachten, Werbelicht dient als Denkmalillumination heute auch der Stadtwerbung und Festlicht zeigt sich zunehmend in Formen der Lichtkunst, Lichtfestivals und sonstigen temporären Lichtinstallationen. Zuvorderst dient nächtliches Kunstlicht der Ermöglichung nächtlicher Aktivität, die 24-Stunden-Gesellschaft ist nur mit künstlichem Licht denkbar. Dieser Zusammenhang muss aber anhand ausgewählter Indikatoren konkretisiert werden. Vor allem zum Beitrag der nächtlichen Außenbeleuchtung zu Sicherheit und Sicherheitsempfinden liegt eine größere Zahl an Untersuchungen vor. Von steigender Bedeutung, aber bisher nicht (wirtschafts-)wissenschaftlich untersucht, ist der Beitrag der Lichtinszenierung zur Wertschöpfung (Lichtplanung, touristische Attraktion, Werbung, etc.). Methodisch aufwendig, aber ebenso denkbar, ist eine ökonomische Untersuchung des Beitrags des künstlichen Lichts im Außenraum zur Festigung der Stadtidentität und zur Verbesserung der ästhetischen Qualität des Stadtraums. Im Folgenden wird den Möglichkeiten der ökonomischen Bewertung dieser Aspekte nachgegangen.

2.1 Ermöglichung von wirtschaftlicher Aktivität in der Nacht

Künstliches Licht im öffentlichen Raum - insbesondere die öffentliche Straßenbeleuchtung - ist ein ermöglichender Faktor für viele wirtschaftliche Betätigungsfelder in der Nacht (Henckel 2009, The Royal Commission on Environmental Pollution 2009). In ökonometrischen Analysen lässt sich ein eindeutiger Zusammenhang zwischen dem Ausmaß der Lichtverschmutzung und Formen der Landnutzung, der Höhe an Direktinvestitionen und dem Bruttoinlandsprodukt pro Kopf feststellen (Gallaway et al. 2010). Obwohl bei steigendem Pro-Kopf-Einkommen auch die Beleuchtungseffizienz steigt und daher der Zusammenhang zwischen Lichtverschmutzung und dem Bruttoinlandsprodukt nicht linear ist, zeigen empirische Analysen doch eindeutig, dass Wertschöpfung und nächtliches Licht eng miteinander korrelieren und beides räumlich in großen Städten konzentriert ist (Elvidge et al. 1997a, Elvidge et al. 1997b). Erst künstliches Licht schafft die Voraussetzungen für die 24-Stunden-Gesellschaft, also Produktion, Konsum und Verkehr rund um die Uhr. Gerade mit dem Wandel von der fordistischen Massenproduktions- und Massenkonsumgesellschaft zu flexibleren postfordistischen Gesellschaftsformationen hat sich die Struktur und Organisation der städtischen Wirtschaft massiv verändert. In traditionellen Industrie- und Dienstleistungssektoren bedingten technologische Innovationen und die Internationalisierung der Wirtschaft eine Ausweitung der Arbeitszeiten. Daneben kam es zu einem Boom neuer freizeitorientierter Dienstleistungen, neuer Einzelhandelsstrukturen und gastronomischer Angebote, die insgesamt den Event zu jeder Tageszeit in den Vordergrund rücken, sich gut mit dem Wachstum des Städtetourismus fügen und auch entsprechende Planungen der Stadtverwaltungen hervorrufen (Lovatt/O’Connor 1995, Roberts/Eldridge 2009, Henckel 2009). Dies führte zu einem fundamentalen Wandel der Raum- und Zeitstrukturen des städtischen Alltagslebens. Daneben verstärkt die Ausweitung beleuchtungsintensiver Orte wie Infrastrukturknoten (Flughäfen, Bahnhöfe etc.), Stadien und Gewächshäuser den Zusammenhang zwischen ökonomischem Wachstum und Lichtverschmutzung.

Insgesamt führen die neuen Zeitrhythmen der städtischen Wirtschaft zu einer Steigerung der Wertschöpfung. Obwohl die nächtliche Beleuchtung des Außenraums dafür als conditio sine qua non verstanden werden kann, scheint eine Zurechnung der nächtlichen Wertschöpfung überaus komplex. Produktionsaktivitäten müssten zu diesem Zweck nicht zuletzt auch zeitlich erfasst werden, was in den aktuell bestehenden Systemen der Volkswirtschaftlichen Gesamtrechnungen nicht vorgesehen ist. Gleichzeitig stellen sich in diesem Zusammenhang auch Fragen der Abhängigkeit der Produktivität von Tag-Nacht-Unterschieden, die bisher nicht abschließend geklärt werden konnten (Moore-Ede 1993, Levitt/List 2009). Daher muss vorerst zusammenfassend festgestellt werden, dass der aus der nächtlichen Beleuchtung des Außenraums

gewonnene gesellschaftliche Nutzen zwar allem Anschein nach immens ist, sich derzeit aber Möglichkeiten der ökonomischen Bewertung entzieht bzw. dafür noch erhebliche Vorarbeiten geleistet werden müssten.

2.2 Wertschöpfung durch Lichtgestaltung

Künstliches Licht in der Nacht ermöglicht nicht nur Wertschöpfung. Mit der nächtlichen Beleuchtung des Außenraums sind auch unmittelbar Wertschöpfungaktivitäten verbunden, die selbst als Teil des gestifteten Nutzens betrachtet werden müssen. Mit der zunehmenden Bedeutung von Lichtinszenierung und -planung, Lichtfestivals und Lichtwerbung (FSU/KPK 2009, Cuttle 2009, van Santen 2006, Schmidt 2007) müsste dieser Sektor erfasst und seine Wachstumsdynamik beschrieben werden. So haben seit den Vorreitern Zürich und Lyon nicht nur zahlreiche Städte weltweit professionelle Lichtkonzepte und Lichtpläne erstellen lassen, Lichtplanung wurde in den letzten Jahren als Disziplin auch an Fachhochschulen und Universitäten akademisch verankert (bspw. FH Dortmund, Donauuniversität Krems). Viele Städte versuchen gleichzeitig, sich durch spezielle Architekturbeleuchtung und teilweise auch temporäre Lichtevents im Städtetourismus zu positionieren. Diese modernen Formen des Festlichts sind aber nicht nur auf öffentliche Initiative zurückzuführen, sondern sind vielfach auch privaten Ursprungs – wie beispielsweise die durch Einkaufstraßenvereine organisierten Weihnachtsbeleuchtungen. Zusätzlich hat Lichtwerbung eine lange urbane Tradition, Plätze wie der Londoner Picadilly Circus oder der Times Square in New York sind ohne großflächige Leuchtreklame heute kaum vorstellbar (siehe auch Wurm 2009, Beckmann 1986, Behar 2005).

Im Unterschied zu den indirekten Effekten scheint der direkte Wertschöpfungsbeitrag der künstlichen Beleuchtung des nächtlichen Außenraums im Falle der Bereitstellung entsprechender Forschungsressourcen relativ klar zu beziffern. Die Kosten der Straßenbeleuchtung sind nicht zuletzt durch die kommunalen Sparzwänge in den letzten Jahren stark in den Blickpunkt der Politik geraten (NABU o.J., siehe unten). Anders verhält es sich mit jüngeren Aspekten der öffentlichen Lichtplanung und der Wertschöpfung durch private Initiativen, wie event- und ortsbezogene Festbeleuchtungen oder private Lichtwerbung. In den bisher gesichteten Quellen spielen Fragen der ökonomischen Bewertung kaum eine Rolle. Möchte man die Wertschöpfungsleistungen erfassen, müssten Primärerhebungen in einschlägigen Unternehmen erfolgen. Erste Hinweise zur wachsenden Bedeutung der entsprechenden Branchen und Professionen könnten eventuell Expertengespräche mit Planern, Mitarbeitern von Stadtverwaltungen und Werbefachleuten bringen. Die „Lighting Urban Community International“ (LUCI) hat jüngst einen Bericht zum wirtschaftlichen Nutzen von Lichtfestivals erstellt. Anhand von zehn Fallstudienstädten auf unterschiedlichen Kontinenten wurden Besucheraufkommen und -ausgaben, Veranstaltungskosten, Wahrnehmung durch die Medien, Beitrag zum Stadtimage und geschaffene Arbeitsplätze erhoben. Dabei zeigte sich, dass die Festivals in sämtlichen Städten überaus positiv bilanzieren, die Einnahmen pro Besucher sind bis zu 35 mal höher als die Kosten (LUCI 2012). Insgesamt ist offensichtlich, dass Licht als Bestandteil stadtökonomischer Strategien verstanden werden muss, der durch entsprechende Planwerke zunehmend professionell gestaltet wird.

2.3 Effizienzgewinne durch gleichmäßigere Auslastung von Infrastrukturnetzen

Indirekt könnte die Ausweitung der städtischen Aktivitätszeiträume sowie der Energiebedarf der Lichtkörper selbst zur gleichmäßigeren Auslastung von Verkehrsinfrastruktur- und Energienetzen beitragen und somit die Effizienz der Leistungserbringung erhöhen. Die kontinuierliche Ausdehnung der nächtlichen Produktion, des nächtlichen Konsums und des nächtlichen Handels könnte insofern durch die Entzerrung sogar Produktivitätsfortschritte bringen. Tatsächlich zeigt sich im Falle Deutschlands, dass sich die Spitzen der Verkehrsbelastung in den letzten Jahren etwas abflachen und verschieben (Lenz et al. 2010). Da das weitergehende Ansteigen der Mobilität primär auf die Verkehrsmittel des Umweltverbundes entfällt, ist zumindest bei gleichbleibenden räumlichen Verteilungsmustern von einem Rückgang der Staus im motorisierten Individualverkehr auszugehen und mithin auch von einem Sinken der damit verbundenen volkswirtschaftlichen Kosten. Aus verkehrsplanerischer Perspektive können damit unterschiedliche positive Folgewirkungen verbunden sein: Zunächst sinken bei gleichmäßiger verteiltem Verkehrsaufkommen die notwendigen Straßenbreiten und damit auch die verbundenen Erhaltungsaufwendungen. Gleichzeitig scheinen auch eine Reduktion von Lichtsignalanlagen und die Steigerung der Effizienz von Schaltsystemen möglich. Inwiefern diese Zusammenhänge allerdings monetär quantifiziert oder auch nur belegt werden können, wurde in der bisher ausgewerteten Literatur nicht diskutiert. Wie im Falle der ermöglichten Wertschöpfung in der 24-Stunden-Gesellschaft ist jedoch davon auszugehen, dass die Komplexität nur mit erheblichem Aufwand bearbeitet werden kann.

Ähnliches gilt für den Bereich der Energienetze. Tatsächlich wird erst jüngst im Zeichen der bevorstehenden Energiewende stärker über die ökonomischen und technischen Aspekte der Energiegewinnung aus alten und neuen Energiequellen diskutiert (bspw. Wissel et al. 2008). Bei konventionellen Formen der Energiegewinnung aus Kohle und Kernenergie stehen aufgrund der bedingten Speicherfähigkeit von Elektrizität noch Fragen der Nachfrageverteilung und der Grundlast im Vordergrund. Da die geringste Belastung des Stromnetzes regelmäßig in der Nacht auftritt, sollte die Straßenbeleuchtung in dieser Hinsicht einen Beitrag zur Stabilisierung des Stromnetzes leisten. Mit der Energiewende rücken aber unter dem begrifflichen Deckmantel des Smart Grid zunehmend Fragen der intelligenten Steuerung und Abstimmung von Nachfrage und Angebot in den Vordergrund (bspw. Knab/Strunz/Lehmann 2010). Inwiefern sich in diesem Zusammenhang ein positiver Beitrag der Straßenbeleuchtung ergeben wird, muss in den in naher Zukunft folgenden Forschungsschritten erörtert werden.

2.4 Objektiver und subjektiver Sicherheitsgewinn

Zumindest in Großstädten wird Straßenbeleuchtung mit Sicherheitsgewinn und sinkenden Kriminalitätsraten assoziiert, Sicherheit kann historisch als eine ihrer zentralen Funktionen betrachtet werden (der Geschichte der Stadtbeleuchtung widmet sich Teilprojekt 3). Heute wird die Frage, ob sich unter den institutionellen und sozialen Voraussetzungen in den modernen Großstädten der hochentwickelten Welt mit bestimmten Beleuchtungsqualitäten ein Zugewinn an Sicherheit im öffentlichen Raum erzielen lässt, meist im Zusammenhang mit der angestrebten Modernisierung der Straßenbeleuchtung gestellt. Richtungsweisend sind in diesem Zusammenhang britische Studien, in denen zur Begründung der Verteilung von Fördermitteln Kosten und Nutzen der Modernisierung in ausgewählten Zielräumen verglichen wurden (Painter 1996/1999, Painter/Farrington 2001, Loukaitou-Sideris et al. 2001). Obwohl die genauen Wirkungen vom räumlichen Kontext abhängen, zeigen Painter und Farrington (2001), dass die Einsparungen bei der Kriminalitätsbekämpfung die Kosten der Modernisierung regelmäßig übersteigen. Unklar ist allerdings, ob diese Effekte nicht auch den baulichen Verbesserungen der Wohnumgebung insgesamt zugerechnet werden müssten (z.B. Farrington/Welsh 2002). Pease (1999) argumentiert darüber hinaus, dass die Beteiligung der Bevölkerung an der Modernisierung der Straßenbeleuchtung das Verantwortungsgefühl stärkt und somit ebenfalls zur Reduktion von Kriminalität beiträgt. In manchen Quellen wird daher ein direkter Zusammenhang zwischen bestimmten Beleuchtungsformen und Kriminalitätsraten angezweifelt (bspw. Atkins et al. 1991, Marchant 2004), eine Studie für das US Department of Justice hält bei bestimmten kriminellen Handlungen sogar gegenteilige Effekte für denkbar (Clarke 2008).

Relativ unumstritten ist demgegenüber, dass Straßenbeleuchtung das subjektive Sicherheitsempfinden fördert. So belegen bisher ausgewertete Studien – meist durch Zahlungsbereitschaftsanalysen – den Nutzen von Straßenbeleuchtung für das Sicherheitsempfinden der Stadtbevölkerung (bspw. Atkins et al. 1991, Willis et al. 2005, Knight 2010). Die Verbesserung der Beleuchtung würde demnach zur Reduktion von Ängsten beitragen und die Bereitschaft, die eigene Wohnung zu verlassen, erhöhen. Allerdings scheint der empfundene Sicherheitsgewinn, der mit einer Verbesserung der nächtlichen Beleuchtung des öffentlichen Raums verbunden wird, im Vergleich mit anderen das Faktoren eher gering (Willis et al 2005) und stark vom räumlichen Kontext und den genauen Maßnahmen abhängig. Bei Detailbetrachtungen müssen daher auch Fragen der Lichtqualitäten und Beleuchtungssysteme berücksichtigt werden. Im Extremfall könnte eine durch schlechte Beleuchtung verursachte Blendung die positiven Effekte zunichte machen. Zusammenfassend kann man daher festhalten, dass Straßenbeleuchtung – wie in der Geschichte meist vermutet – zumindest im Regelfall einen Beitrag zum subjektiven Sicherheitsempfinden leistet. Ob sich der Zugewinn an Sicherheit allerdings auch an objektiven Daten der Kriminalitätsstatistik festmachen lässt, ist bisher nicht eindeutig geklärt.

2.5 Verkehrssicherheit

Ein offensichtlicher Zweck von nächtlichem Licht im öffentlichen Raum, der spätestens mit dem Beginn der Massenmotorisierung offensiv verfolgt wurde, ist die Förderung der Sicherheit im Straßenverkehr. Tatsächlich steigt das Unfallrisiko nachts immens an, wobei dies nicht nur von den Sichtverhältnissen, sondern auch von Faktoren wie Müdigkeit, Alkoholisierung und der Verkehrsgeschwindigkeit abhängt. Auch wenn die anderen Faktoren tendenziell schwerer ins Gewicht fallen, zeigen zahlreiche Untersuchungen, dass Beleuchtung einen wesentlichen Beitrag zur Reduktion von Unfallwahrscheinlichkeiten leisten kann (für einen Überblick siehe Elvik 1995, Beyer/Ker 2009). Die Wirkungen hängen allerdings auch in diesem Fall

vom räumlichen Kontext und der genauen Wahl der Beleuchtungsmittel ab (bspw. Meseberg 1997). Vor allem an Kreuzungspunkten im städtischen Umfeld können die Unfallkosten durch zweckdienliche Beleuchtung sicherlich reduziert werden. Die vor kurzem erfolgte Abschaltung der durchgehenden Autobahnbeleuchtung in Belgien wurde hingegen damit begründet, dass sich die Beleuchtung an den meisten Stellen nicht positiv auf die Verkehrssicherheit auswirkt (bspw. Region Wallonie 2003). Demgegenüber zeigte das Texas Transportation Institute schon in den 1980er Jahren, dass die Unfallwahrscheinlichkeit an zeitweise unbeleuchteten Straßenabschnitten zunimmt (nach Hasson /Lutkevich 2002). Ein positiver Effekt lässt sich folglich dann erzielen, wenn eine nach Lichtfarbe und Intensität adäquate Beleuchtung an einer geeigneten Stelle installiert wird. Wie diese genau ausgestaltet sein muss, bleibt eine wichtige Fragestellung der lichttechnischen Forschung. Dabei ist zu berücksichtigen, dass Verkehrsteilnehmer in Abhängigkeit von der Beleuchtungssituation ihr Fahrverhalten anpassen (für einen Überblick siehe u.a. Willis et al. 2005, The Royal Commission on Environmental Pollution 2009). Im Sinne einer ökonomischen Bewertung konkreter Formen der Straßenbeleuchtung können auf der Basis dieser Erkenntnisse Kosten-Nutzen-Analysen durchgeführt werden. Die Kosten der Straßenbeleuchtung werden dabei – gemessen an den Gesamtkosten des Verkehrs – als verhältnismäßig gering eingeschätzt. Diesen können die volkswirtschaftlichen Kosten von Unfällen, die sich aus dem materiellen Schaden und den direkten, indirekten und intangiblen Gesundheitskosten ergeben (siehe unten), gegenübergestellt werden.

2.6 Stadtidentität und Ästhetik

In einem vorhergehenden Punkt wurde schon angesprochen, dass das an Bedeutung gewinnende Feld der Lichtplanung, Lichtinszenierung und Lichtwerbung prinzipiell als Beitrag zur Wertschöpfung verhandelt werden kann. Neben diesem objektiv zu erhebenden Aspekt der ökonomischen Bedeutung von Lichtgestaltung im nächtlichen Stadtraum wird Lichtplanung als Beitrag zur Förderung der Stadtidentität, zur Schaffung sozialer Räume sowie als Element der architektonischen Gestaltung und Ästhetik diskutiert (bspw. FSU/KPK 2009, Senatsverwaltung für Stadtentwicklung 2011). Seit jeher gilt die Stadtbeleuchtung als Zeichen von Modernität, Wohlstand und städtischen Lebensstilen (Auer 1997). Licht trägt entscheidend zum Image einer Stadt bei, durch künstliches Licht wird das nächtliche Stadtbild erst erzeugt (Köhler 2009). Städte wie Las Vegas scheinen als Bild eines lichttechnisch inszenierten Raums bekannter als bei Tag. Tatsächlich wurde der seitens der Stadtbevölkerung gefühlte Nutzen von Aspekten wie Anmut und verbesserte Straßengestaltung schon mittels Zahlungsbereitschaftsanalysen erhoben (Willis et al. 2005). Daneben wäre auch denkbar, den Wert der Stadtbeleuchtung an Immobilienpreisdifferentialen festzumachen (Henke 2008). Zu berücksichtigen ist allerdings auch hierbei, dass die entsprechenden Wirkungen in engem Zusammenhang mit dem sozialräumlichen und baulichen Kontext betrachtet werden müssen.

3 KOSTEN DER KÜNSTLICHEN BELEUCHTUNG DES NÄCHTLICHEN AUßENRAUMS

Wie im Falle des Nutzens, für den keine Gegenleistung erbracht werden muss, spricht man von externen Kosten, wenn beim Produktionsprozess Kosten entstehen, die nicht vom Hersteller getragen werden und entsprechend bei Dritten anfallen. Im Fall der nächtlichen Außenbeleuchtung bzw. Lichtverschmutzung lassen sich die indirekten Kosten bei grober Betrachtung als negative Auswirkungen auf die terrestrischen und aquatischen Ökosysteme (ecological light pollution) und die Abstrahlung in den Nachthimmel (astronomical light pollution) beschreiben (Longcore/Rich 2004). Detaillierter werden die indirekten Kosten der künstlichen Beleuchtung des Außenraums in der Literatur in den Dimensionen glare (Blendung), light trespass (Lichtübertretung), sky glow (Himmelsleuchten), light profligacy (Lichtverschwendung), cost to the environment und absence of darkness (The Royal Commission on Environmental Pollution 2009; ähnlich Mizon 2002) gefasst. In sämtlichen Fällen ist eine gesamtwirtschaftliche Betrachtung schwierig, sind doch weder die negativen Folgen der Lichtverschmutzung noch Fragen ihrer ökonomischen Bewertung abschließend geklärt. So ist bisher nur eine geringe Zahl an Auswirkungen der nächtlichen Außenbeleuchtung auf die terrestrischen und aquatischen Ökosysteme gut erforscht. Auch die Untersuchung der Auswirkungen auf Krankheitsbilder steckt noch in den Kinderschuhen, in den meisten Fällen bestehen nur Vermutungen. Und selbst bei Kenntnis der naturwissenschaftlichen Zusammenhänge scheinen lediglich die Gesundheitsfolgen für den Menschen relativ zuverlässig – wenn auch unter ethischen Gesichtspunkten nicht unumstritten – quantifizierbar (siehe Zweifel et al. 2009, Deutscher Ethikrat 2011). Die ökonomische Bewertung negativer Effekte auf die Ökosysteme stellt die umweltökonomische Forschung hingegen vor das Problem ihrer anthropozentrischen Weltsicht (siehe Polasky 2002, Marggraf et al. 2005, Hein 2010).

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Kleinere Kostendimensionen, wie jene der Lichtverschwendung, der mangelnden Sichtbarkeit des Nachthimmels oder der Blendung, lassen sich hingegen besser eingrenzen und – zumindest abstrakt – einfacher bestimmen. Im Folgenden werden die einzelnen Kostendimensionen kurz diskutiert.

3.1 Licht- und Energieverschwendung

Fragen der Energieverschwendung durch Lichtverschwendung und mangelnde Effizienz scheinen vor dem Hintergrund des zunehmenden Bewusstseins für Umweltfolgen und Ressourcenknappheit an Bedeutung zu gewinnen (bspw. NABU o.J.). In einer japanischen Studie zur Lichtabstrahlung in die Atmosphäre konnte anhand von Satellitenbildern von fünf Städten gezeigt werden, dass der Energieverlust der privaten und öffentlichen Beleuchtung zwischen 1993 und 1996 um 10 bis 20 Prozent zunahm (Isobe/Hamamura 2000). Diese Verschwendung ließe sich durch eine stärkere Nutzflächenorientierung der Beleuchtung reduzieren. Die wichtigste Quelle der Lichtverschwendung ist dabei die Straßenbeleuchtung, noch vor Werbeflächen und privaten Haushalten (Hänel 2000). Hält man sich die Kostenstrukturen der Straßenbeleuchtung vor Augen, ist das Bemühen um Effizienzsteigerungen seitens der Kommunen verständlich. In Deutschland belaufen sich die Anteile der Straßenbeleuchtung auf 0,1 Prozent am gesamten Energieverbrauch und auf 0,7 Prozent am Gesamtstromverbrauch (VDN/LiTG 2009), jedoch auf bis zu 45 Prozent an den kommunalen Stromkosten. Auch wenn das nur 0,4 Prozent des kommunalen Haushalts entspricht, ist der Anteil der Energiekosten an den Gesamtkosten der Bereitstellung von Straßenbeleuchtung von rund 30 Prozent zu Beginn der 1990er Jahre durch den technologischen Fortschritt, der Wartungs- und Instandsetzungskosten erheblich gesenkt hat, auf 50 bis 65 Prozent im Jahr 2010 gestiegen. Die Anstrengungen, durch die Umrüstung auf effizientere Systeme Energiekosten einzusparen, ist daher in den letzten Jahren forciert worden. Laut einer Publikation des Leuchtenherstellers TRILUX (2009), der auch die angeführten Zahlen entnommen sind, könnten in Deutschland allein durch die Erneuerung der Anlagen der Straßenbeleuchtung aus den 1960er und 1970er Jahren 400 Millionen Euro bzw. 2,7 Mrd. kWh und 1,6 Mio. Tonnen CO2 jährlich eingespart werden. Zusätzliche Einsparungspotenziale lassen sich durch die Anpassung der Nutzungszeit an den Bedarf erschließen (Höhne/Schröter 2002). Zusammenfassend sind Daten zur Licht- und Energieverschwendung für die Straßenbeleuchtung vergleichsweise gut zugänglich. Lediglich regionale Unterschiede der Kostenstrukturen wurden bisher kaum systematisch erhoben. Zur Effizienz der privaten Beleuchtung im öffentlichen Raum ist hingegen bisher insgesamt wenig veröffentlicht worden.

3.2 Mangelnde Sichtbarkeit des Nachthimmels

Lichtverschwendung beeinträchtigt in Form der Lichtverschmutzung auch die Stellung des Sternenhimmels als Kulturgut und Orientierungshilfe. Von Urzeiten an entwickelte die Menschheit eine metaphysische und eine praktische Beziehung zum Sternenhimmel, bis heute werden viele Kunst- und Kulturschaffende und Wissenschaftler von ihm inspiriert. Durch Lichtverschmutzung ist die Beziehung des Menschen zum Nachthimmel jedoch zunehmend gestört. Vor allem die Lichtkuppeln großer Städte strahlen weit aus, in hell erleuchteten europäischen Städten hat die Sichtbarkeit der Sterne von 3.000 möglichen auf 100 abgenommen (Hänel 2010). Um den Sternenhimmel als Kulturgut zu schützen, beschloss die UNESCO im Jahr 2009, astronomische und archäoastronomische Stätten als Weltkulturerbe anzuerkennen. In manchen Regionen der Welt wurden bereits eigene Dark Sky Parks eingerichtet (Kolláth 2010), der Astrotourismus zwecks Sternenbeobachtung nimmt seit Jahren zu (Ruggles/Cotte 2010). Kosten der mangelnden Sichtbarkeit des Nachthimmels wurden bisher jedoch kaum analysiert. Gallaway (2010) beklagt, dass die traditionellen Methoden der neoklassischen, aber auch der institutionellen und ökologischen Ökonomie mit passiven Vergnügungen nicht umgehen können. Allerdings wurden schon Zahlungsbereitschaftsanalysen zur Bewertung des Sternenhimmels als Kulturgut durchgeführt, die zeigen, dass zumindest in einschlägigen Kreisen die Bereitschaft besteht, für Dunkelheit zu zahlen (vgl. Simpson/Hannah 2010, Willis et al. 2005). Daneben müssten auch die Kosten, die der astronomischen Forschung durch die eingeschränkte Funktionsfähigkeit, Stilllegung oder Verlagerung von Sternwarten entstehen, sowie die mangelnde Nutzbarkeit des Sternenhimmels für Zwecke der Navigation berücksichtigt werden. Studien dazu sind jedoch bisher nicht bekannt. Ebenso wenig ist bisher geklärt, ob die Fragen nach der Verlagerung von Sternwarten und der Sternennavigation heute unter technologischen Aspekten überhaupt noch relevant sind.

3.3 Auswirkungen auf die Ökosysteme

Die Wirkungen der Lichtverschmutzung auf Fauna und Flora erwecken zunehmend die Aufmerksamkeit der Biologie. In der Tierwelt können sich die Veränderung des Lebensraums und die Störung biologischer Rhythmen verhaltens- und populationsökologisch auf die Orientierung, Anziehung, Reproduktion und Kommunikation auswirken, gemeinschaftsökologisch kann die Balance von Konkurrenz und Prädation aus dem Gleichgewicht kommen (Longcore/Rich 2004, Health Council of the Netherlands 2000, The Royal Commission on Environmental Pollution 2009). Bisher wurden besonders die Folgen für Vögel (bspw. Evans Ogden 1996, Jones/Francis 2003), Fledermäuse und andere ausgewählte Säugertierarten (bspw. Boldogh et al. 2007, Stone et al. 2009, Bedrosian et al. 2011), Meeresschildkröten und andere Amphibien (bspw. Perry et al. 2008, Baker/Richardson 2006), Fische (bspw. Brüning et al. 2011) und Insekten (bspw. Eisenbeis 2009) beforscht (zu sämtlichen genannten Spezies siehe auch die Beiträge in Rich/Longcore 2006). Säugetiere sind vor allem von veränderten Tageszyklen und Artenrivalität betroffen, Folgen für das Immunsystem, die Thermoregulation und die Fortpflanzung sind möglich. Bei Vögeln kann es zu veränderten Zeiten der Nahrungssuche und einem veränderten Brut- und Zugverhalten kommen, das künstliche Licht führt zu Ablenkung, Entkräftung und steigendem Risiko, gefressen zu werden. Bei Amphibien und Fischen sind vor allem die Fortpflanzung, das Wanderungsverhalten und die Schwarmbildung betroffen. Insekten drohen, entweder an heißen Lampen zu verbrennen oder im Licht zu entkräften und gefressen zu werden. Fehlen Insekten infolge der Lichtverschmutzung als Bestäuber, sind auch Folgen für die Landwirtschaft denkbar.

Im Vergleich zur Tierwelt ist jedoch zu den Auswirkungen auf die Pflanzenwelt insgesamt noch relativ wenig Wissen vorhanden. Die Lichtstärke von Straßenlaternen dürfte nicht ausreichen, um das Wachstum von Pflanzen zu beeinflussen (Health Council of the Netherlands 2000). Manche Bäume werfen jedoch als Folge der nächtlichen Beleuchtung ihre Blätter nicht oder verspätet ab, wodurch sie dem Winterwetter unmittelbar ausgesetzt sind (Briggs 2006). Daneben werden auch negative Auswirkungen auf die Luftverschmutzung vermutet, weil bestimmte Stickoxide, die bei Dunkelheit zur Reinigung der Luft beitragen, durch die Helligkeit nicht mehr wirken können (Castelvecchie 2010). Zusammenfassend lässt sich also festhalten, dass sich Lichtverschmutzung aus ökologischer Perspektive auf Fauna und Flora sowie die Luftqualität negativ auswirken kann. Ungeklärt ist allerdings die Frage nach Möglichkeiten der ökonomischen Bewertung dieser Effekte. Biodiversität wird prinzipiell als öffentliches Gut betrachtet, das als Stabilitätsfaktor in ökologischen Systemen, als Ressource für genetische Information, als Rohstofflieferant sowie zur Befriedigung ästhetischer, kultureller und wissenschaftlicher Bedürfnisse Nutzen stiftet (Klauer 2001). Schwierig ist die Bewertung von Biodiversität deshalb, weil die Zusammenhänge einerseits überaus komplex sind, Biodiversitätsverluste aber andererseits irreversibel sind, stark eingeschränkte Substitutionsmöglichkeiten bestehen und die Auswirkungen eines starken Verlusts größtenteils unbekannt sind. Aus diesem Grund wird vielfach anstelle von Kosten-Nutzen-Analysen die Gewährleistung eines "safe minimum standard" vorgeschlagen. Auf dieser Grundlage kann die ökonomische Bewertung einen Beitrag zur Diskussion effizienter Schutzstrategien und zur Schaffung von Anreizsystemen liefern (bspw. Loomis/White 1996, Montgomery et al. 1999, Stevens et al. 1991). Die Bewertung der Luftverschmutzung aus gesamtwirtschaftlicher Perspektive erfolgt prinzipiell in den Umweltökonomischen Gesamtrechnungen (Statistisches Bundesamt 2010). Kosten für die Landwirtschaft könnten bei Kenntnis der genauen Zusammenhänge auch sektoral betrachtet werden.

3.4 Physiologische Blendung

„Von physiologischer Blendung spricht man bei Blendungsereignissen, die eine messbare Herabsetzung der Sehleistung oder des Sehvermögens verursachen. Ursächlich hierfür kann eine Minderung der Unterschiedsempfindlichkeit, der Sehschärfe, des Form- und Gestalterkennungsvermögens, der Tiefenwahrnehmung und der Wahrnehmungsgeschwindigkeit sein" (IFA 2010: 3). Kosten physiologischer Blendung sind vor allem ein Thema der Verkehrssicherheit, insbesondere im Fall von großflächiger Lichtwerbung, aber auch von entgegenkommenden oder hinterher fahrenden Fahrzeugen oder Grundstücks- und Gebäudebeleuchtung. Studien zu den verursachten Unfallkosten sind bisher nicht bekannt. Insgesamt dürfte die Zahl an Unfällen, die auf Blendung zurückzuführen sind, eine vergleichsweise nachrangige Rolle spielen und darüber hinaus in den meisten Fällen durch Sonnenlicht und nur in Ausnahmefällen durch künstliches Licht in der Nacht verursacht werden (vgl. Rönsch-Hasselhorn 2003). Neben der Gefährdung der

Verkehrssicherheit kann Blendung auch kriminelle Handlungen begünstigen bzw. selbst als kriminelle Handlung betrachtet werden, beispielsweise wenn Piloten bei Abflug oder Landung mit Laserpointern gezielt geblendet werden. Zu diesen Aspekten sind aber bisher keine wissenschaftlichen Untersuchungen bekannt.

3.5 Lichtüberschreitung durch psychologische Blendung

„Im Gegensatz zur physiologischen Blendung ist die psychologische Blendung messtechnisch weder quantifizierbar noch optisch-visuell nachweisbar. Sie kommt häufig in Innenräumen vor und liegt dann vor, wenn ein aufgrund des qualitativen Urteils eines Beobachterkollektivs ermittelter Grenzwert von gerade noch annehmbarer hin zu gerade unannehmbarer Blendung überschritten wird. Es muss betont werden, dass es sich um rein subjektive Eindrücke handelt“ (IFA 2010: 5). Lichtüberschreitung durch psychologische Blendung soll hier also verstanden werden als Fall, in dem die Beleuchtung des nächtlichen Außenraums unbeteiligten Dritten Nutzeneinbußen verursacht. Bisher sind keine Studien bekannt, die versuchen, diese Lichtkonflikte ökonomisch zu bewerten. Denkbar wären auch hier Zahlungsbereitschaftsanalysen. Daneben können in Deutschland die Lichthinweise der Lichttechnischen Gesellschaft, mit denen das Bundesimmissionschutzgesetz für Fragen der Lichtverschmutzung konkretisiert wird, erste Hinweise zur Bewertung von Lichtüberschreitung und mögliche Kompensationen geben (siehe LiTG 2011).

3.6 Auswirkungen auf die menschliche Gesundheit

Bekannt ist heute aus der medizinischen Forschung, dass sich verschobene Zeitrhythmen auf die menschliche Gesundheit auswirken (Zulley/Knab 2009, Griefahn 2009), Nacht- und Schichtarbeit werden als Störgröße der zirkadianen Rhythmik angesehen und gelten als potentiell krebserregend (Straif et al. 2007). Der ‚shiftlag‘ bei Schichtarbeit kann zu Schlafschwierigkeiten, Stimmungsschwankungen bzw. Depressionen und Herz- Kreislauferkrankungen beitragen (Thorne et al. 2010). Insofern müssten die Kosten der 24-Stunden-Gesellschaft anteilig der nächtlichen Beleuchtung zugerechnet werden. Neben direkten Gesundheitswirkungen entstehen dabei auch gesellschaftliche Kosten durch indirekte Auswirkungen auf zwischenmenschliche Beziehungen und die individuelle Konzentrationsfähigkeit (Moore-Ede 1993). Die Zusammenhänge sind jedoch – wie im Fall der Ermöglichung wirtschaftlicher Aktivität – keinesfalls trivial. Inwiefern sich die Erhellung des Außenraums direkt auf den Rhythmus der Einnahme von Mahlzeiten, Alkoholkonsum, Schlafverhalten und Stress auswirkt, muss allerdings erst erforscht werden. Der am meisten diskutiert direkte Zusammenhang zwischen nächtlichem Licht und Krankheitsbildern betrifft derzeit die Wahrscheinlichkeit an Brustkrebs zu erkranken (Stevens et al. 2007, Stevens 2009). Nächtliches Licht dürfte demnach hormongesteuerte Krebsarten besonders stark beeinträchtigen. Allerdings sind den Studien zufolge vor allem Schichtarbeiterinnen betroffen, eine Korrelation mit Licht im Außenraum wurde bisher eher selten nachgewiesen (Kloog et al. 2010, Chepesiuk 2009). Ein Zusammenhang von Licht und Körpermasse konnte bereits bei männlichen Mäusen nachgewiesen werden, die sowohl bei dauerhaftem Einwirken von Licht als auch bei ständiger Dunkelheit ihre Nahrungsaufnahme ändern und Gewicht zulegen (Fonken et al. 2010).

Sollten die Gesundheitswirkungen der Lichtverschmutzung in naher Zukunft besser erforscht sein, lassen sich prinzipiell auch die gesellschaftlichen Kosten gesundheitsökonomisch ermitteln. Dabei bestehen unterschiedliche Zugänge. Direkte Kosten lassen sich aus den Ausgaben für Medikamente und die Gesundheitsdienste ermitteln, indirekte Kosten ergeben sich volkswirtschaftlich durch die Krankentage und mögliche Verdienstausfälle bei den Betroffenen, bei intangiblen Kosten müssen die verminderte Lebensqualität und eventuelle Schmerzen bewertet werden. Zur Bewertung der indirekten Kosten kann der Humankapital-Ansatz herangezogen werden, intangible Kosten werden mit dem QALY-Ansatz als Ausdruck der in einer bestimmten Qualität verbrachten Lebensjahre qualifiziert (bspw. Zweifel et al. 2009). Allerdings sind bisher keine einschlägigen Studien bekannt. Erste Gedanken zur ökonomischen Betrachtung von Licht und Gesundheit machte sich Henke (2008) in einem Vortrag, in dem er sich primär mit der Heilkraft von Licht und direkten Gesundheitsschädigungen beschäftigte.

4 SCHLUSSFOLGERUNGEN

Die Diskussion der Nutzen und Kosten des Verlusts der Nacht hat gezeigt, dass die Forschung zu vielen der besprochenen Dimensionen noch in den Kinderschuhen steckt. Die ökonomische Betrachtung erfordert dabei prinzipiell ein kreatives Vorgehen, das zumindest zu Fragen der Auswirkungen auf die Ökosysteme nicht ohne eine (ergänzende) qualitative Beschreibung oder Bewertung in physischen Einheiten auskommen wird (siehe TEEB 2010). Grundlegender Forschungsbedarf besteht noch zu Kosten und Nutzen der meisten

privaten Beleuchtungsquellen im öffentlichen Raum, zu den Folgen für die Infrastrukturnetze und zu den Folgen für die Pflanzenwelt. Ob eine Bewertung der Ermöglichung der 24-Stunden-Gesellschaft letztendlich möglich sein wird, muss aus heutiger Sicht bezweifelt werden. Unabhängig davon kann die Taxonomie aber Hinweise zu einer nüchterneren Betrachtung der künstlichen Beleuchtung im Außenraum liefern.

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reviewed paper

MOR€CO – Mobility and Residential Costs: Improving the Settlement Development in the Transnational Alpine Space Region

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1 ABSTRACT

Overriding trends like globalization, differentiation of life-styles and an increasing personal mobility lead to rapid growth of central located cities and shrinkage of remote areas with no significant economy. The Transnational Alpine Space Region includes large cities like Grenoble, Lyon, Munich and Salzburg as well as small villages. Consequently there are many different settlement structures ranging from low to high density. Planners are confronted with the challenge of offering equivalent living conditions for all inhabitants including those located high within the Alps. The limited space for qualitative settlement development and the different demographic dynamics intensify these trends. In the end this development leads to high residential prices in city centres with good infrastructure and to lower prices in suburban and rural areas. Hence, people move to the countryside where they can rent or buy cheaper real estates, without reflecting on the resulting induced costs for longer travel distances. The site decision has significant impacts on mobility and residential costs which differ greatly because of the dissimilar topography and settlement structure of the Alps. The results are not only raising costs for mobility but also other negative consequences like high energy demand, emissions, air pollution, time costs, reduced quality of life and others.

All these parameters influencing the amount of these costs have to be taken into account for a long term sustainable development. The "MOR€CO" project is trying to achieve transferable strategies to tackle these issues.

The EU co-funded Alpine Space project "MOR€CO – Mobility and Residential Costs" is a cooperation of 10 project partners located in Austria, France, Germany, Italy and Slovenia. MOR€CO started in July 2011 and runs until July 2014. The general aim of the project is to force good governance for a sustainable regional settlement pattern in the pilot sites with respect to mobility and residential cost transparency including a simulation of a potential increase of these costs.

2 CONDITIONS IN THE ALPINE SPACE REGION

The Alpine Space Region extends over nearly 200.000km2 and eight countries. There are big differences in altitude between the valleys and the mountains and various settlement and traffic conditions existing in the area.

One example of extremely changing conditions in the last years is the city and region of Munich. The metropolitan area which is located in the Alpine foothills received a major population growth and a correlated demand for houses. In the Pilot Site "City of Munich and Munich Transport and Tariff Association Area" live more than 2.6 Million people on 5.470km2. This is an average population density of 475 inhabitants per km2. However the situation in the City of Munich is another one: on an area of 310 km2 live nearly 1.4 Million people which generates an average density population of 4500 inhabitants per km2. The major part prefers to live in the city centre and this trend will increase in the future. The real estate prices rise enormously, additionally the most of the people use their car for their daily ways (37% in the City of Munich, see Figure 1). This leads to massive costs for housing and mobility for private households.

In dense areas like the Munich Region it is very important to provide an effective technical infrastructure for reducing long trips, especially when the settlement structure is already strained.

On the other hand there are regions in the Alps like the Val Belluna, a valley for which the population forecasts predicts a shrinking trend till 2029. Here approximately180.500 inhabitants live on 2.454 km2 (see Figure 2) which makes an average population density of approximately 74 people per km2. Even in the City

of Belluno the density is just about 250 people per km2 (Source: www.demostat.it). The problem in areas like this is first of all to maintain the quality of the public infrastructure and also to develop and structure the settlement.

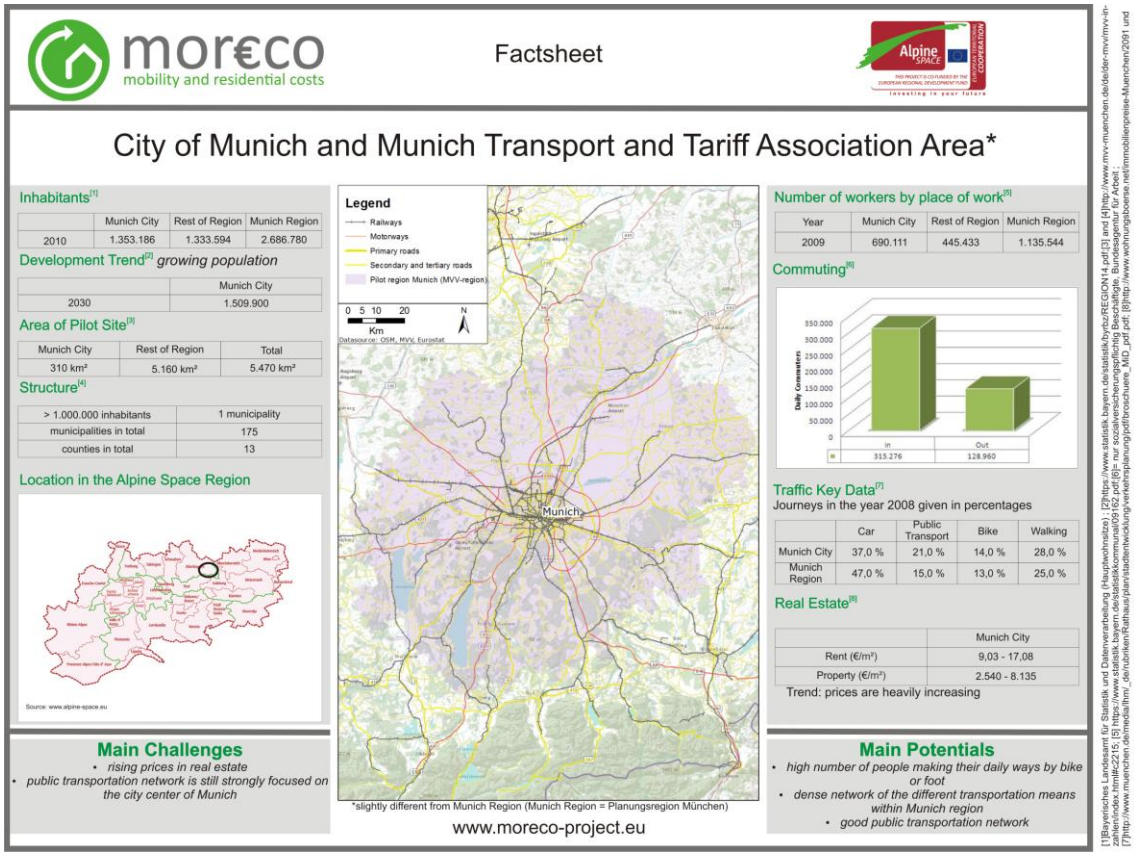

Fig. 1: MOR€CO Factsheet "City of Munich and Munich Transport and Tariff Association Area"

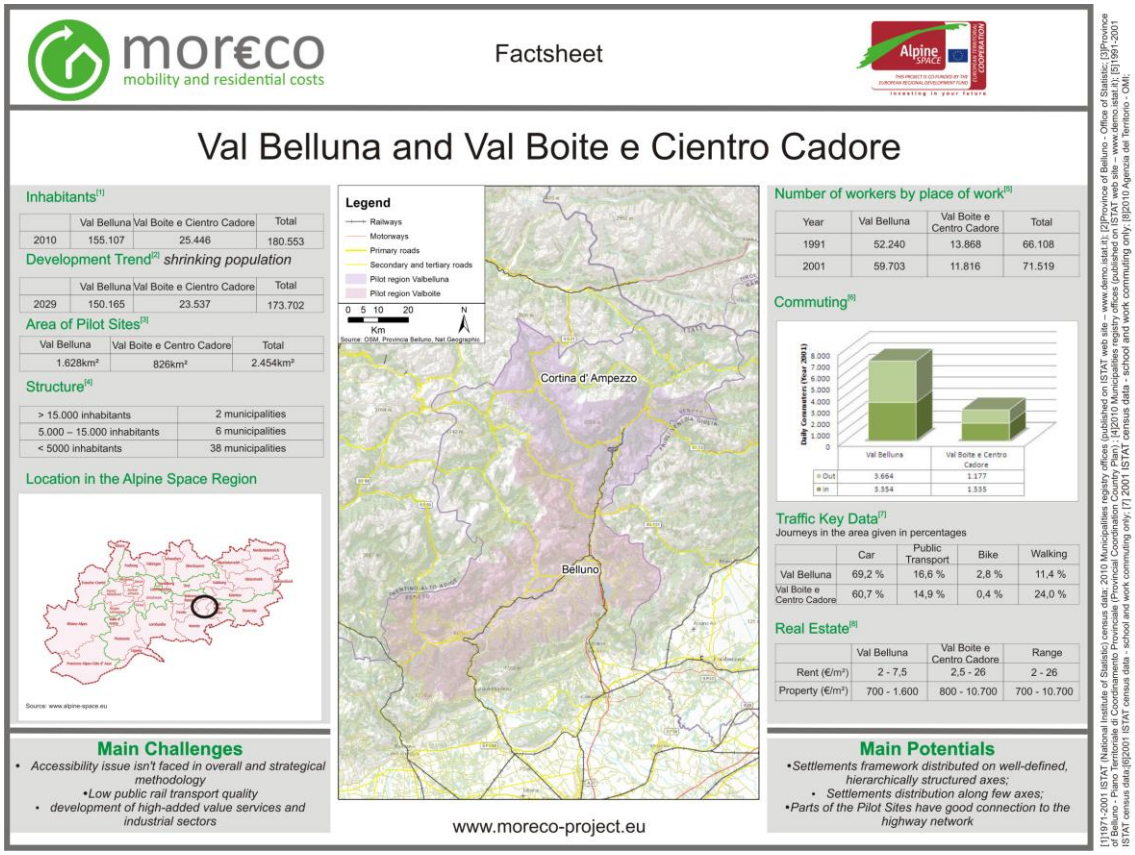

Fig. 2: MOR€CO Factsheet "Val Belluna and Val Boite e Cientro Cadore"

The pressure to tackle these challenges is very urgent in growing areas, but to accomplish equivalent living conditions it is important to serve the needs of all regions in the Alpine Space Region. MOR€CO tries to provide solutions for all kinds of these challenges. This paper is focused on the Munich area because the strategy and further approach is already very advanced.

3 THE INTENDED MOR€CO TOOL KIT

To make the induced long-term costs of site decisions transparent, several tools and strategies will be developed during the MOR€CO project time for special target groups.

Because site decisions are made by different groups of stakeholders, the project will address the following three main target groups:

3.1 Househunting citizens and other private households

When it comes to changing residential location, most people consider first of all the rent or purchase price for real estate. They rarely calculate the mobility costs they will incur by choosing a particular location and especially not the long-term costs. However, the major part of private trips start and stop at home and this implies in most cases:

- The more the residential location lies in the countryside (less costs for real estate), the longer the daily trips are (higher mobility costs)
- The more the residential location lies in a city centre (higher costs for real estate), the shorter the daily trips are (lower mobility costs)

This simple principle works in the major settlement structures but it is not very easy to transfer this to an individual private household, particularly in the Alpine Space Region whit its specific infrastructure. This is the reason why it's essential for citizens to understand the context between residential location decision and induced following costs for mobility.

The general aim of the calculation tool for private households is to give an overview about the mobility and residential costs for an inhabitant of the Alpine Space Region per month based on the individual residential site decision. The tool should help forcing the relation between residential living situations and the induced (long-term) follow-up costs for mobility more transparent.

Fig. 3: User interface of the Munich Residential and Cost Calculator (http://womo.mvv-muenchen.de/)

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Because the cost calculator should be usable in the whole Alpine Space Area, it needs to be a simple tool free for everybody to download in the internet. The tool follows a similar approach as realized in the Munich Residential and Mobility Cost Calculator (see Figure 3) but transformed into a Windows Excel based Tool which then can be used in the whole Alpine Space Region. There are already several existing tools for this topic, but in the most cases these tools are only partially usable for special regions. The development of the MOR€CO tool will include - where possible – the results and approaches of these existing tools.

3.2 Planners and public transport organisations

The relations between residential location and induced mobility costs are not only important to know for private households but also for spatial and traffic planners, regional developers, public transport organisations and others. These stakeholders should be especially conscious of the consequences of their planning decisions. By knowing the needs of the population and customers the persons responsible for planning could determine more effective and sustainable plans when it comes to questions like mobility behaviour in relation with the settlement structure.

Within the MOR€CO Project a GIS-based tool will be developed to analyze planning decisions concerning future settlement and traffic development. The tool will consist of three main parts:

- Regional Analysis
- Settlement Assessment
- Mobility Planning

These tools will create a combination of maps, diagraphs, interpretation texts and other visualisations. The outputs will help the stakeholders to find qualified settlements for further (re-)developments.

3.3 Politicians, decision makers and municipalities

Politicians, decision makers, municipalities and other authorities at the local level are responsible for zone planning, quantitative targets in settlement development and other formal determinations. They also have to be aware of mobility effects to make sustainable decisions.

Another important group, in addition to the the main target group, includes banks and building societies, housing subsidy institutions, investors and others.

For this target group it is most efficient to develop “soft” tools like

- governance and cooperation strategies
- consulting material
- workshops and seminars

The most important aim for this target group is to provide complicated information in an easily understandable form and to give effective recommendations and instruction for sustainable development.

3.4 Tool practicability and enhancements

By this means private households as well as municipalities/political stakeholders are able to fulfil their current needs. Nevertheless an examination of the current status quo will not solve future issues. Therefore sustainable long-term strategic planning needs to take possible future scenarios into account.

For this reason so-called stress tests will be simulated within the Munich Metropolitan Region combining a mobility cost calculator with a GIS-based accessibility instrument. In the near future sharp increases of mobility costs due to the scarcity of fossil fuels are expected. Therefore simulating drastic future scenarios is a must in order to test the resilience of sub-regions as well as of individuals and households. By means of the vulnerability assessment methodology, several stress tests including different shock scenarios (e. g. triple of gas prices, budget of emission…) will be simulated within the case study.

4 MUNICH CASE STUDY

For the region of Munich the described tools have already been developed and are used in planning practice. Therefore the Munich Region will be highlighted as a case study in the following chapter. The data that will be displayed originated either from the models itself or from the Bavarian statistical database.

4.1 Stress tests on a municipal scale: methodology and first results

To see which region is in danger of increasing mobility costs a so-called vulnerability assessment has been performed for each municipality in the Region Munich.

Kelly and Adger (2000) defined the concept of vulnerability as "the ability or inability of individuals or social groupings to respond to, in the sense of cope with, recover from or adapt to, any external stress placed on their livelihoods and well-being"; while Kasperson et al. (2006) stated that vulnerability refers to "the degree to which a person, system, or unit (such as a human group or place) is likely to experience harm due to exposure to perturbations or stresses".

The vulnerability assessment is divided into the following three dimensions (Kasperson et al. (2006):

- Exposure is the contact between system and stress.
- Sensitivity is the degree to which something/someone is affected by exposure to stress.
- Resilience is the ability of something/someone to absorb perturbations or stresses without changes in its fundamental structure or function that would drive it into different state).

Measuring vulnerability is a crucial issue. As underlined by Leary and Beresford (2007) "… because vulnerability is a complex, multi-dimensional concept that is not directly observable, researchers have experimented with a variety of methods to develop proxy indicators".

The following maps show a selection of key indicators for measuring different levels of exposure, sensitivity and resilience.

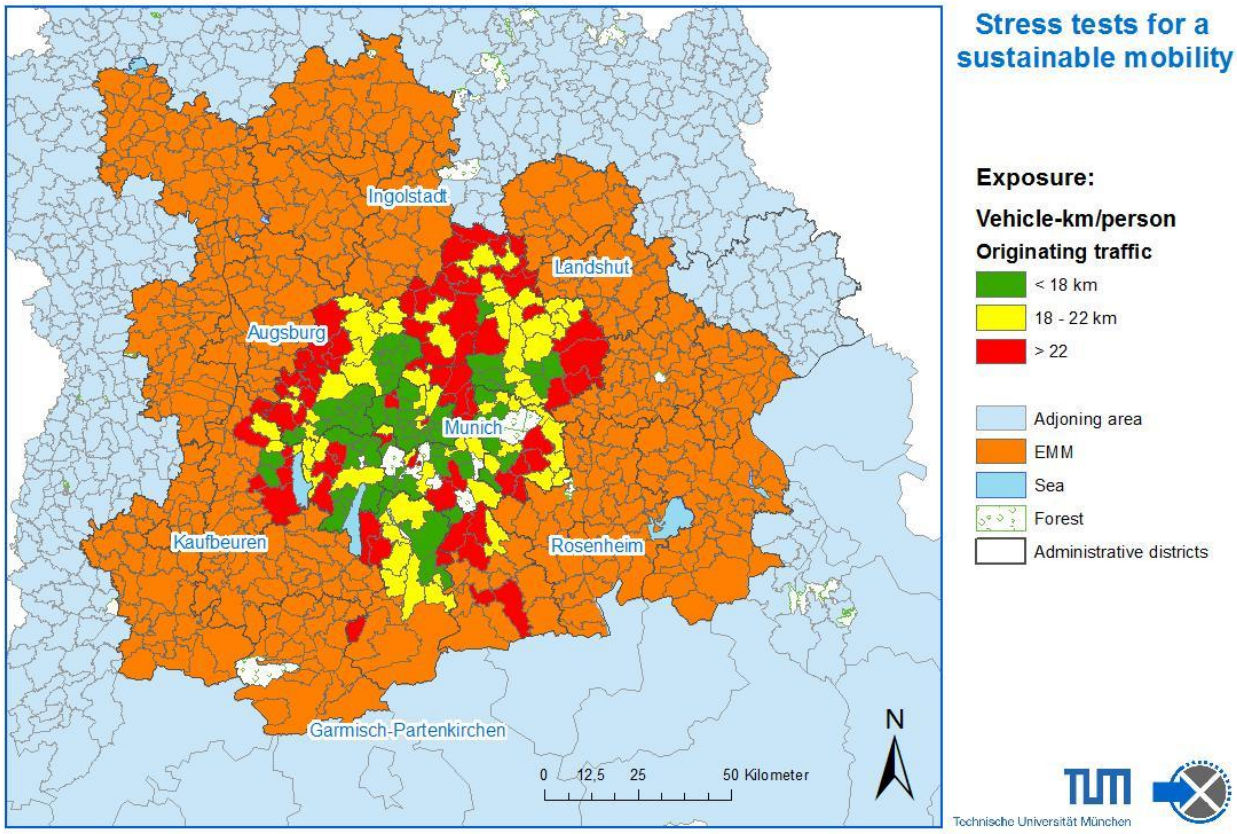

Figure 4: Exposure indicator: Average driven vehicle-km per capita for the municipalities within the Munich Region

The red municipalities have an average driven vehicle-km per capita of more than 22 kilometres daily. Hence these regions are very car dependent and are highly exposed to a sharp increase in fuel costs.

Other possible indicators for exposure are for instance car ownership rate or commuting distance.

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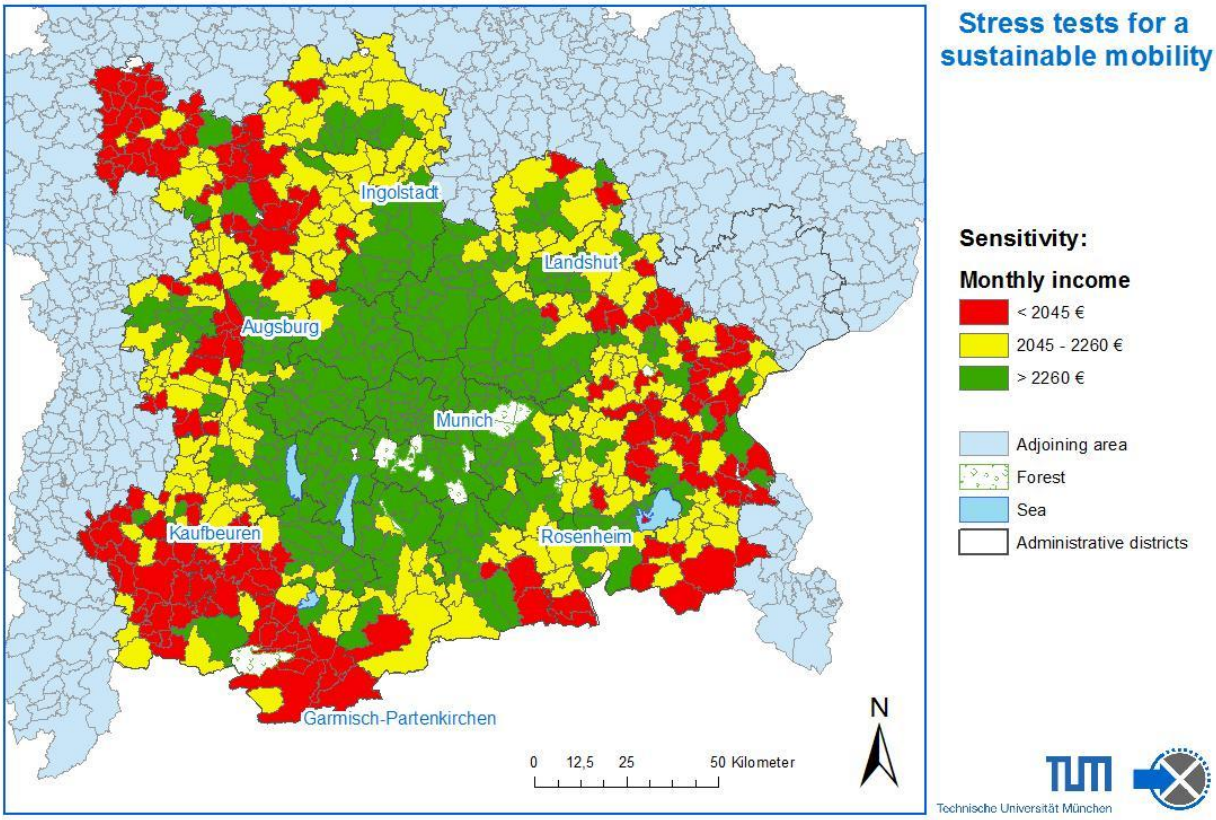

Figure 5: Sensitivity indicator: Monthly average income for each municipality within the Munich Metropolitan Region

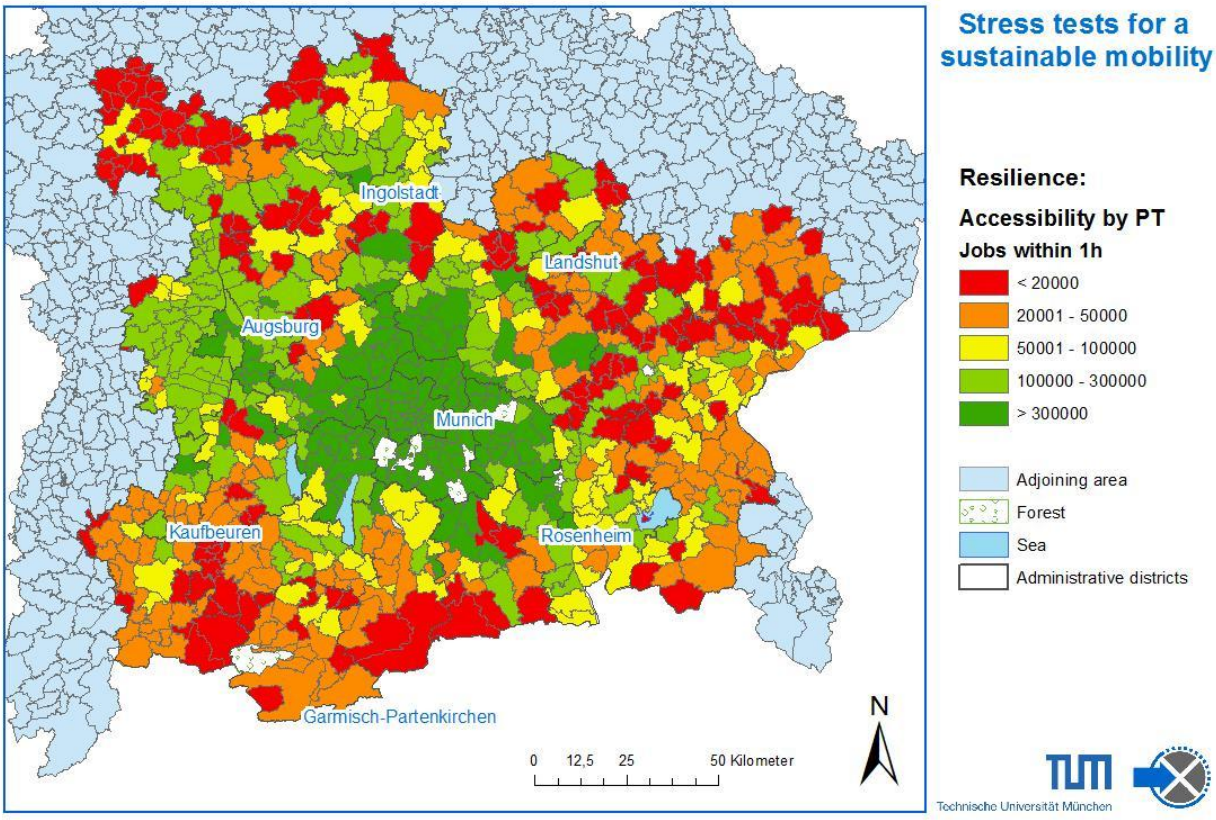

Figure 6: Resilience indicator: Accessibility of the number of jobs by public transportation for each municipality within the Munich Metropolitan Region

The average monthly income is visualized for the Munich Metropolitan Region. In the red municipalities the average income is below 2045 €. Most of them are located in rural locations. The southern regions are close to the Alps and increasing mobility costs will hit the inhabitants in the rural regions very hard; in many cases alternative modes of transport are lacking and therefore their resilience is quite low (see Figure 6).

Other possible indicators for sensitivity are for instance unemployment rate or the share of mobility costs on the household budget.

Figure 1 shows the accessibility of jobs by public transportation for the Munich Metropolitan Region. From the red municipalities less than 20000 jobs can be accessed by public transportation within one hour. Combing accessibility for public transportation with activities (e. g. jobs) will give an idea about need for improvement in the affected regions. Different sorts of accessibility indicators can and should be used for a wide range of thematic analyses.

Other possible indicators for resilience are for instance alternative locations/activities, modes and strategies (e. g. carpooling).

A combination of different indicators for the three dimensions is needed to complete the vulnerability assessment. Nevertheless an examination of the current status quo will not solve future issues. Therefore sustainable long-term strategic planning needs to take possible future scenarios into account. For this reason so-called stress tests will be simulated within the Metropolitan Region Munich combining a mobility cost calculator with a GIS-based accessibility instrument. In the near future sharp increases of mobility costs due to the scarcity of fossil fuels are expected. Therefore simulating drastic future scenarios is a must in order to test resilience of sub-regions as well as of the individuals and households. By the means of the vulnerability assessment methodology several stress tests including different shock scenarios (e. g. triple of gas prices, budget of emission…) will be simulated within the case study.

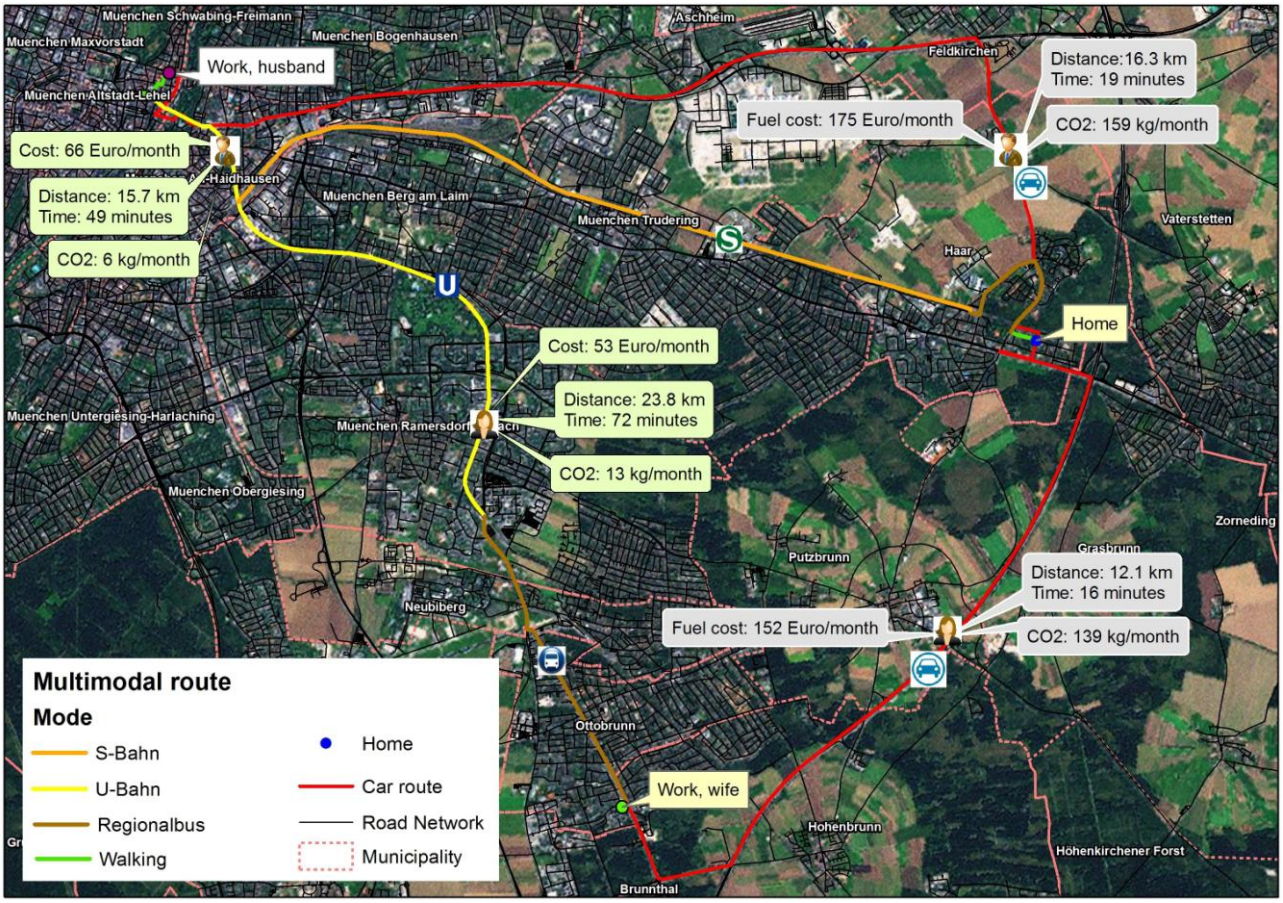

Figure 7: Current mobility costs for trip purpose working in the suburban municipality “Haar” with good access to public transport

4.2 Calculating mobility costs for households

The vulnerability assessment on a regional scale is important to stress test the municipalities regarding the future development. Nevertheless it is of high importance to include site and mobility decisions by

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individuals and households, which cannot be highlighted in average numbers for each municipality. Wilbanks and Kates (1999) state that research on multiple scales (e. g. household and municipality) is needed.

With respect to this matter, fictional yet realistic storylines for synthetic households (based on regional data and survey) have been developed by the means of a residential and mobility cost calculator provided by the Munich Transport and Tariff Association (MVV). For three different settlement structures including a compact urban city, a suburban municipality and a rural municipality the different mobility behaviours have been analysed and the current costs for individuals and households have been calculated.

Figure 4 visualizes the route choices for different modes of transport for the suburban municipality Haar to the place of employment. The exemplary household consists of a wife and a husband; both of them are travelling to work each day. Other household members and activities like a son doing sports and going to school are included. The travel time, mobility costs as well as CO_2 emissions are calculated for each trip. In that way different activities for different members of the household are calculated, visualized and tested for their respective sustainability. Afterwards these numbers are listed and compared, and they provide guidance for improving the mobility behaviour.

5 CONCLUSION AND OUTLOOK

Visualizing the current and the even more important future costs exposes the high importance of the location choice (residential and activity based) and mode choice; this will ultimately help households and decision makers to lead to more sustainable short and long term choices. The MOR€CO tools in combination with stress testing the study regions concerning price shocks will ultimately lead to a more sustainable way of transport and spatial planning in the Alpine Space Area.

If all future project steps will be successfully finished, the project serves the needs from growing and from shrinking structures in the Alpine Space Region as well as support transnational cooperation.

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Multi-Channel-Konzepte als Chance für eine nachhaltige und zukunftsfähige Entwicklung der Innenstädte?

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1 KURZFASSUNG

Einzelhandel und die Entwicklung der Innenstädte stehen in den Städten seit jeher in einem besonderen Verhältnis. Als eine Leitfunktion der Innenstadt trägt der Einzelhandel neben der Versorgungsfunktion maßgeblich zur Zentrumsbildung, Stadtgestaltung sowie Urbanität und damit zur Attraktivität und dem Image der Innenstadt bei, wovon wiederrum innerstädtische Dienstleistungen und innerstädtisches Wohnen profitieren. Andererseits bieten die Innenstädte mit den Wohn-, Arbeits- und Freizeitfunktionen die notwendige Geschäftsgrundlage für den Einzelhandel.

In den vergangenen Jahren ist der Einkaufsstandort Innenstadt jedoch durch äußere Einflüsse verstärkt gefährdet. Neben der Konkurrenz durch die Ansiedlung großflächiger Einzelhandelsunternehmen und Shopping-Center auf der ‚Grünen Wiese' sowie der Eröffnung von ‚Factory Outlet Centern' besteht derzeit eine zunehmende Konkurrenz durch das Online-Shopping. Während sich der Interneteinkauf immenser Wachstumsraten erfreut, leidet der stationäre Einzelhandel in der Innenstadt vielerorts unter sinkender Nachfrage. Ursächlich dafür ist u.a. das veränderte Einkaufsverhalten. Vor dem Hintergrund zunehmender digitaler, vor allem mobiler, Endgeräte und der Nutzung des Online-Shopping wollen die Konsumenten heute möglichst bequem, schnell – das heißt in Echtzeit, ortsungebunden, günstig und ohne sich zum Kauf verpflichtet zu fühlen einkaufen. Diese Anforderungen kann der stationäre Einzelhandel alleine nur bedingt erfüllen.

In Reaktion auf diese Entwicklungen kombinieren daher immer mehr Einzelhändler ihr Ladengeschäft mit einem Online-Shop. Diese Multi-Channel-Konzepte können dazu beitragen, die Versorgungsinfrastruktur in der Innenstadt aufrecht zu erhalten, sind aber auch nicht frei von Risiken. Im günstigsten Fall stellen sie durch die Verknüpfung von stationärem und Online-Angebot ein attraktives Einkaufsangebot dar, welches zu einer zukunftsfähigen und nachhaltigen Entwicklung der Innenstadt beiträgt.

Ziel des Beitrags ist es, nach einer grundlegenden Betrachtung der gegenseitigen Bedeutung von stationärem Einzelhandel und Innenstadt, der aktuellen Situation des innerstädtischen Einzelhandels und den veränderten Anforderungen der Konsumenten, die Chancen von Multi-Channel-Konzepten zur Unterstützung einer nachhaltigen und zukunftsfähigen Entwicklung der Innenstadt zu durchleuchten.

2 WECHSELSEITIGE BEDEUTUNG VON STATIONÄREM EINZELHANDEL UND INNENSTADT

Einzelhandel und die Entwicklung der Innenstädte stehen seit jeher in einer großen wechselseitigen Beziehung. „Städte ohne funktionierenden Handel sind ebenso undenkbar, wie ein Handel ohne Städte mit einer entsprechenden Wohn- und Lebensqualität sowie Infrastruktur" (Steinebach 2002: 45).

2.1 Die Bedeutung des stationären Einzelhandels für die Innenstadt

Rückblickend auf die Zeit des frühen Mittelalters – in jener Zeit bildete sich der Handel als dauerhafter und regelmäßiger Austausch von Waren und Dienstleistungen an einem Standort heraus – kam dem Handel vor allem eine Versorgungs- und Stadtgründungsfunktion zu, da das Marktrecht Voraussetzung für das spätere Stadtrecht war. Der Handel war demnach wesentlich für die Entwicklung der (Innen-)Städte. Ursprünglich auf den Marktplatz beschränkt, dehnte sich der Handelsraum im Laufe der Jahrhunderte weiter aus. Heute hat sich die gesamte Innenstadt als Zentrum des Einkaufens etabliert. Dies wirkt sich in vielfältiger Weise auf die Innenstadt aus:

Als eine Leitfunktion der Innenstadt weist der innerstädtische Einzelhandel eine „besondere zentrumsbildende Magnetfunktion" (Heinritz et al. 2003: 201) auf. Bei entsprechender Qualität und Angebotsvielfalt und daraus resultierenden Attraktivität wirkt er sich positiv auf die Frequentierung und damit die Belebung der Innenstadt aus, welche wiederum für die urbane Qualität von Bedeutung ist, die das

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Wesen einer Stadt ausmacht. Der Einzelhandel ist folglich ein wesentlicher Garant für den Charakter, die Bedeutung und das Image der Innenstadt. Davon profitieren auch die anderen innerstädtischen Leitfunktionen wie Dienstleistungen, Gastronomie und Wohnen.

Daneben prägt der innerstädtische Einzelhandel die Baustruktur und damit das Stadtbild. „Seit der Antike waren Handelsbauten auch immer repräsentative Bauten, die eine besondere Stellung in der Stadt einnahmen (Mayer-Dukart 2010: 50).“ Heute mischen sich kleinteilige Ladenlokale mit den dominanten Bauten von Passagen, Markthallen, Warenhäusern und Stadtgalerien. Letztere lösen die seit einigen Jahren von Insolvenz und Umsatzeinbrüchen betroffenen Warenhäuser zunehmend als Frequenzbringer ab. So werden leerstehende Warenhäuser neben der Umnutzung als Hotels, Museen, Verwaltungsgebäude oder Loftwohnungen immer öfter in Einkaufsgalerien umgewandelt oder ausgebaut (Köhler 2010). Wesentlichen Anteil an der Vielfalt der Handelsbauten haben die verschiedenen Nutzungen und die veränderten Anforderungen der Konsumenten (Walzel et al. 2011: 481) (s. Kap. 3.2).

Abschließend sei die soziale Funktion des innerstädtischen Einzelhandels für die Innenstadt genannt. Zum einen als Arbeitgeber und zum anderen als Treffpunkt und Ort der Kommunikation. Er bringt Menschen zusammen, da viele Besucher das Einkaufen in der Innenstadt mit anderen Terminen verknüpfen, sich zum gemeinsamen Shopping verabreden oder ohne Kaufabsicht Bummeln gehen und dabei auf Fremde und Bekannte treffen.

2.2 Die Bedeutung der Innenstadt für den stationären Einzelhandel

Neben der großen Bedeutung des stationären Einzelhandels für die Innenstadt profitiert andererseits der stationäre Einzelhandel bis heute von der Innenstadt. Historisch boten die dauerhaften und regelmäßigen Marktsiedlungen des frühen Mittelalters, aus denen viele der heutigen Städte hervorgingen, mehrere Vorteile. Durch die starke Abgrenzung von Stadt und Umland durch Befestigungsanlagen der Städte wie Stadtmauer und Stadtgraben waren nicht nur die Bewohner, sondern auch die Händler vor Plünderungen geschützt. Die räumliche Trennung hatte jedoch nicht nur eine schützende Wirkung, sondern führte auch zu einem Abhängigkeitsverhältnis, welches eine Kooperation der Stadt- und Landbewohner erforderte. Während die Stadt vom Umland Nahrung und Rohstoffe bezog, versorgte sie andersherum das Umland mit handwerklichen Erzeugnissen und Dienstleistungen. Daher kamen die Kunden nicht nur aus den Städten selbst, sondern vor allem aus dem Umland, ein großer Absatzmarkt für die Händler war damit gegeben. Überdies stellte die Versorgung mit Informationen einen großen Standortvorteil für die Händler dar. Vor dem Einsatz von modernen Informations- und Kommunikationstechnologien konnten Neuigkeiten auf dem Marktplatz am schnellsten in Erfahrung gebracht werden (Wietzel 2007: 23f.). Ein zusätzlicher zeitlicher Vorteil für die Händler waren die kurzen Transportwege, da sich die Produktionsbetriebe in unmittelbarer Nähe zum Marktplatz niederlassen konnten.

Auch aktuell bieten die Innenstädte eine wesentliche Geschäftsgrundlage für den Einzelhandel. Ihre Attraktivität resultiert dabei vor allem aus der großen Multifunktionalität und Nutzungsmischung, welche mit Einschränkungen in den meisten Innenstädten vorhanden ist. Die Wohn-, Arbeits- und Freizeitfunktionen tragen zu einer hohen Aufenthaltsqualität bei, ermöglichen die Verknüpfung von Einkäufen mit anderen Tätigkeiten, welche vor dem Hintergrund des knapper werdenden subjektiven Zeitbudgets immer wichtiger wird, und erhöhen somit die Frequentierung der Innenstadt und folglich auch der Ladengeschäfte. Allerdings ist die Innenstadt als Einkaufsstandort in Folge des ökonomischen Strukturwandels zunehmend gefährdet.

3 AKTUELLE SITUATION UND HERAUSFORDERUNGEN FÜR DEN INNERSTÄDTISCHEN EINZELHANDEL

3.1 Gegenwärtige Entwicklungen im innerstädtischen Einzelhandel

Der innerstädtische Einzelhandel befindet sich seit vielen Jahren in einem ökonomischen Strukturwandel, der auf handelsexogene und handelsendogene Faktoren zurückzuführen ist (Heinritz et al. 2003: 40ff.). Die Veränderung der Nachfrage stellt neben den allgemeinen politischen und wirtschaftlichen Rahmenbedingungen sowie politisch-administrativen Entscheidungen eine der wichtigsten handelsexogenen Ursachen des Strukturwandels im Einzelhandel dar und ergibt sich u.a. aus den veränderten Anforderungen der Konsumenten an das Einkaufen. Diese veränderten Konsumentenanforderungen werden, auch weil Multi-Channel Konzepte im Wesentlichen auf diese zurückgehen und in Kapitel 4 als mögliche Chance für

die Innenstädte thematisiert werden, in Kapitel 3.2 detaillierter behandelt. Zu den wichtigsten handelsendogenen Einflüssen, d.h. internen Veränderungen, zählen die kapitalbedingte Selektionswirkung bei der Umsetzung von Innovationen, da diese meist sehr kostenintensiv sind, der verschärfte Wettbwerbs- und Preisdruck infolge der Kapitalkonzentration und Internationalisierung sowie die Nachfragemacht der Großunternehmen (Heinritz et al. 2003: 42; Mayer-Dukart 2010: 59).

Vor dem Hintergrund der beschriebenen Einflussfaktoren stellt sich die Situation des innerstädtischen Einzelhandels derzeit wie folgt dar:

Zunehemende Konkurrenz

Der innerstädtische Einzelhandel ist in den vergangenen Jahrzehnten einer verstärkten Konkurrenz ausgesetzt. Auf der ‚Grünen Wiese' haben sich konkurrierende Handelsstandorte wie ‚Factory Outlet Center', Shopping-Center und Fachmarktzentren herausgebildet und auch das Online-Shopping etabliert sich zunehmend. In Konsequenz sind innerstädtische Geschäfte mit reiner Versorgungsfunktion immer seltener vertreten, während der Erlebniseinzelhandel dominiert (Fahle et al. 2008: 71).

Filialisierung – Verdrängung inhabergeführten Einzelhandels

Der kleinteilige, inhabergeführte Einzelhandel wird aufgrund seiner mangelnden Konkurrenzfähigkeit gegenüber den Filialisten zunehmend in die abgewerteten Nebenlagen der Innenstädte verdrängt und ist immer häufiger zur Geschäftsaufgabe gezwungen. So ist heute die Mehrheit der deutschen Innenstädte von Filialisten geprägt. Dies führt einerseits zu einer zunehmenden Fremdbestimmtheit, zu einer Uniformität des Stadtbildes sowie zu Niveauverlusten durch die Banalisierung, Vereinheitlichung und Verflachung des Angebots, die sich in einem sinkenden Erlebniswert und Qualitätsverlust niederschlägt (Fahle et al. 2008: 65ff; Heinritz et al. 2003: 44; Kiepe/ Thielen 2011: 7). Andererseits tragen die Filialisten jedoch über ihren positiven Wiedererkennungswert und Funktion als Ankermieter zu einer Belebung der Innenstadt bei (Fahle et al. 2008: 65).

Zunehmende Leerstände vor allem in Nebenlagen

Innerstädtische Leerstände sind aufgrund von strukturellen Veränderungen als auch individuellen Standortfaktoren wie überzogenen Mietpreissteigerungen „schon lange nicht mehr ein vereinzeltes, sondern ein alle Stadtgrößen und Standorte betreffendes Problem" (Mandac 2011: 11). Vor allem die Nebenlagen erfahren eine zunehmende Abwertung, da sich die Filialisten auf die 1A-Lagen konzentrieren (Bundesministerium für Verkehr 2011: 35), aber auch gut gelegene Ladenlokale sind in den vergangenen Jahren zunehmend von Leerstand bedroht. Je länger und je mehr Ladenlokale leerstehen desto schwerwiegender sind die Folgen. Der Branchenmix und das Image, welche die Attraktivität des Einkaufsangebots und damit auch der Innenstadt garantieren, werden nachhaltig gestört, ganze Straßenzüge veröden, da auch benachbarte Ladenlokale hinsichtlich Frequentierung und Umsatz beeinträchtigt werden und das soziale Leben in den Innenstädten verändert sich, weil die von Leerstand betroffenen Straßen deutlich seltener besucht und auch hinsichtlich Gestaltung und Sauberkeit vernachlässigt werden (Mandac 2011: 11; Bormann/ Siegel 2007: 28; Kippig 2004).

Verkaufsflächenwachstum

Ungeachtet sinkender Umsätze und des demographischen Wandels haben die Anteile der Verkaufsflächen im innerstädtischen Einzelhandel in den vergangenen Jahren massiv zugenommen; von 55 Prozent 1990 auf 63 Prozent im Jahr 2010 (Handelsverband Deutschland (HDE) 2010). Die wesentlichen Gründe für das Anwachsen der Verkaufsflächen sind die Einführung der Selbstbedienung, die Erweiterung des Sortiments (Heinritz et al. 2003: 43), rückläufige Betriebszahlen sowie die generelle Marktsättigung, die dazu führt, dass eine immer weitere Vergrößerung der Verkaufsflächen in Verbindung mit einem massiven Preiswettbewerb als einziger Ausweg gesehen wird Konkurrenten vom Markt zu drängen und dadurch die eigenen Umsätze wieder zu steigern (Bormann/ Siegel 2007: 5). Für die Innenstädte ist die Nachfrage nach größeren Verkaufsflächen insofern problematisch, als dass sie vor dem Hintergrund ihrer historischen Struktur der Gebäude oftmals lediglich über sehr kleine Verkaufsflächen verfügen und damit nur eingeschränkt konkurrenzfähig sind.

„Gastrofizierung“

In vielen Innenstädten ist seit einigen Jahren ein stetiger Zuwachs an Gastronomieeinrichtungen zu beobachten. Diese ‚Gastrofizierung‘ resultiert zum Einen aus der Verlagerung des Einkaufs lebensnotwendiger Güter auf die Grüne Wiese, während die Innenstadt eher für den meist spontan stattfindenden ‚Kann-Kauf‘ vor dem Hintergrund des Trends zum Erlebnisshopping (s. Kap. 3.2.1) genutzt wird, der ein entsprechend ansprechendes Umfeld benötigt. Zum Anderen ist die zunehmend älter werdende, gesättigte Bevölkerung weniger am Erwerb von Waren als an einem geselligem Beisammensein in der Innenstadt interessiert. In Konsequenz auf diese Entwicklungen haben nicht nur die gastronomischen Angebote in der Innenstadt selbst, sondern insbesondere die Außenbestuhlung stark zugenommen sowie die Einkaufcenter ihre Gastronomieanteile von ehemals fünf Prozent in den zweistelligen Bereich erhöht. Dies wirkt sich auch auf den innerstädtischen Einzelhandel aus, da der Passantenlauf von den Ladenlokalen weggeführt wird und somit die Kundenfrequenz in den Geschäften sinkt (Domino Immobilien Dienstleistungen GmbH 2011).

Gutes Komsumklima trotz stagnierender Kaufkraft

Nach einem stetigen Rückgang der Kaufkraft seit den 1950er Jahren, werden die Deutschen 2012 erstmals wieder mehr Euro pro Kopf für ihre Ausgaben zur Verfügung haben. Aufgrund der steigenden Preise – die Bundesbank prognostiziert derzeit eine Inflation von 1,8 Prozent – wird die reale Kaufkraft jedoch stagnieren (Lindcom Group 2011; Lichtner 2011). Dennoch ist das Konsumklima insbesondere auch vor dem Hintergrund der derzeitigen Finanz- und Wirtschaftskrise wiedererwartend gut; der Konsumklimaindex ist im Februar angestiegen (SPIEGEL online 2012). Damit steigen auch die Wachstumschancen für den Einzelhandel, ob der innerstädtische Einzelhandel profitiert bleibt abzuwarten.

Sinkende Umsätze

Die Umsätze im Einzelhandel sind seit Jahren rückläufig. Auch wenn sich seit dem vergangenen Jahr mit dem größten Umsatzanstieg seit der Wiedervereinigung eine Trendwende andeutet, zählt der innerstädtische Einzelhandel nicht zu den Profiteuren. Er büßte in der vergangenen Dekade jährlich etwa 1,5 Mrd. Euro Umsatz ein mit der Folge dass die Besucherfrequenzen vielerorts rückläufig sind (Mandac 2011: 10). Besonders erfolgreich war hingegen der Online-Handel; von 2000 bis 2010 wuchs sein Umsatz um über 1000 Prozent (Handelsverband Deutschland (HDE) 2011).

3.2 Anforderungen der Konsumenten an das Einkaufen

Die Anforderungen der Konsumenten an das Einkaufen, welche im Wesentlichen für die Veränderung der Nachfrage verantwortlich sind, haben sich deutlich verändert. Ursächlich dafür ist die Kombination aus sich wandelndenen demographischen und sozioökonomischen Rahmenbedingungen, dem Wertewandel, der zunehmenden Polarisierung zwischen armen und reichen Bevölkerungsschichten, Einflüssen der Einzelhandelsunternehmen sowie dem technologischen Wandel.

Die veränderten Anforderungen der Konsumenten schlagen sich in drei zentralen Trends im Konsumverhalten nieder; dem Erlebnisshopping, dem Convenience Shopping und dem Preiskauf, welche nachfolgend näher erläutert werden. Weiter ausdifferenziert und dynamisiert werden die Konsumtrends durch die zunehmende Nutzung digitaler Medien (Hassenpflug/ Tegeder 2004: 88f.) (s. Kap. 3.3).

<u>Erlebnisshopping</u>

Das Hauptmerkmal des Erlebnisshopping, welches vor allem auf den Wertewandel zurückgeht, ist, dass „nicht die Bedarfsdeckung mit lebensnotwendigen Gütern, sondern der Vergnügungs- und Freizeitaspekt im Vordergrund“ stehen (Mayer-Dukart 2010: 58). Dies färbt auch auf den Sprachgebrauch ab. Sowohl im allgemeinen Sprachgebrauch als auch in der Literatur lässt sich zunehmend die begriffliche Differenzierung zwischen dem klassischen ‚Einkaufen‘ als reinem Akt der Versorgung mit Waren und Dienstleistungen sowie dem ‚Shopping‘ als dem Erwerb von Waren und Dienstleistungen als Freizeitbeschäftigung beobachten. Kennzeichnend für das Erlebnisshopping ist weiterhin die Verknüpfung des Einkaufens mit weiteren Tätigkeiten, wie einem Gastronomiebesuch und dem Treffen von Freunden, welche auch vor dem Hintergrund des knapper werdenden subjektiven Zeitbudgets erfolgt (Wirtz 2008: 48).

Damit das Einkaufen zum Vergnügen und Freizeiterlebnis werden kann, sind ein guter Branchenmix und eine hohe Beratungsqualität wesentliche Voraussetzungen (Planungsverband Ballungsraum Frankfurt/Rhein-

Main 2011: 4). In Konsequenz bietet der Einzelhandel besondere Serviceangebote wie spezielle (kulturelle) Events, Gewinnspiele und Autogrammstunden an. Weitere Maßnahmen des Einzelhandels und der Planung, um auf die Erlebnisorientierung der Verbraucher zu reagieren, sind die Schaffung von Erlebniswelten, beispielsweise durch die Integration von Erlebnisparzellen in die Verkaufsräume sowie die Aufwertung der Fußgängerzonen (Fritz/ Lang 2008: F.46; Mayer-Dukart 2010: 58). Diese Maßnahmen sollen zu einer Belebung der Innenstädte auch außerhalb der Ladenöffnungszeiten beitragen. Die Ausrichtung des Einzelhandels auf Erlebnisorientierung scheint sich zu rechnen. Mehrere Studien bestätigen, dass Erlebnisse, Emotionen und Atmosphäre den Umsatz und die Kauffreude der Verbraucher erhöhen (Kroeber-Riel/ Weinberg 2003: 436ff.).

Als Angebotsformen für das Erlebnisshopping eignen sich insbesondere innerstädtische oder innenstadtnahe Galerien und Passagen, Megastores, Themenkaufhäuser, Einkaufszentren sowie Urban Entertainment Center (Planungsverband Ballungsraum Frankfurt/Rhein-Main 2011: 3). Demnach können Innenstädte wesentlich mehr vom Trend zum Erlebnisshopping profitieren als der ansonsten boomende Online-Handel.

Convenience Shopping

Ein weiterer, sich aus den demographischen und sozioökonomischen Rahmenbedingungen ergebender Trend im Konsumverhalten ist das Convenience Shopping. So werden vor dem Hintergrund der zunehmenden Überalterung der Bevölkerung, der wachsenden Anzahl an Single-Haushalten, der vermehrten Erwerbstätigkeit von Frauen sowie des subjektiven Eindrucks der Zeitknappheit durch berufliche und private Verpflichtungen, verstärkt Convenience-Angebotsformen nachgefragt, welche zu Bequemlichkeit und Zeiteffizienz beitragen (Mayer-Dukart 2010: 57; Wirtz 2008: 48; Planungsverband Ballungsraum Frankfurt/Rhein-Main 2011: 4). Typische Angebotsformen sind Kioske, Trinkhallen, Tankstellenshops und Bahnhofsmärkte, die sich bevorzugt in Transiträumen an Verkehrsknotenpunkten befinden, sowie indirekt auch Online-Shops. Sie zeichnen sich, mit Ausnahme der Online-Shops, durch eine wohnungsnahe Lage und damit gute Erreichbarkeit, verlängerte Öffnungszeiten, ein übersichtliches Angebot, welches insbesondere älteren Menschen zugutekommt, und die Möglichkeit des ‚One-stop-shopping' aus. Letzteres bedeutet, dass mehrere Tätigkeiten bzw. Konsumwünsche kombiniert werden können, wie zum Beispiel der Erwerb einer Zugfahrkarte mit dem Kauf einer Zeitschrift in der Bahnhofsvorhalle. Von Vorteil sind ferner der persönliche Kontakt sowie die Beratung und die Bedienung, welche an frühere Vertriebsformen wie den Tante-Emma-Laden angelehnt sind (Fritz/ Lang 2008: 42; Mayer-Dukart 2010: 57; Ahlert/ Hesse 2003: 5). Vor dem Hintergrund der gewünschten Entlastung beim Einkaufen werden zudem besondere Serviceangebote, wie Bring- und Abholservices, Kinderbetreuung und Online-Dienste, angeboten. Dieses Mehr an Service spiegelt sich im vergleichsweise hohen Preisniveau gegenüber anderen Einkaufsmöglichkeiten wieder. Dennoch ist gemäß HEINRITZ widererwartend kein Zusammenhang zwischen dem Haushaltseinkommen und der Convenience-Orientierung feststellbar (Heinritz et al. 2003: 160ff.).

Preiskauf

Der Preiskauf gliedert sich in zwei Verhaltensformen; das Discount Shopping und das Smart Shopping. Beide Ausprägungen gehen auf den Wertewandel zurück, das Discount Shopping ist zusätzlich Folge der Einkommensentwicklung. Discount Shopping bedeutet, dass die Verbraucher eine hohe Preisorientierung aufweisen und bevorzugt bei discoutorientierten Betriebsformen einkaufen, in denen „Konsumgüter des Massenabsatzes bei einfacher Ladenausstattung zu günstigen Preisen angeboten werden" (Ausschuss für Definitionen zu Handel und Distribution 2006: 31). Die Niedrigpreisorientierung spiegelt sich vor allem an den Ausgaben für Lebensmittel am privaten Verbrauch wieder. Innerhalb von knapp 60 Jahren haben sich diese von 44 Prozent (1950) auf 11 Prozent (2009) verringert (Frankfurter Rundschau online n.b.). Zu den Konsequenzen dieser als ‚Aldisierung bzw. Discountierung der Gesellschaft' (Horx 1995; Fritz/ Lang 2008: 38) beschriebenen Entwicklung zählt insbesondere die wachsende Verödung der Innenstädte (Fritz/ Lang 2008: 39).

Der Trend zum Smart Shopping, der sich mittlerweile zu einem regelrechten Lifestyle entwickelt hat, ist seit Mitte der 1990er Jahre zu beobachten (Heinritz et al. 2003: 156). Wesentlich, neben einer wachsenden Qualitätsorientierung, ist auch hier eine starke Niedrigpreisorientierung, die jedoch unabhängig von der sozialen Schicht und dem Einkommen auftritt (Ausschuss für Definitionen zu Handel und Distribution 2006) und aus einem steigenden Anspruchsniveau sowie einer wachsenden Professionalität und gestiegenem

Selbstbewusstsein der Verbraucher resultiert (Pangels 2011). Viele Konsumenten agieren dabei nach dem Motto ‚weniger ist mehr'. D.h. sie kaufen insgesamt weniger, legen dafür aber umso mehr Wert auf Qualität.

Eine Handelsform die dem Trend des Smart Shopping besonders entgegen kommt, ist das Factory Outlet Center, welches seine Attraktivität aus der Kombination von Discount-Preisen und hohem Erlebniswert generiert (Blank 2004). Auch die Teilnahme an Internetauktionen und die Nutzung von Coupons, Bonus- und Kundenkarten, welche auch die innerstädtischen Einzelhändler zunehmend einsetzen, sind Ausdruck des smarten Kaufverhaltens (Mayer-Dukart 2010: 57).

3.3 Einfluss digitaler Medien

Durch die zunehmende Nutzung digitaler Medien, wie Internet, Mobiltelefon und E-Book, und die Möglichkeit des Online-Shopping werden die beschriebenen Trends weiter ausdifferenziert und dynamisiert und damit schwieriger handhabbar. Nachfolgend werden die wesentlichen Einflüsse auf das Einkaufsverhalten im Einzelnen dargestellt.

Adaption des Online-Verhaltens auf den Einkauf im stationären Einzelhandel

Verbraucher, die regelmäßig im Internet konsumieren, gewöhnen sich allmählich an die Schnelllebigkeit und ständigen Neuerungen sowie die ausgeprägte Service- und Convenienceorientierung und erwarten diese auch im stationären Einzelhandel (Tegeder 2004: 114). Die Bereitschaft, für zusätzlichen Service und Beratung höhere Preise zu akzeptieren ist allerdings weniger ausgeprägt. Da der stationäre Einzelhandel zusätzlichen Service und Beratung zudem bei weitem nicht so kostengünstig anbieten kann wie der Online-Handel, ist er nur eingeschränkt konkurrenzfähig.

Durch die zunehmende Nutzung von Medien, die zu einem beschleunigten Zugang zu Informationen und einer Vereinfachung der Kommunikation beitragen, werden die Kunden „sprunghafter, spontaner und in ihrem Kaufverhalten immer weniger vorhersehbar. Damit wird die Prognostizierbarkeit der Nachfrage immer schwieriger" (Neidberger 2011: 619f.). Diese Entwicklung wird häufig im Begriff ‚Multioptionales Kaufverhalten' zusammengefasst. Ausdruck dieses Verhaltens sind das ‚Varity Seeking' und das ‚Channel Hopping'. Variety Seeking steht für das Bedürfnis von Kunden nach Abwechslung. Das Verhalten zielt darauf ab „reizmonotone Situationen, also Zustände zu geringer Abwechslung bzw. Langeweile, durch Reizvariationen, also aktive Suche nach neuen Reizen bzw. Reizwechsel, auszugleichen" (Schramm-Klein 2003: 39f.). Es stellt folglich ein starkes Motiv dar verschiedene Produktmarken und Einkaufsorte zu nutzen (Wirtz 2008: 47). Das Channel-Hopping, der kundenseitige Kanalwechsel innerhalb einzelner Transaktionen, eignet sich besonders gut, um dem Bedürfnis nach Abwechslung gerecht zu werden (Ahlert/ Hesse 2003: 11f.). Im Vordergrund steht dabei aktuell vor allem der Wechsel zwischen stationären Einzelhandelskanälen und internetbasierten Kanälen (Müller-Lankenau 2007: 47).

Fragmentierung des Einkaufvorgangs

Jeder Einkaufsvorgang setzt sich aus vielen Einzelelementen zusammen, die bei einem herkömmlichen Einkauf an einem Ort, dem Ladengeschäft, stattfinden. Dazu zählen: das Einkaufsbedürfnis bzw. der Einkaufswunsch, das Sammeln von Produktinformationen und Erfahrungen, die Auswahl und Kaufentscheidung, der Bezahlvorgang, der Erhalt des Artikels sowie die Rückgabe bei Nichtgefallen (Mokhtarian 2003: 213). Die Möglichkeit, sich im Internet zu informieren oder online einzukaufen verändert den Einkaufsvorgang. Es kommt zu einer „Fragmentierung früher ganzheitlicher Aktivitäten und eine neue Wiederverknüpfung (Rekombination) ihrer Einzelteile" (Mokhtarian 2003: 213).

Internetnutzer als Konsumexperten

Durch die wachsende Zugänglichkeit und Nutzung des Internets im privaten Bereich wird das Warenangebot zunehmend transparenter. Der Internetnutzer kann eigenständig nach Angeboten und Testberichten recherchieren und sich in Foren über einzelne Produkte und Angebote austauschen (Tegeder 2004: 113). Er ist folglich wesentlich umfassender über die Produktangebote des Handels informiert als früher. Das Internet macht Preis- und Qualitätsvergleiche dabei nicht nur einfacher und schneller, sondern auch kostengünstiger (Kromer 2005: 103).

Aufgrund der gestiegenen Informiertheit erlangen die Konsumenten einerseits eine wachsende Souveränität. In Verbindung mit dem seit dem Fall des Rabattgesetzes im Jahr 2001 erlaubten Feilschen im Einzelhandel,

kann zunehmend auf Augenhöhe mit den Anbietern der Waren und Dienstleistungen verhandel werden. Andererseits sind die Konsumenten durch ihren erweiterten Informationsstand auch wesentlich kritischer und den Anbietern gegenüber weniger loyal (Tegeder 2004: 121). Werden die Bedürfnisse nicht erfüllt, wird der Anbieter gewechselt.

Online-Shopping als Alternative

Neben der Übertragung des Online-Verhaltens auf den Einkauf im stationären Einezlhandel und der Nutzung des Internets als Informationsmedium für das Einkaufen, nutzen mehr und mehr Menschen die Möglichkeit direkt im Internet einzukaufen. „(…) shopping no longer needs to be a physical, time-consuming activity. The entire shopping process from product information search, communication and selection, transaction, delivery (of digital goods) to after sales can literally be conducted on the Internet" (Weltevreden/ van Rietbergen 2007: 68). Insgesamt 68 Prozent der Deutschen haben im Jahr 2010 Einkäufe über lokales oder mobiles Internet getätigt (Schneller 2010), wobei vor allem Bücher, Bekleidung, Veranstaltungstickets, Tonträger und Hotelübernachtungen nachgefragt wurden (Statista GmbH 2011). In Konsequenz wuchs der Umsatz im Online-Handel von 2000 bis 2010 um über 1000 Prozent, während der stationäre Einzelhandel im selben Zeitraum lediglich um 1,6 Prozent zulegte. Trotz dieser beeindruckenden Zuwächse liegt der Anteil des Online-Handels am gesamten Einzelhandelsumsatz bisher lediglich bei knapp fünf Prozent (Handelsverband Deutschland (HDE) 2011). Insbesondere die positiven Tendenzen beim mobilen Online-Shopping – jeder dritte Internetnutzer in Deutschland kaufte 2011 online per Smartphone ein, 2010 war es nur knapp jeder zehnte (Mohr/ Sauthoff-Bloch 2011: 20) – lassen jedoch erwarten, dass sich der Anteil in den nächsten Jahren weiter vergrößern wird.

Die Gründe für die zunehmende Beliebtheit des Online-Shopping sind vielfältig. Ein Grund ist zweifelsohne, dass Online-Shopping zwar weniger dem Erlebnisshopping-Trend jedoch sowohl dem Trend zum Convenience Shopping und als auch dem Trend zum Smart Shopping entspricht. Der Konsument kann anders als im stationären Einzelhandel, welcher häufig von uneinheitlichen Öffnungszeiten, schlechter Erreichbarkeit durch mangelnde Parkplätze bzw. ÖPNV-Angebote sowie der Verringerung von Breite und Tiefe des Angebotes durch Billiganbieter betroffen ist (Helmer-Denzel 2004: 26), bequem von jedem Ort und zu jeder Tageszeit zielgenau auf ein nahezu unbegrenztes und aktuelles Angebot an Waren und Dienstleistungen zurückgreifen. Der „Vorgang der Raumüberwindung [entfällt] für den Kunden völlig" (Becker 2000: 133). Die Zeit- und Wegeersparnis empfinden vor allem Frauen als bedeutsam, da „der E-Commerce (…) ein mögliches Mittel zur Alltagsbewältigung" (Lenz 2003: 73) darstellt. Auch der Nachfrage nach maximaler Qualität zum niedrigsten Preis wird das Internet durch seine umfassenden Vergleichsmöglichkeiten gerecht.

Als weitere Vorteile des Online-Shopping gegenüber dem stationären Einzelhandel werden die größere Angebots- und Preistransparenz, der geringere Einkaufsstress, Spontanität und Lebensgefühl sowie das Umgehen von unfreundlichem Verkaufspersonal genannt (Lenz 2003: 71; Heggmaier 2003: 102). Viele Konsumenten schätzen zudem den persönlichen Zuschnitt der Produkte und Dienstleistungen. MOKHTARIAN spricht in diesem Zusammenhang von einer „massenhaften Maßanfertigung" (Mokhtarian 2003: 209).

3.4 Herausforderungen für den innerstädtischen Einzelhandel

Wie vorausgehend dargestellt, fällt es dem innerstädtischen Einzelhandel infolge der gegenwärtigen Trends im Konsumverhalten sowie dem zunehmenden Einfluss digitaler Medien, die sich zudem als neuer Absatzkanal etablieren, immer schwerer, den Anforderungen der Konsumenten gerecht zu werden und somit für die breite Masse attraktiv zu bleiben. Viele, insbesondere alteingesessene, inhabergeführte Geschäfte tun sich aufgrund mangelnder digitaler Kompetenz, fehlender finanzieller Mittel sowie mangeldem Interesse an Neuerungen schwer, mit der notwendigen Flexibilität zu reagieren. Das häufig verfolgte Prinzip der Ignorierung bzw. Totalverweigerung gegenüber den durch die Digitalisierung ausgelösten Anforderungen ist jedoch wenig zielführend und beschleunigt den Trend zunehmender Geschäftsaufgaben, wachsender Leerstände und sinkender Umsätze vermutlich eher.

Ein hohes Zukunftspotenzial wird dagegen dem sogenannten ‚Multi-Channel-Retailing', d.h. der Verbindung mindestens eines ‚klassischen' Vertriebskanals, wie dem stationären Ladengeschäft, mit dem Internet-Vertriebskanal (van Baal/ Hudetz 2005: 139), unterstellt. Nach Meinung des HDE-Hauptgeschäftsführers

STEFAN GENTH werden die Multi-Channel-Retailer die weitere Entwicklung der Branche signifikant prägen. Insbesondere die Verknüpfung von innerstädtischen Ladenlokalen mit Online-Shops ist äußerst vielversprechend, weil dieselben Nutzergruppen angesprochen werden (Tegeder 2004: 117). So besteht gemäß einer niederländischen Studie eine signifikante Korrelation zwischen dem Genuss des Online-Shoppings und dem Einkaufen in der Innenstadt; je größer das Vergnügen am Online-Shopping ist, desto größer ist es auch beim Einkaufen in der Innenstadt (Weltevreden et al. 2004: 15).

15 Prozent der stationären Einzelhändler – wobei die Hälfte von ihnen mittelständische Facheinzelhändler sind – kombinieren bereits ihr Ladengeschäft mit einem Online-Shop (Handelsverband Deutschland (HDE) 2011). Vor allem diejenigen Branchen, „die einen hohen Anteil digitalisierbarer sowie standardisierter Güter und Dienstleistungen umfassen“ (Adrian 2003: 322) vertreiben ihre Waren verstärkt zusätzlich online. Insgesamt generierten Multichannel-Anbieter im Jahr 2010 ein Umsatzplus von 14,7 Prozent, d.h. das Umsatzvolumen stieg auf 6,7 Mrd. Euro und liegt damit über dem Online-Handels-Gesamtvolumen der Internet-Pure-Player (Schmidt 2011: 3). „Fast 60 Prozent der Einzelhändler, die neben ihrem Ladengeschäft auch einen Online-Shop betreiben, erwarten höhere Umsätze (Handelsverband Deutschland (HDE) 2011).“

Die wesentlichen Vorteile des Multi-Channel-Retailing liegen für die Einzelhändler in:

- Der Verbesserung der Wettbewerbsposition und Steigerung der Marktanteile,
- Umsatzsteigerungen durch von Multi-Channel-Retailing ausgelöste Zusatzkäufe,
- der Sicherung des stationären Ladengeschäfts,
- steigender Kundenzufriedenheit durch besseren Service,
- besseren Möglichkeiten der Kundenansprache,
- größerer Bekanntheit und besserem Image sowie
- der Möglichkeit der Verkaufs- und Lagerflächenverkleinerung.

Insgesamt können demgemäß viele Nachteile eines stationären Geschäfts gegenüber dem Online-Handel durch die Verknüpfung beider Kanäle aufgehoben werden, wenn gewisse Spielregeln beachtet werden. Dazu zählen die Ähnlichkeit zwischen den Absatzkanälen hinsichtlich der Gestaltung und des Warenangebots, eine möglichst optimale Verknüpfung von virtuellem und realem Geschäft sowie die Schaffung eines Mehrwerts für die Konsumenten.

Inwieweit sich das Multi-Channel-Retailing auch für die Innenstädte als Chance herausstellt, soll nachfolgend betrachtet werden.

4 MULTI-CHANNEL-KONZEPTE ALS CHANCE FÜR DIE INNENSTÄDTE?

Die innerstädtischen Einzelhändler können unter gewissen Voraussetzungen in vielfacher Hinsicht von dem Umstieg auf Multi-Channel-Konzepte profitieren (s. Kap. 3.4). Drei dieser Vorteile stellen zugleich eine Chance für die Innenstädte dar:

Sicherung der stationären Ladengeschäfte

Da die Umsätze, die über das Internet erzielt werden können, die Umsatzmöglichkeiten des stationären Einzelhandels häufig übersteigen, trägt der Online-Shop als zweiter Absatzkanal insbesondere bei kleinen und mittelständischen Unternehmen zur Sicherung des Ladengeschäfts bei (Sigge 2011). In Konsequenz kann die Versorgungsinfrastruktur – zumindest im Bereich des Erlebniseinzelhandels – in der Innenstadt aufrechterhalten und zugleich Leerstände vermieden werden, da die Geschäfte mit einem erfolgreich umgesetzten Multi-Channel-Konzept seltener von Insolvenz betroffen sind. Beides, ein vielfältiges Angebot an Geschäften als auch geringe Leerstände, trägt zum Erhalt einer attraktiven Innenstadt bei.

Erhöhte Bekanntheit und Imageverbesserungen

Es ist denkbar, dass sich das durch das Multi-Channel-Retailing hervorgerufene verbesserte Image der Ladengeschäfte sowie ihre größere Bekanntheit auch auf die Innenstadt übertragen. Insbesondere von multi-channel-affinen Konsumenten – Studenten, Azubis und gut verdienenden Alleinlebenden – könnten die Innenstädte dann als innovativer und damit attraktiver wahrgenommen und häufiger aufgesucht werden.

Verkaufs- und Lagerflächenverkleinerung

Wenn zukünftig immer mehr Waren über das Internet verkauft werden, könnten sich die Ladengeschäfte zunehmend zu Ausstellungsräumen wandeln, die dem Wunsch des Anfassens sowie des An- und Ausprobierens der Waren nachkommen, das Abholen oder die Reklamation von Waren ermöglichen und nur noch untergeordnet dem Verkauf dienen. In Konsequenz würden weniger Verkaufs- und Lagerflächen benötigt. Dies würde den Innenstädten insofern entgegenkommen, als dass sie in ihrer historisch bedingten, kleinteiligen Baustruktur gerade diese nachgefragten kleinen Ladenlokalen zu bieten haben, welche derzeit vor dem Hintergrund des anhaltenden Verkaufsflächenwachstums noch eher ein Hemmnis darstellen.

Im günstigsten Fall kann die verstärkte Nutzung von Multi-Channel-Konzepten der innerstädtischen Einzelhändler folglich zu einer Unterstützung und Aufwertung der Innenstädte beitragen und sie damit zukunftsfähig machen. Neben den beschrieben Chancen bestehen jedoch auch Risiken. Es ist nicht ausgeschlossen, dass einige stationäre Einzelhändler durch die guten Erfahrungen mit dem Online-Handel oder aufgrund der fehlenden Nachfrage nach stationären Geschäften durch die Konsumenten langfristig ganz aus dem lokalen Einzelhandel aussteigen und ihre Waren und Diestleistungen, insbesondere wenn es sich um digitalisierbare und standardisierte Produkte handelt, nur noch ausschließlich online vertreiben. Leerstände, der Bedeutungsverlust der Innenstädte als Einkaufsstandort, Engpässe in der lokalen Versorgungsinfrastruktur und damit ein Attraktivitätsverlust der Innenstädte insgesamt wären die Folge. Problematisch bei beiden möglichen Entwicklungsrichtungen ist, dass die Einflussmöglichkeiten der Planung äußerst begrenzt sind.

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Negative Space and Positive Environment: Mapping Opportunities for Urban Resilience

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1 ABSTRACT

Cities have long held a fascination for people – as they grow and develop, there is a desire to know and understand the intricate interplay of elements that makes cities 'live'. In part, this is a need for even greater efficiency in urban centres, yet the underlying quest is for a sustainable urban form. In order to make sense of the complex entities that we recognise cities to be, they have been compared to buildings, organisms and more recently machines. However the search for better and more elegant urban centres is hardly new, healthier and more efficient settlements were the aim of Modernism's rational sub-division of functions, which has been translated into horizontal distribution through zoning, or vertical organisation thought high-rise developments.

However both of these approaches have been found to be unsustainable, as too many resources are required to maintain this kind or urbanisation and social consequences of either horizontal or vertical isolation must also be considered. From being absolute consumers of resources, of energy and of technology, cities need to change, to become sustainable in order to be more resilient and more efficient in supporting culture, society as well as economy. Our urban centres need to be re-imagined, re-conceptualised and re-defined, to match our changing society.

One approach is to re-examine the compartmentalised, mono-functional approach of urban Modernism and to begin to investigate cities like ecologies, where every element supports and incorporates another, fulfilling more than just one function. This manner of seeing the city suggests a framework to guide the re-mixing of urban settlements. Beginning to understand the relationships between supporting elements and the nature of the connecting 'web' offers an invitation to investigate the often ignored, remnant spaces of cities. This 'negative space' is the residual from which space and place are carved out in the Contemporary city, providing the link between elements of urban settlement.

Like all successful ecosystems, cities need to evolve and change over time in order to effectively respond to different lifestyles, development in culture and society as well as to meet environmental challenges. This paper seeks to investigate the role that negative space could have in the reorganisation of the re-mixed city. The space 'in-between' is analysed as an opportunity for infill development or re-development which provides to the urban settlement the variety that is a pre-requisite for ecosystem resilience. An analysis of the urban form is suggested as an empirical tool to map the opportunities already present in the urban environment and negative space is evaluated as a key element in achieving a positive development able to distribute diverse environmental and social facilities in the city.

2 INTRODUCTION

2.1 Background

Cities have long held a fascination for people – the appeal of the melting pot of cultures, lifestyles and opportunities has drawn humanity to create ever more complex iterations of urban centres teeming with life, movement and energy (Karp, Stone, & Yoels, 1991). Yet the demands of cities are growing even now – the pace of life, the demands of new technology, resultant social changes and perhaps most urgently, the growing awareness of environmental consequences of Western lifestyles are causing cities to draw more, consume more and become more (Zukin, 2010).

Complexity is one of the main characteristics of a consolidated urban environment; mixed uses, social heterogeneity, sensory stimulation at multiple levels, economic transactions and cultural exchange are all variables that contribute to the development of a town's own complexity, a town's own identity (Allen, 2004; Tung, 2001). The balance between these different components has been assumed as a key element in the success of an urban environment based on demographic and population growth (Mumford, 1989). Several approaches have attempted to explain urban complexity and especially its contradictions; cities have always been less healthy than the countryside and historically their citizens have always had a shorter life

expectancy; nevertheless for the last 200 years people have been leaving villages in rural areas to cluster in slums, generate suburban sprawls and engage with the persistent urban congestion (Hall, 1998).

2.2 Understanding Cities

Cities have been evolving and adapting to changes in lifestyle, economy and production processes from their beginning. Elements which were central during a historic phase and that have required consistent investment in order to be built, like city walls, have been quickly demolished when more than keeping enemies out they were restraining the growth of the bourgeois society (Benevolo, 1980). Palaces and temples have been built, promoted as cultural icons of civic identity and then torn down; activities which were keeping town centres alive were removed, isolated or segregated on the outskirt of the urban stage (Norberg-Schulz, 1979).

Traditional methods of introducing urban changes have tended to fall into three categories: razing the city in order to start again; annexing new areas beyond existing city boundaries; and the more moderate approach of 'change from within' making use of infill opportunities to slowly upgrade the urban system to meet new requirements, whether social or economic (Kowalik & Guaralda). Given the small number of new cities constructed globally, and understanding the intense resource consumption of urban construction as well as more general environmental concerns, it is reasonable to suggest that the means implementing urban change has been narrowed down to the third option in the vast majority of cases (Allen, 2004).

Approaches to the Urban Environment

Cities have been described as over-scaled residential buildings, an analogy pointing out how the different components of urban life mirror that of dwellings; a room to sleep, one to work, and one to meet people became districts to live, work, shop and relax in. In other cases towns have been compared to forests or gardens (Patetta, 1986). Perfect designs have been proposed to celebrate princely power, divine intervention or social structures. In order to make cities more efficient they have been compared to machines and they have been reinvented as a rational system where every component has a specific role, every activity a specific space (Kostof, 1991).

A different approach has proposed the study of cities as organism, with a defined centre of control, green lungs, veins to move people and goods; every element in a close relationship with each other, every element contributing to the good health of the system (Hough, 1984). This comparison to organisms is still central in popular culture and cities are diagnosed with several diseases which affect the social fabric, the structure of the economy and especially the health of citizens as well as the environment (Blakely & Ellin, 1997).

While these approaches have typically been aimed at improving efficiency of urban centres and streamlining processes of delivery of urban services, there now exists a different motivation for the better understanding of urban behaviour (Newman & Jennings, 2008). Growing awareness and concern over the environmental cost of cities (Girardet, 2008) has become a driver of new urban theories and models (International New Town Institute, 2009). Recognising that on the whole, we are unlikely to abandon the city in order to pursue simpler and "more sustainable" lives, concern has shifted to the issue of urban sustainability.

Urban Sustainability

Sustainability, as a concept, has changed and developed in the last 40 years moving from being the priority of a minority to one at the centre of debate in every political arena at every level. The building industry and cities in general have been recognised as the major pollution factors which are compromising the fragile ecosystem of our planet. Several solutions to environmental issues have been proposed; being green is the new trademark of commercial companies and local governments, however the exact means of implementing large scale sustainable solutions without adverse effects is not clear (J. Birkeland, 2008); cities are inherently complex, layering meaning, history and cultural memory (Tung, 2001). As manifestations of shared cultural values they do not allow a 'tabula rasa' approach of blanket solutions (I. Birkeland, 2008).

Being sustainable is a priority, but being sustainable just means containing the damages, not repairing damage done in the past. A relatively recent attempt to counter this sustainability fault, is the theory of Positive Development by Janis Birkeland (2008). To sum up, the theory puts forth the argument that the built environment needs to have an overall net positive impact, essentially returning land to a level of ecological health that was present prior to urbanisation. Arguing that current ideas regarding sustainable development are based on a negative presumption that damage to the environment is unavoidable and

therefore 'standard' and acceptable, it calls for a paradigm shift in the planning, design, retrofitting and management of the built environment. Rather than accepting the damage that the built environment causes and believing that the best we are capable of is to remediate or restore 'inevitable' environmental degradation, Positive Development (J. Birkeland, 2008) advocates a shift to a design-based (positive) approach in our built environment. Ecological remediation, restoration and regeneration are considered to be insufficient as we have already exceeded the Earth's ecological carrying capacity; and offsetting ecological losses with social gains, typically unrealised in the final design, is a zero-sum game. Arguing that development which does not 'pay its own way' ecologically is no longer acceptable, Positive Development (J. Birkeland, 2008) calls for a built environment which has a net positive ecological and social impact. In practical terms, it argues for the retrofitting urban sites to increase the net ecological carrying capacity as well as natural and social capital, expanding both the ecological base and the public estate of cities. New buildings need to reverse the damage caused by previous development in absolute terms (J. Birkeland, 2008).

The positive development theory then, aims not only to minimise built environment impact, but also to improve the general condition of the environment (J. Birkeland, 2008), where buildings are proposed as agents to modify the context in order to provide a gain at the multiple levels that urban complexity requires: social, cultural, economic and environmental. The way this theory could be implemented in the actual design process is still debated, but this approach suggests a different way to look at cities.

Cities as Ecosystems

In the XXI century cities could be discussed as ecosystems (Chiesura, 2004); ecosystems allow a dynamic approach and the different components change in response to interactions with the others and the general context (Fuller et al., 2010). In a machine or in an organisms some elements are assumed to be central and not subject to alteration or modification, but this has been proved erroneous in the case of urban complexity, where functions move, areas grow and shrink, and shared memories and values morph (Hough, 1984). The ecological value of some urban elements, mainly green spaces, is expansively debated in literature (Smith & Levermore, 2008). Planted areas have a recognised value for the environment, contributing to absorb pollutants, mitigate the heat island effect and increase carbon sequestration (Smith & Levermore, 2008). The role of vegetation has also been discussed in terms of social structure; green areas affect the perception of the environment and also human behaviours; from the ecological point of view they support biodiversity (Fuller, et al., 2010). Vegetated areas affect the economy through impact on real estate values (Bowman, Thompson, & Colletti, 2009), but also in terms of welfare; it is recognised that an active lifestyle has a role in reducing the Government's investment in healthcare (Willis & Crabtree, 2011). Current studies are investigating how the provision of parks and gardens relates to active lifestyles of residents (Willis & Crabtree, 2011). Additionally, the growing number of dwellings in urban centres adds import to the creation and maintenance of urban retreats in the form of parks and green space (Phillips, 2003). Enhancing this connection to nature through the creation of urban habitat for native wildlife contributes to humanise the overwhelming scale of the city (Hoevan, 2006).

Approaching to the city as an ecosystem is still fragmented and focused on the provision of singular elements or defined corridors between green spaces (Pickett & Cadenasso, 2008). On the other hand sustainable buildings are proposed to respond the local environment, but usually these do not address the problem of the wider city (J. Birkeland, 2008); green roofs, green walls or other green elements to reduce the impact of new construction on the environment do not relate to the city in terms of a system, just in terms of local a environment. Looking at cities like ecosystems means that every new development could be a cluster which contributes in some way to the general positive performance; buildings, parks, and street plantings can all be seen as biotopes that interact in a dynamic way. Buildings could be developed not as isolated elements, but as 'cells' providing an environmental function to the wider ecosystem; negative space could be designed not as an in-between medium, but as the tissue connecting the different cells. Through a negative space connective tissue, buildings in urban centres could 'spread the load' and 'share the gain' simultaneously. Individual positioning and design of buildings presents a range of possible opportunities for retrofitting a myriad of environmental solutions to existing building stock. These solutions already exist and offer opportunities for energy generation, air and water filtration, carbon sequestration and food production (Birkeland, 2002). For example: equatorial facing elevations of high-rises could harness solar energy in a collective grid and 'share' it amongst the city, lessening the overall energy burden of the city. Retrofitting a

series of green roofs and walls can create wildlife corridors which would be 'safe' from human degradation without any loss of valuable urban land. This approach suggests the possibility of the city as a whole becoming a 'living' system, allowing a non-linear shift of the whole city into a new state (Newman & Jennings, 2008). The interaction of the various building 'cells', each with a shared communal social or environmental function, may result in an emergent state of urban sustainability. This proposed strategy could also suggest possible alternative developments to the recent visions of new eco-cities, which while solving some of the recent environmental issues, do not solve the question of the existing urban environment and how to retrofit it (Kowalik & Guaralda).

3 MAPPING NEGATIVE SPACE

In order to promote this vision, an initial step is proposed of the mapping of opportunities in the urban environment (Holt-Damant & Wyeld, 2005). Studies on the green space or on the blue space are consolidated in urban design and planning, what is suggested in this paper is that this kind of mapping also includes the opportunities offered by urban development in implementing the vision of cities as ecosystems (Cho, Poudyal, & Roberts, 2008). Traditionally open spaces are recorded on the basis of their use or presence of greeneries (Varon, 1998a). Parks are programmed within the urban environment to provide retreats for local residents or as main recreational precincts for the city users (Shaftoe, 2008). The planning approach takes into consideration the distribution of green areas as the provision of facilities, not in terms of an ecological system. In particular situations, especially alongside creeks and rivers, corridors are maintained; in some cases there are environmental principles behind the protection of these kinds of spaces, more often consideration of floods risk or difficulties in the development of these landscapes are the real factors which force their preservation (Hough, 1990). In some instances also the space of creeks has been urbanised, cities in Italy, Brazil and Spain made the decision to cover or channelize water bodies, having then to pay damages in the case of overload of these systems (Pavia, 1996).

In parallel to the functional or economical study of open space, a typological one has been proposed by Varon (1998b) who initiated a possible categorisation of these urban areas on the basis of their character, closely related to the one of the surrounding elements. The proposed methodology is not limited to publicly accessible areas, but has a more holistic approach taking into consideration private gardens streetscape. The studies of Varon are based on the development of pedestrian networks, potentially using open spaces within blocks to gain missing connections (Varon, 2004). On the other hand ecological studies promote the creation of interconnected systems where natural areas are connected through corridors in order to allow the movement of fauna and the creation of complex biological networks (Allen, 2004). Merging these two theories is proposed in order to create an urban system operating as an ecosystem, where all the elements can contribute to the positive development of the urban area. For this kind of approach the typological element is not central, but clearly the possibility of interconnections has to be taken into consideration.

3.1 Mapping Opportunities

Based on the studies on typologies of open space, ecological systems as well as urban planning, the following elements are suggested as a framework to map positive development opportunities:

Public Parks

These elements usually play a central role in providing cities with a social space as well as environmental relief (Vapaa, 2002). Larger parks can accommodate leisure facilities and can be key elements in the identity of a city, for example being located in strategic areas or hosting high profile festivals (Platt., 2006).

Gardens

These these are not always publicly accessible, but can be taken in consideration in the creation of an ecological network. These elements have an important social role providing a personal sanctuary where to rejuvenate within the busy urban environment (Griswold, 1996)

Pedestrian Areas

The role of walkable networks is extensively discussed in literature for their social importance, especially in terms of public health (Guaralda, 2006). Apart from being a significant element for a sustainable lifestyle, pedestrian areas are usually the outcome of a process of refurbishment of the urban environment (Newman &

Jennings, 2008). These spaces could provide opportunities to include sustainable technologies for the production of electricity or gathering of water, as well as to manage weather extremes. Some greenways projects have been including this kind of elements alongside artworks or shelters.

Street Planting

The provision of trees in the urban environment is discussed as a potential elements to improve the local environment in terms of air quality and climate control (Lee, Jang, Wang, & Namgung, 2009). Plants in the urban environment can also support a variety of life forms, provide biodiversity to the urban environment and also mitigate the presence of pest (Cowan & Steward, 2007). Cities are an ideal habitat for this kind of biotopes, especially because they do not provide space for their natural predators (Fuller, et al., 2010)

Laneways

The potential of laneways in building pedestrian networks is quite widely recognised in literature (Varon, 2004). These urban spaces can be vibrant social places, but also provide informal connections between different kinds of more structured elements, like private gardens or main streets.

Accessory Spaces

Driveways, accessways, internal manoeuvre spaces or commercial courtyards are spaces often used temporarily during the day or the week (Varon, 1997). Management of this temporality can provide different social uses and the introduction of elements to set up different kinds of urban networks.

Carparks

The need for car space is a central issues in contemporary cities. Large areas are devoted for provisional parking even entire structures are built for this use. In the case of accessible areas, the recognisable pattern is that of busy areas in the daytime, on weekdays and desolated wasteland at nighttime or weekends (Groth, 2005). Also in this case the management of the temporarily of use can allocate different social functions in these spaces as well as the inclusion of environmental mitigation elements (Rawlinson & Guaralda).

Infrastructures and Lost Space

Railway networks as well as motorways and road viaducts generate spaces which in some cases are not accessible or which are socially dangerous (Edwards, 2011). These elements, on the other hand, could play an interesting role providing ecological corridors or including elements for positive development of the urban environment.

Vacant blocks and Redevelopment Sites

Cities are ever-changing systems, mapping areas which are underdeveloped; under redevelopment or due for refurbishment can help in setting an ecological system which goes beyond the unbuilt environment. Green technologies are currently available and are already included in some new buildings (Keeler, 2009), the connection of these elements with the ones in the negative space has the potential to implement the proposed vision of cities as ecological systems.

In parallel to the planning of economic functions, cities could investigate environmental functions to be distributed in the urban fabric and interconnected by the considered design of negative space. Through this approach cities could evolve into Marshall's 'corporate entities' made up of complementary component parts which work together to reinforce and support the function of the city itself (Marshall, 2009). Distributing energy generation, air and water filtration, carbon sequestration and food production (known as 'eco-services') (J. Birkeland, 2008) throughout the wider city fabric, would see the city function as a collective whole in order to achieve a more sustainable state. Over time, as buildings are progressively either retrofitted or replaced, the entire city could generate surplus environmental services. Although composed of independently functioning elements, actively using negative space to connect these discrete environmental cells, the net result would be a city operating as a single self-sustaining unit regardless of any incremental and individual changes – a 'corporate entity' (Marshall, 2009). Identifying and using negative space in a systemic manner to drive sustainable functioning through urban infill development or redevelopment, could help meet urban environmental goals. Temporal activation of negative space could play a key role in enhancing the social interaction which is increasingly becoming 24/7 and meet evolving cultural changes

(Lofland, 1998). This approach would allow the city to evolve and change over time to effectively respond to developments in culture and society; and to progressively take advantage of technological advancements.

4 CASE STUDY

To examine the possibilities of negative space, an initial case study mapping has been carried out of Brisbane, Australia. Brisbane is Australia's third largest city and the capital of the state of Queensland with a population of 1,067,300 people. Formed around the Brisbane River it is a sprawling car-centric city with a light and mid-grained urban fabric. The mapping was carried out on the denser Central Business District which has an increasing city centre population due to a growing number of mixed use commercial and residential towers.

The initial Nolli map of Brisbane was supplemented with the use of high-resolution aerial photographs to broadly identify existing infrastructure, parks, laneways and pedestrian areas. Location visits were used to further refine the initial mapping and identify accessory spaces such as private lanes to rear parking lots.

4.1 Figure Ground

The city centre outlines a dense core which become less dense towards the rive edge. On the South-West side of the city, the connections between the urban environment and the river system is interrupted by a motorway. On the North-East side, the view from the city to the river is often blocked by high-rise buildings which follow a different settling rule in respect to the rest of the urban fabric. The figureground also shows an articulated system on open spaces.

Fig. 1: Figure ground - Brisbane, Australia.The location of infrastructure elements is shown in dark purple.

4.2 Green Space

Overlaying parks, gardens and street planting it is possible to underline a preliminary ecological network through the negative space. The pattern of green spaces is discontinuous and there are several missing links in the potential network. A connection to the river is partially regained.

Fig. 2: Green Space - Brisbane, Australia

4.3 Pedestrian Space

The inclusion of the actual and potential pedestrian areas makes evident how the system, although concentrated in the negative space, could be denser. The refurbishments of public spaces with positive technologies could implement a system which radiates from the main parks deep into the built fabric through laneways and service spaces.

Fig. 4: Pedestrian Space - Brisbane, Australia. Light purple indicates pedestrian plazas along with laneways (in yellow) and accessory spaces (orange)

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4.4 Redevelopment or Refurbishment Opportunities

Areas under redevelopment or refurbishment make clear how punctual elements could be nodes in the restructuring of the city as a positive ecosystem. In some cases new connections could be gained and the existing system in the negative space could be used to distribute the eventual benefit of sustainable elements included in new buildings.

Fig. 5: Complete Mapping – showing existing figure ground (black), vacant and development sites (apricot and red, respectively) green space (green), infrastructure (dark purple), pedestrian areas (light purple) and lost space (dark blue).

5 FUTURE RESEARCH

The proposed mapping is an initial approach to the investigation of cities as ecosystems (Kaika, 2005); further developments of this tool could include the recognition of elements fixed in the development of cities, such as heritage listed buildings. In some cases these cannot be heavily modified and their technological contribution to the system could be limited; however they play a key role in the social sustainability of the urban system concentrating shared memories and representing the common values of the local urban society.

Further, dismissed services, such as tunnels, old aqueducts or sewer systems could also be taken into consideration to intensify the network of connections (Coutard, Hanley, & Zimmerman, 2005). A further level of complexity could be gained introducing a time based mapping of uses and functions in order to

establish how facilities, infrastructure and spaces could be used in different ways throughout the day, optimising resources and also providing new spaces for communities (Varon, 2004).

Additionally this tool could be used to identify the best positional opportunities for retrofitting specific environmental functions in the city. Contextually appropriate technology which relies on particular environmental conditions, such as food production or energy generation, could be plotted onto the map and adjacent negative space appropriately activated. A framework for allocating suitable retrofits would need to be developed and applied.

6 CONCLUSION

Cities today are changing at fast pace and redevelopment or conversions of dilapidated areas is a common approache to the redefinition of the urban environment. These processes offer opportunities to include in our cities sustainable nodes; however mapping the available residual space from which the urban form has been created, offers an opportunity to perceive and understand the existing connecting 'web' of negative space. It is possible to then offer a structure that positively directs the progress of the urban fabric.

Cities have been oversimplified in the last 60 years, in order to regain the complexity which used to be their characteristic; the built environment should not be read as separated functional clusters, but as an integrated technological network. More than activities, planning could take in consideration opportunities; more than extreme interventions of redevelopment, urban design could work on the creation of complex ecological systems staged in time, following the pace of the urban change.

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Noise Pollution Management Issues in Tirana, the Capital of Albania

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1 ABSTRACT

On average, Tirana's population is exposed to daytime noise levels higher than 70 dB and nighttime noise levels higher than 55 dB. These levels are relatively high for Europe. This paper relates the results of a research project conducted in 2011 on the impact of noise on residents' comfort in two mixed-use neighborhoods in the city, and on public measures to abate the negative impacts of noise. This research found that, although noise presents a problem for exposed residents, to date public measures to abate noise levels have been very limited. Some of the negative noise impacts are due to Tirana's high density physical development pattern and laissez-faire zoning regulations, which permit noise-generating uses in residential neighborhoods. However, the author argues that the main factor is the institutional context for addressing problems related to noise, which is highly adverse to the generation of solutions, and the political culture, which dominates the government structures and the institutional forms. The weak "soundscape" management reflects larger issues of urban governance in Tirana.

2 INTRODUCTION

This paper sets forth the results of a research project conducted in the spring of 2011 on the impact of noise on residents' comfort in two neighborhoods in Tirana, the capital of Albania. In addition, the paper addresses the institutional context and public measures to abate the negative impacts of noise.

To place the noise problem in perspective, during communism Albanian cities were generally quiet, due to the absence of private cars, the dearth of entertainment and commercial services, and the peripheral location of industrial activities. However, by the mid-1990s noise levels in Tirana were already at the threshold ceilings recommended by the World Health Organization. This increase was particularly shocking in a country that had no private cars and few buses until 1990. Now, on average, Tirana's population is exposed to daytime noise levels higher than 70 dB and nighttime noise levels higher than 55 dB. Noise levels in Tirana are shown in Table 1.Overall, almost two-thirds of the Albanian population is exposed to noise levels higher than 65 dB. These levels are relatively high for Europe.

Research indicates that the majority of Tirana's daytime noise is due to motorized traffic. The noise emitted by vehicles is intensified due to: idling at malfunctioning traffic lights; drivers who impatiently hunk horns while stuck in traffic or to greet acquaintances; truck traffic within the urban area; traffic generated by youth looking to pass the time; severe shortage of parking places which increases "hunting" traffic; and the poor condition of vehicles. Other factors contributing to high noise levels, unrelated to transport, are the high volume of construction and individual diesel power generators (that many shops and restaurants use in case of power cuts) during the day, and bar and club music at night (Ministry of Environment, Forestry, and Water 2007; Institute of Public Health 2006; Cicolli 2008).

The desire to meet requirements for European Union membership is forcing legislative and administrative action in favor of environmental protection. In 2007, Albania passed a law on noise pollution management, which is based on similar legislation in Europe (*Law on the Assessment and Management of Noise Pollution*, No. 9774, 12 July 2007). The law requires the establishment of noise limits in urban areas, including noise limits for various activities and transport vehicles. The responsibility for the enforcement of this law is shared among national ministries - the Ministry of Environment, Forestry, and Water, and the Ministry of Public Health - and local governments.

However, to date public measures to abate noise levels have been very limited. Interventions to protect against noise pollution have been sporadic. They have mainly resulted from the will of key public officials rather than being produced by an accountable administrative system, which ensures continuous monitoring and enforcement.

Part of the noise pollution is due to Tirana's high density development pattern and laissez-faire zoning regulations, which permit noise-generating uses in residential neighborhoods. However, the main factor is the institutional context for addressing problems related to noise.

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dB*	Day	Night
2002	73	38
2003	76	42
2004	71	62
2005	71	59
2006	71	58
2007	72	57
	range 68-74	range 54-65
WHO recommended limits		
Residential area (outdoors)	50-55	45
Public space	70	

Table 1: Noise levels in Tirana. *Average of measurements in 15 locations in Tirana. Source: Albanian Institute of Public Health 2006, World Health Organization 1999.

3 CONSIDERATION OF NOISE POLLUTION IMPACTS IN WESTERN COUNTRIES: A BRIEF LITERATURE REVIEW

The levels of environmental noise vary for a substantial part of the world population, especially in areas with a dense population and dense transportation networks. It is estimated that in the European Union during daytime approximately 77 million people (22% of the total EU population in 1994) are exposed to transportation noise levels exceeding 65 dB, a level that many countries consider to be unacceptable (Miedema 2007).

Environmental noise, like other forms of pollution, has wide-ranging adverse health, social, and economic effects. Numerous studies on the adverse health effects of noise, many of recent vintage, have been published - for a comprehensive overview, see Miedema (2007) and Goines and Hagles (2007). It has been found that noise interferes with behavior, including communication and concentrated activity, or desired states, such as relaxation and sleep. Noise exposure can lead to acute stress responses and/or chronic stress, and can even lead to cardio-vascular and mental health disturbances.

In terms of urban planning, noise has been found to interfere with home values and the cost of building and operating new construction. In US-based post-occupancy surveys, the acoustic environment, specifically the lack of adequate speech privacy and control of noise levels, has been a major complaint with respect to the ability to carry out work tasks (Jenson et al. 2005). A study conducted in Holland (Nijland et al. 2007) suggested that noise-sensitive people are less satisfied with their living environment and are more willing to move than others. Another study investigating the combined effects of noise and temperature on human thermal comfort and task performance found that thermal comfort was affected by noise levels, while ratings of building or office noise were not affected by the ambient temperature (Tiller et al. 2010).

Being able to cope with daily noise is important for human well-being and health. The effects of environmental noise depend on acoustical characteristics of the noise (e.g., loudness, time pattern), and on aspects of the noise situation that may involve cognitive processing, such as expectations regarding the future development of the noise exposure (whether will it get better or worse), lack of short-term predictability, and a feeling of lack of control over the source of the noise. People differ in their appraisal of noise situations and in their coping style (Cohen and Weinstein 1981).

However, environmental noise is not only a personal matter, but also a societal problem that is beyond the control of most individuals. Unfortunately, noise is still considered a relatively minor form of pollution and public awareness on its negative effects is lower than for air pollution.

4 RESEARCH CONTEXT AND APPROACH

This research project included door-to-door surveys of 100 households, conducted in the spring of 2011. Female, middle-aged, and well-educated individuals were slightly overrepresented in the surveys. Most respondents were long-term Tirana residents, and had lived in their present dwelling for over a decade.

Surveys were taken in two mixed-use neighborhoods: Bllok and Selvia (50 surveys in each), selected due to their contrasting settings. Bllok is a vibrant city center neighborhood, in which most high-end shopping and entertainment activities are concentrated, in addition to housing. Most housing in the Bllok is in 10-12 story condominium buildings which is relatively new. Typically, current residents belong in the upper-income strata. All surveyed individuals lived in apartments facing both on main streets and back alleys. More than one third of surveyed households included children under 10), and almost one fourth included seniors (above 70).

The Bllok's plentiful cafés, restaurants, and music venues, which generate pedestrian and car traffic until late at night, have been known to present a disturbance for residents. In the fall of 2009, one of the major newspapers in the country, "Shekulli", prompted by residents living in the center of Tirana, who were disturbed by the loud music and car traffic generated by nightclubs, led a campaign against noise pollution in the capital. This campaign drew the attention of several politicians, foreign environmental organizations, and the ombudsman. Several residents informed reporters that they were planning to change residence as the noise levels in the center were unbearable, especially at night. While almost daily press coverage of noise impact issues and complaints, over several weeks, prompted the City to issue high fines to several bars and clubs in the area, which played loud music at night, traffic-generated noise pollution was not addressed. In addition, enforcement was not consistent, and after a brief period of tranquility, club owners ignored the law. A new Mayor was recently elected in Tirana. One of his first actions after taking office was to enforce nighttime noise monitoring in the Bllok. For a few months, night clubs were forced to shut down any music at midnight. Eventually, the rules became relaxed. As of this writing, the press reports that nighttime noise levels in the Bllok are 80-90 dB, based on monitoring data from the Institute of Public Health (*Shekulli*, 23 March 2012).

The other area surveyed, Selvia, is an older, mixed use and mixed-income, neighborhood, located at a distance from the city center. It is flanked by a large open air market. Auto traffic levels are perceived as high in Selvia as well, due to its narrow and windy traditional road system inherited from earlier eras. One third of the respondents in Selvia live in single-family homes with gardens while the rest live in (mostly new) condominium buildings. About 30% of surveyed households included children under 10 and/or seniors over 70.

In the framework of the project interviews were conducted with nine representatives of public institutions, which are involved in environmental protection issues, regarding their efforts in noise abatement and prevention. Interviews were also conducted with (1) a night club employee in the Bllok on club owners' responses to resident complaints, (2) a real estate agency on the impact of noise on condominium prices, and (3) a construction firm on the use of noise insulation in new construction.

The interview with a real estate representative indicated that families are moving away from the Bllok. The area is slowly undergoing a process of transformation into an office and entertainment center. The percentage of tenants (mostly students and young adults) is increasing relative to homeowners. Selvia on the other hand is becoming a favorite neighborhood for families.

5 NOISE IMPACTS ON URBAN NEIGHBORHOODS

Resident surveys indicated that perceived noise levels are very high in the Bllok (4.2 out of a maximum of 5). Also, residents reported a high level of discomfort from noise (an average of 4.2 out of 5). Almost half of the respondents reported thinking daily about noise disturbance. In fact, Bllok's residents were more preoccupied with noise levels than other major concerns such as air pollution, car traffic, lack of parking spaces and green areas, illegal construction, and the quality of road infrastructure in their neighborhood.

Most residents said that noise levels have been on the rise in the last 5 to 10 years, a perception confirmed by public research. They pointed to car traffic as the main source of daytime noise, and the loud music from bars and night clubs as the main source of nighttime noise. The latter was considered more bothersome by the majority. Weekend evenings and nights were reported to be the nosiest and most stressful times. Respondents in households that included young children or older adults were well aware of the detrimental health impacts of noise. They cited sleep disturbance, irritation, inability to concentrate, high blood pressure, headaches, hearing problems, and stress as observed effects of noise exposure on children and seniors.

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Some Bllok residents had been forced to sound proof their apartments. While a few had attempted to directly negotiate with night club owners, more than half had been active in appealing to the public authorities on noise management issues. They had repeatedly contacted the City, the Borrow Council, and the police. Respondents reported that authorities had attempted interventions in many, though not in the majority of, cases, but the noise problem had typically remained unsolved as of the time survey answers were collected. This outcome had led to a profound distrust of the public sector. Extreme frustration about the inability to solve a common problem that affects many was combined with a passive attitude of many residents, who were unaware of the existence of a noise management law in Albania and did not know who to contact for noise-related complaints. The principal desire of the Bllok residents surveyed was a strong regulation of the evening and night activity schedule for entertainment establishments.

In Selvia, perceived noise levels were much lower than in the Bllok (2.7 out of 5), through still above average. Although they reported a higher than average noise-related discomfort (2.9 out of 5), Selvia residents were more preoccupied with issues such as air pollution and urban amenities than noise. Residents said that they worried about noise disturbance infrequently, although they felt that noise levels had been slightly increasing in recent years. Morning car traffic was reported to be the main source of noise in this neighborhood, followed by construction-related noise. Few residents had taken any action to deal with noise pollution. A handful of residents who had contacted the police with noise-related complaints reported that the problem had remained unsolved. Selvia's residents expressed the same level of distrust in the public authorities and feeling of helplessness as the Bllok's residents.

The survey findings were in line with the finding of a larger-scale survey conducted by the Public Health Institute. It found that, citywide, 44% of the population is "very annoyed" by noises while another 28% is "annoyed". The principal reported noise source was car traffic. (Half of the survey respondents lived in flats facing traffic streets.)

6 INSTITUTIONAL CONTEXT FOR NOISE POLLUTION MANAGEMENT

The author conducted interviews with staff members of the following public institutions:

- Borough Council, Selvia
- City of Tirana, Department of Environment
- City Police
- Institute of Public Health
- Ministry of Environment, Forestry, and Water
- National Environmental Agency
- Prefecture of Tirana
- Regional Environmental Agency
- State Police

These institutions are connected to each other according to the scheme shown in Fig. 1.

In addition, the author interviewed:

- An employee of a night club in the Bllok
- A real estate representative
- An employee of a construction firm

The interviewed public officials indicated that noise-related complaints received by public institutions are numerous. Bllok's residents lead in terms of number of complaints; however, other central areas of Tirana are considerably affected by noise. Residents most affected by noise are those who live near main traffic streets, bars and clubs, schools (especially music schools), and areas with large construction activity. It must be noted that, in the last two decades, Tirana has experienced a construction boom, which turned the city into a permanent building site. However, the construction wave has recently significantly abated.

The interviews revealed that, if the noise is generated by a single source, such as a night club, the noise complaint procedure is rather complex; in some cases, public officials appeared uncertain of the steps a

complaint has to go through. Also, the procedure is relatively lenient towards businesses, granting them multiple "second chances" in case of non-compliance with the law.

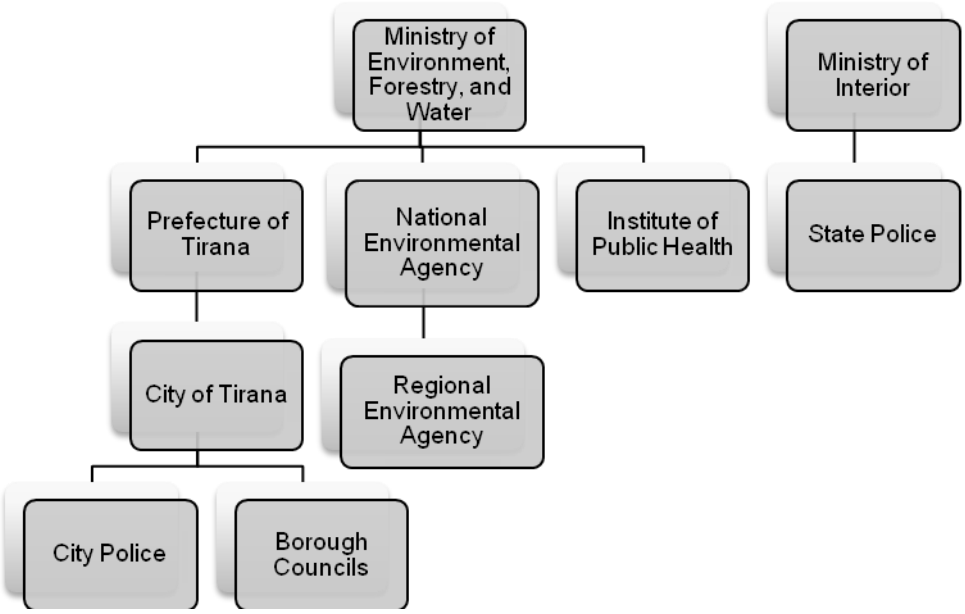

Fig. 1: Public institutions involved in noise management in Tirana.

Residents must file a complaint with the nearest local government unit (the Borrow Council). The Borrow Council passes on the complaint to the Regional Environmental Agency, and in special cases, to the City Police. The City Police indicated that they are overwhelmed with filed complaints. Occasionally, the City Police collaborate with the State Police on noise management issues, if a major conflict has occurred among the parties involved. The City Police are not empowered to issue fines if a business generates noises higher than the limit; however, it can require a business to stop its activity temporarily (i.e. shut down a nightclub for one night if a neighbor has called in with a complaint).

If the issue remains unsolved, the complaint is passed on to the City of Tirana. The City is only empowered to fine a business (up to $300) should it find that it is not equipped with a proper license (i.e. to play music). If the City fails to solve the issue as well, the Prefecture of Tirana intervenes, firstly notifying the noise-generating business to reduce noise, secondly sending a written order including a compliance deadline, thirdly fining the non-complying business, and finally requesting the Regional Environment Agency to revoke its business license. The City is also empowered to request the same from the Regional Environment Agency. The Ministry of Environment, Forestry, and Water is not directly involved in noise issues; it main task is to draft action plans on noise pollution management.

The interviewed public officials admitted that often residents must file multiple complaints before any action is taken in their favor. Also, they indicated that many business owners believe that they are above the law and ignore notices to reduce noises sent by public institutions. Many residents file anonymous complaints due to fear of violent retaliation by affected businesses. Even police officials are not immune to this fear. In addition, the police are prone to corruption, as indicated by an interview with a nightclub employee. In terms of traffic or construction related noise, it is almost impossible for residents to take any steps.

In terms of noise monitoring, the institution in charge is the Institute of Public Health, which depends on the Ministry of Environment, Forestry, and Water for its funding. The collected data is owned and utilized exclusively by the Ministry. This financing arrangement limits the scope of work of the Institute. For example, the Ministry issued no funding for urban noise monitoring in 2010. The Institute does receive noise-related complaints but it is not empowered to act directly. However, it can recommend the business license revocation of activities that are found to generate noise above allowed levels.

In contrast with public perceptions collected through surveys and public research, some public officials are under the impression that noise pollution has decreased in the last few years due to stronger monitoring activities. Public officials generally agreed that, in order to reduce noise pollution, institutional capacities must be strengthened. City employees felt that they should have more legal authority to intervene in case of noise complaints. Other proposed measures included traffic calming in residential neighborhoods, use of

noise barriers (such as trees or green walls), ban of heavy and/or old vehicles within the urban area, building permit requirements to soundproof new housing construction, and zoning regulations that require wide building setbacks from traffic streets and do not allow noise sources (night clubs, bakeries, wood workshops, gas stations) in neighborhoods that are mostly residential.

Due to increasing resident complaints on nighttime noise, some clubs in the Bllok and other central locations have partially soundproofed their spaces. However, soundproofing of new housing is minimal. One construction firm has started using inexpensive soundproofing materials, such as polysterol on the internal walls. However, firm representatives say that this method blocks out only 20-30% of noises. The use of double pane glass windows (with vacuum between panes) blocks out an additional 5%. The use of triple/quadruple glass pane windows or the use of special fluid between glass panes would provide much higher sound insulation but this window technology is too expensive for widespread use in Albania. Another firm has built a pilot residential building in the Bllok, which is fully soundproof, with exceptionally high prices by Albanian standards (2000 Euro/sq.m.).

7 CONCLUSION

This research found that noise is a growing concern for residents in Tirana. While it is well known that central area residents experience serious distress due to noise pollution, even more peripheral neighborhoods are affected. However, until recently noise pollution has remained mostly untackled because the overall institutional scheme that deals with noise management issues is beset with redundancies and gaps and a lack of clear functional division among competing authorities and levels. Furthermore, corruption and favoritism are rampant at all government levels.

Within this framework, a portion of business owners, who belong to the upper income groups, resist restrictions on activities that generate nighttime noise and are able to bend the law in their favor. Any past interventions to protect residents from nighttime noise pollution have been the result of the will of individual politicians, which makes long-term rule enforcement uncertain. No clear institutional system has been set to permanently and consistently deal with noise management. In addition, Tirana's public has no belief that the citizenry can bring about public action for its benefit or much belief in the legitimacy of the law. The author speculates that this attitude is due to the legacy of the communist regime, which ended in 1990.

Solutions proposed include the creation of a single office in charge of noise management, preferably included within the city police, which can also collect and respond to complaints at night. This office must guarantee the anonimity of complaints and take immediate action, with prompt enforcement against continuing violations. Another solution would be to group night clubs in areas far from the center, in which they do not disturb residents. However, the presence of entertainment establishements gives the Bllok district its character and constitutes its major attraction. In view of this consideration, a solution would be to require club owners to sound-proof their buildings at the time of licencing, with periodic reviews afterwards. Awareness-raising is important, too. Public authorities must send notices to residents informing them that they have a right to object in case of excessive noise levels in their neighborhood.

While it might be technically easier to deal with nighttime noise, it will be more difficult to substantially improve the daytime noise situation given the growth of motorized transportation in Tirana. Given strong political will, traffic calming measures could be introduced in neighborhoods that are mostly residential or centrally located with heavy pedestrian traffic. Other effective measures would be stringent noise emission criteria for road vehicles, measures at the source (e.g., porous asphalt, speed limitation, high fines for drivers honking horns in non-emergency situations), with respect to the transmission (e.g., noise barriers, including trees), or at the receiver (e.g., dwelling insulation, dwelling layouts).

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Offene Ganzheit in der europäischen Stadt der Zukunft

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1 ABSTRACT

Architektur, deren besondere Ausstrahlungskraft ihre Besucher fasziniert, gilt in zahlreichen Fällen als Wahrzeichen von Städten und Regionen. Jährlich besuchen Tausende diese Orte, sorgen für wirtschaftlichen Aufschwung und tragen zur Imageaufwertung bei – auch in bisher unscheinbaren Klein- oder Mittelstädten.

Diese Gebäude werfen die Frage auf, welche Wirkungsmechanismen dieser Ausstrahlung zu Grunde liegen. Welche besonderen Eigenschaften lassen sich in derartigen Bauten wieder erkennen und sind diese Eigenschaften spezifisch für ihre Zeit oder auch in Gebäuden anderer zeitlicher Epochen wieder zu finden?

Bei der Betrachtung einer Anzahl ausgewählter Gebäude unterschiedlicher Nutzungen hinsichtlich ihrer haptischen Qualitäten, räumlichen und semantischen Strukturen sowie der Verknüpfung zum umliegenden Stadtraum wird deutlich, dass es gewisse Gesetzesmäßigkeiten gibt. Die beschriebenen gegenwärtigen als auch historischen Architektur- und Städtebaukonzepte sind geprägt von der Integrität und Prägnanz – der Ganzheit – der Form bei gleichzeitiger Offenheit für das Zukünftige. Beide Prinzipien sind dabei als einander ergänzend und nicht ausschließend zu begreifen. Im Sinne dieser offenen Ganzheit können architektonische und städtebauliche Entwürfe generiert werden, die verschiedene Nutzungen und Dichten kombinieren, sich den zukünftig verändernden Bedürfnissen unserer Gesellschaft anpassen und dennoch ein hohes Maß an ästhetischer Autonomie erlangen.

2 DIE EUROPÄISCHE STADT

Die Geschichte der europäischen Stadt ist die Geschichte stetiger baulicher Anpassung an veränderte soziale, politische und ökonomische Rahmenbedingungen – es ist eine Geschichte des Wandels. Aus heutiger Sicht wird deutlich, dass nicht nur das Erscheinungsbild der europäischen Stadt mittels einer historisierenden Architektur kopiert wird, sondern auch die Eigenschaften der europäischen Stadt – mit ihren Straßen, Gassen und Plätzen – werden simuliert, jedoch zumeist ausschließlich für eine nach außen hin abgeschottete Innenwelt. Viele Gebäude dabei werden so groß dimensioniert, dass eine städtebauliche Integration absehbar schwer erfolgen kann. Oft geschieht dies auf Wunsch von Investoren, die diese Strukturen als rentabler erachten.

Die traditionelle europäische Stadt besteht aus einer Vielzahl kleinteiliger Parzellen, die sich als räumliche Sequenzen gegenseitig ergänzen und zu einem Gesamtbild zusammenfügen lassen. Hierbei entsteht eine weitere kennzeichnende Eigenschaft, nämlich bauliche Dichte. Im Zusammenhang mit der Zersiedlung der Stadtlandschaft, dem Wunsch nach dem Einfamilienhaus am Stadtrand und der Entstehung von Industrie- und Einkaufsinseln “auf der grünen Wiese”, wurden die Innenstädte teilweise stark entleert.

Ebenso problematisch ist die Monofunktionalität besagter Großstrukturen einzustufen, die durch einen steigenden Filialisierungsgrad im Einzelhandel oder die gewünschte Standardisierung von Gebäuden entsteht. Die Idee der Funktionstrennung, insbesondere von Wohnen, Arbeiten und Freizeiteinrichtungen, die sich Mitte des 20. Jahrhunderts entwickelte, entspricht dabei nicht den Idealen der europäischen Stadt.

Das Wechselspiel zwischen Öffentlichkeit und Privatheit, das durch eine Verknüpfung unterschiedlicher Nutzungen beispielsweise entstehen kann, hat in der heutigen Stadt oftmals gänzlich an Beachtung verloren. Die feinsinnige Abstufung und die Ausrichtung der Stadthäuser hin zum öffentlichen Raum wird bei einer Vielzahl architektonischer Projekte wenig berücksichtigt, was dazu führt, dass das wichtigste Qualitätsmerkmal der Stadt – die öffentlichen Flächen für den Austausch der Bewohner und Nutzer – überbaut oder unattraktiv wird. Der Sozialcharakter der Stadt geht dabei verloren.

Die Qualität der europäischen Stadt liegt darin, dass sie Urbanität erzeugt, das bedeutet: Möglichkeiten des Austausches von materiellen und geistigen Gütern, Attraktivität und Identität. Historisch gewachsene Stadträume sind in ihrer Wertschätzung zwar wieder gestiegen, dennoch werden deren Eigenschaften in der

Stadtplanung noch immer nicht konsequent umgesetzt, um damit eine gebaute und gelebte Urbanität zu erzielen.

Abb. 1: Venedig

Lange war prognostiziert worden, dass eine Abwanderung der städtischen Bevölkerung ins Umland die starke Entleerung der Stadtkerne verursachen würde. Somit stand das Wachstum des Umlandes gegenüber dem Schrumpfen der Innenstädte. Heutige Erkenntnisse zeigen aber, dass dies nicht überall die erwarteten Ausmaße angenommen hat und zudem bereits eine Rückwanderung in die Innenstädte erfolgt – nicht zuletzt weil politische Gegensteuerungs¬maßnahmen getroffen wurden. Das heißt, Wachstums- und Schrumpfungsprozesse verlaufen nun zeitlich und räumlich parallel. Die simultanen Polaritäten prägen sowohl unsere Kernstädte, das Umland und die ländlichen Regionen.

Ein weiterer wichtiger Faktor ist der wirtschaftliche Strukturwandel, der eine Reihe von Brachflächen hinterlassen hat, deren Potenzial – insbesondere in innerstädtischen Lagen – zunehmend erkannt wird. Die Konversion ehemals industrieller, militärischer oder infrastruktureller Anlagen ist zum Alltagsgeschäft der Städte geworden, ebenso bietet sie Spielraum für eine Reihe innovativer Ideen und Nutzungskonzepte. Diese tragen oft innerhalb kürzester Zeit zur Aufwertung ganzer Stadtteile bei und schaffen, teilweise mit geringem Aufwand, die verloren gegangene Urbanität.

Was macht überhaupt Urbanität aus und wie muss urbane Architektur beschaffen sein, um eine langfristig nachhaltige Struktur zu gewährleisten? Welche Eigenschaften haben Städte, die als positiv wahrgenommen werden, wodurch kennzeichnen sich Bauwerke, die eine besondere Ausstrahlungskraft auf ihre Besucher haben?

3 UNTERSUCHUNG AUSGEWÄHLTER GEBÄUDE

Auf den ersten Blick haben zeitgenössische Architekten wie Frank O. Gehry, Daniel Libeskind, Zara Hadid, Jacques Herzog und Pierre DeMeuron oder Bjarke Ingels, um nur einige davon zu nennen, unterschiedliche Ansätze, um die beschriebenen Phänomene in ihren Gebäuden zu thematisieren. Aber sind diese Ansätze nur scheinbar unterschiedlich und folgen doch gemeinsamen Regeln? Um Gemeinsamkeiten oder Unterschiede ersichtlich werden zu lassen, die der Grund für den besonderen, öffentlich wirksamen Charakter der Architektur sind, werden zwei zeitgenössische Entwürfe unterschiedlicher Nutzung in Paris hinsichtlich haptischer, räumlicher und semantischer Aspekte untersucht sowie insbesondere auch deren Zusammenhang zum städtischen Umfeld hergestellt.

Die Gebäude sind ausgewählt worden, da sie sich in einer historisch bedeutenden europäischen Stadt befinden, beide der Öffentlichkeit frei zugänglich gemacht werden, jedoch sehr unterschiedliche Nutzungen und Formensprachen beinhalten. Es wird der Frage nachgegangen, welchen Bezug diese geplanten Gebäude zu Urbanität und der europäischen Stadt haben.

Fondation Louis Vuitton von Frank O. Gehry in Paris

Das Gebäude basiert auf einem Entwurf von Frank O. Gehry aus dem Jahr 2006. Es befindet sich derzeit im Bau und soll 2013 fertig gestellt werden. Das Museum gestaltet den Übergang zwischen zwei städtischen Parks und beinhaltet einen sogenannten “aktiven Sozialraum” in der Erdgeschosszone.

Forschungszentrum Universität Sorbonne von B.I.G. in Paris

Das Forschungszentrum, ein Wettbewerbsgewinn des dänischen Büros B.I.G. aus dem Jahr 2011, ist das Resultat eines urbanen Experiments auf dem Campus Jussieu in unmittelbarer Nähe zum Seine Ufer. Der gläserne Kubus thematisiert besonders den Bedarf nach Tageslicht sowie den Bezug zum urbanen Außenraum. Der Entwurf hat eine klar strukturierte, orthogonale Außenhülle, im Inneren eröffnen sich jedoch vielfältig verwobene Sicht- und Richtungsachsen, die durch die allseitige Transparenz auch außen sichtbar sind.

3.1 Wahrnehmung der Bauten

Die Wahrnehmung der untersuchten Bauwerke ist durch eine starke Betonung der haptisch-sinnlichen Aspekte der Architektur geprägt – die Bauformen sind dynamisch, oft schwellend, und appellieren unmittelbar an das Körpergefühl des Betrachters. Auch die Verwendung bestimmter Materialien trägt dazu bei, den haptischen Charakter zu verstärken. Dies erlaubt es, eine Verbindung herzustellen zwischen den dargestellten Beispielen und solchen Architekturen, die durch einen bewusst antirationalen, haptisch-sinnlich erfahrbare Merkmale betonenden Gestus geprägt sind, so etwa viele Sakralbauten des gegenreformatorischen Barock in Süddeutschland.

Eine vergleichbare antirationalistische Haltung ist ebenfalls spürbar auf der Ebene der räumlichen Struktur der untersuchten Architekturbeispiele. Anstatt dem Betrachter abgeschlossene, eindeutig interpretierbare Räume erfahrbar zu machen oder aber eine mathematisch-abstrakte Raumvorstellung architektonisch abzubilden, sind die untersuchten Beispiele stark durch topologische Raumvorstellungen geprägt. Dieses bedeutet, dass der Raum zusammengesetzt ist aus unscharf definierten Teilräumen, die in einem beweglichen und dynamischen Verhältnis zueinander stehen und die jeweils durch eine spezifische Atmosphäre oder aber eine temporäre Zweckzuweisung bestimmt sind. Die Flexibilität und Uneindeutigkeit, aber auch der anregende Charakter der so erzielten Form der räumlichen Gliederung befördern eine aktive 'nomadische' Aneignung des Bauwerks durch seine Rezipienten.

Die Bauwerke sollen weniger "gelesen" als 'erfahren' werden. Dabei ist zu berücksichtigen, dass die oft gebräuchliche Ineinssetzung von optischer Wahrnehmung und verstandesmäßiger Interpretation hier keine Gültigkeit besitzt. Von daher ist es möglich, dass auch Dinge, die 'gesehen' werden, eine ähnliche unmittelbare Wirkung auf den Körper entfalten können wie solche, die 'gefühlt' oder 'geschmeckt' werden – wie umgekehrt auch von den 'niedrigeren' Sinnen übermittelte Wahrnehmungen der kategorisierenden verstandesmäßigen Zuordnung nicht grundsätzlich verschlossen sind.

3.2 Wirkung

Die besondere Wirkung der untersuchten Architekturen ist in weiten Teilen darauf zurückzuführen, dass sie mit intellektuellen Mitteln nicht vollständig zu durchdringen sind und gerade dadurch den Betrachter in Staunen versetzen. Dies ist eine Folge ihrer hohen Komplexität sowohl auf der Ebene ihrer Bauteile, als auch ihres räumlichen Gefüges und ihrer semantischen Struktur. Sie entziehen sich hinsichtlich der einzelnen Bestandteile sowie auch bezüglich des Geflechts deren jeweiliger Beziehungen zueinander der Reduktion auf einfach zu beschreibende Grundelemente, ohne dabei den Charakter des Beliebigen oder Beziehungslosen anzunehmen. Komplexität kann im Zusammenhang damit nicht nur im herkömmlichen Sinn als formale Vielfalt, sondern auch als die Mehrwertigkeit einzelner architektonischer Bauteile, Teilräume und Bedeutung tragender Elemente verstanden werden.

Die Entwürfe scheinen dadurch gekennzeichnet zu sein, dass sie weder einen perspektivischen Punkt definieren, von dem sie vollständig zu erfassen sind, noch rationalisierenden Raumkonzepten folgen. Die Ansichten darüber sind seit der Erfindung der Perspektive einem starken Wandel unterworfen. Der in der Tradition antiker Baukunst stehenden Architektur der Renaissance liegt noch ein vorwiegend auf der visuellen Wahrnehmung von einem fest verorteten Standpunkt aus beruhendes Verständnis des architektonischen Raumes zugrunde. Demgegenüber scheint bereits die die räumliche Tiefe modulierende Architektur des Barock zur körperlichen Bewegung im Raum aufzufordern. Der Bewegung des Individuums im architektonischen Raum kommt eine wichtige Rolle zu.

Die perspektivische Wahrnehmung der Entwürfe wird ausgehebelt zugunsten eines die spezifischen Qualitäten des einzelnen Raumes oder Teilraumes herausstellenden Erlebens. Der räumliche Eindruck, den die Architektur vermittelt, entsteht mithin in der individuellen und vorwiegend assoziativen Verknüpfung von zunächst nur lose miteinander verbundenen und in kein vorgefertigtes starres Interpretationsschema gefassten Einzelwahrnehmungen. Diese werden in einer Abfolge, welche die Zeitgebundenheit des Aneignungsprozesses hervorhebt, schrittweise gesammelt: Es ist nicht möglich, mehr als einige wenige Teilräume gemeinsam zu erfahren.

3.3 Nachgiebigkeit und Gegenwärtigkeit

Betrachtet man die bisherige Darstellung der untersuchten Beispiele zur Architektur im Zusammenhang, so zeigt sich, dass diese trotz formaler Unterschiedlichkeiten gemeinsame Eigenschaften aufweisen: Deren innenräumliche Struktur kann jeweils als integriertes oder sogar 'glattes' Raumgebilde bezeichnet werden, dessen Aneignung weniger von festen baulichen Grenzen als von den Raum 'topologisch' strukturierenden unterschiedlichen Merkmalen geprägt ist, etwa einer lokal besonderen Nutzung oder einer lokal spezifischen Atmosphäre. Die haptische Unmittelbarkeit der untersuchten Architekturen und ihre semantische Asignifkanz sind weitere entscheidende Merkmale, infolge derer diese einen 'offenen' Charakter aufweisen: In den untersuchten Entwürfen werden Informationen – auch wesentliche Teile der künstlerischen Aussage – nicht allein analog der gesprochenen Sprache durch Prozesse der zeichenhaften Verschlüsselung / Entschlüsselung übermittelt, sondern auch durch direktes Vorführen, Hindeuten und Begreifbarmachen. Auf diese Weise lassen die dargestellten Beispiele, anstatt einen bestimmten Sachverhalt oder ein Selbstverständnis zeichenhaft darzustellen, diese dem Individuum intuitiv spürbar werden und erlangen auf diese Weise eine unmittelbare, alle Sinne des Betrachters miteinbeziehende Wirkung. Dadurch, dass sie das Staunen des Betrachters wecken – ebenso aber auch durch ihre "virtuellen Subjektivierungspunkte" – vermeiden sie den in den theoretischen Positionen der Postmoderne so bekämpften 'repressiven' Charakter, ohne allerdings dabei 'nichtssagend' zu werden. Architekturen wie die als Beispiele untersuchten treten tendenziell mit ihren Betrachtern und Nutzern in eine dialogische Situation ein, deren Verlauf sich ergibt durch die konkrete Erfahrung des jeweiligen Bauwerks in einer Wechselwirkung mit der konkreten Befindlichkeit des Individuums. Der Ablauf dieses Prozesses ist nicht festgelegt, sein Ende bleibt offen.

Hinsichtlich des Verhältnisses zu ihrem städtebaulichen Kontext unterscheiden sich die untersuchten Architekten von solchen, die auf der Strategie des Zitierens architektonischer Elemente basieren, im wesentlichen darin, dass im Entwurfsprozess verschiedene Strukturen – darunter auch aus dem Kontext abgeleitete Elemente – miteinander zu einer erkennbar heterogenen und dennoch unauflöslichen architektonischen Einheit verschmelzen. Im Ergebnis steht die Herkunft der einbezogenen Elemente nicht im Vordergrund und ist oft sogar nicht einmal offensichtlich zu erkennen. Durch ihre formale Offenheit legen die untersuchten Architekturen die weitere gestalterische Entwicklung ihres Umfeldes nicht fest, sondern belassen die Möglichkeit, im Umfeld flexibel auf zukünftige Veränderungen zu reagieren. Dieses bewegliche Verhältnis zwischen dem architektonischen Objekt und seinem Umfeld wird von Greg Lynn als 'Nachgiebigkeit' bezeichnet, die er als ein direktes Resultat formaler Operationen der Auffaltung, Verdrehung und Glättung auffasst.

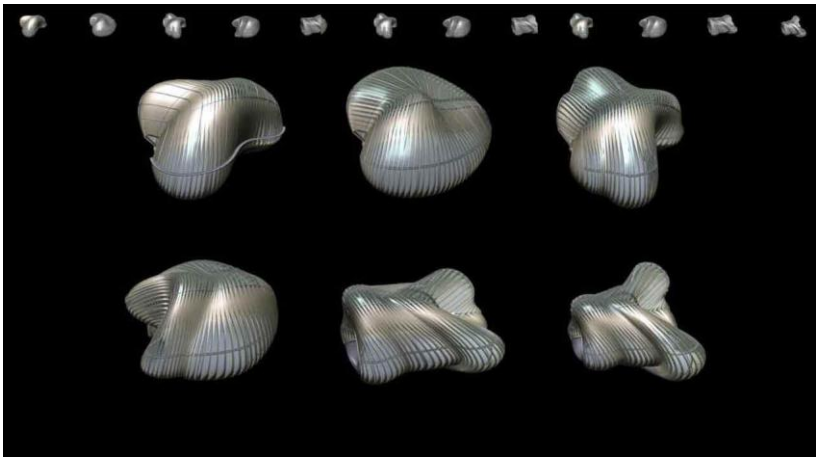

Abb. 2: Greg Lynn Embriological Housing

Der Begriff der 'Nachgiebigkeit' kann im erweiterten Sinne für die Eigenschaft eines Bauwerks gebraucht werden, bei aller architektonischer Eigenständigkeit den prägenden Bedingungen seines jeweiligen Umfeldes soweit zu entsprechen, dass Objekt und Kontext zueinander in eine frei verhandelte, nicht-hierarchische Beziehung treten. Dabei wird es möglich, sie zu einem spezifischen architektonisch-städtebaulichen Ganzen zusammenzuführen. Allerdings ist das Konzept der Nachgiebigkeit nicht so zu verstehen, dass die Entwürfe die Differenzen zwischen Objekt und Umfeld sowie innerhalb des Umfeldes ignorieren oder ver¬decken würden. Vielmehr sind nachgiebige Architekturen gerade aus diesen Differenzen heraus entwickelt. Somit kann die Eigenschaft der Nachgiebigkeit als das Resultat der spannungsreichen formalen Autonomie des architektonischen Objekts mit – oft unterhalb der Schwelle der Bewusstwerdung bleibenden – Elementen formaler Bezugnahme zum städtebaulichen Kontext einerseits in Verbindung mit einer städtebaulich verbindenden Wirkung des Bauwerks andererseits verstanden werden.

Damit verkörpern die Bauten eine Auffassung, nach der die Stadt nicht ein festes, kaum veränderbares Gefüge ist, sondern ein dynamisches und offenes Feld: Die im Umfeld vorhandenen Strukturen determinieren nicht, vergleichbar einem verbindlichen Regelwerk, die formale Ordnung der Architektur, sondern fliessen in den Entwurf in der Art von 'beweglichen Kräften' ein. Sie formen ihn zwar, bestimmen jedoch nicht sein Wesen. Die Stadt wird als ein zusammenhängendes mehrdimensionales Feld von interagierenden Kräften behandelt. Dadurch bleibt die Wirkung des architektonischen Eingriffs nicht auf sein unmittelbares Umfeld beschränkt, sondern kann weit über dessen Ort hinaus ausstrahlen. Diese Strahlkraft kann bewirken, dass die betreffenden Bauwerke den Status eines Wahrzeichens für ihr weiteres städtisches Umfeld und vielleicht sogar über die Grenzen der Stadt hinaus erlangen können.

Ingesamt ist festzuhalten, dass die dargestellten Entwürfe auf räumlicher, semantischer und nutzungsbezogener Ebene als vieldeutig und flexibel – somit als 'offen' – bezeichnet werden können. Die so erreichte Anpassungsfähigkeit geht indes nicht mit einem Verlust architektonischer Prägnanz oder des spezifischen Ausdrucks einher. Die untersuchten Architekturen sind demnach in einer Mittellage eines Spannungsfeldes angesiedelt, das definiert ist durch formale Vollendung – Eindeutigkeit, Stabilität, Harmonie, Verständlichkeit des Aufbaus – auf der einen Seite und Neutralität, Flexibilität, Unabhängigkeit vom Kontext auf der anderen Seite. Sie stehen zwischen Konzepten, die dem baulichen Ausdruck von Ganzheit verpflichtet sind, und solchen, die sich die architektonische Gestaltung von Offenheit zum Ziel gesetzt haben.

4 FAZIT: OFFENE GANZHEIT

Die untersuchten Gebäude, ein Museum und ein Universitätsgebäude, tragen zur Durchmischung der Stadt bei, an der es vielerorts mangelt. Insbesondere die Fondation Louis Vuitton als Museum mit integriertem öffentlich zugänglichen Raum mit Gastronomieeinrichtungen sowie Lehr- und Lernräumen dient als positives Beispiel für innerstädtische Nutzungsvielfalt, wie sie auch schon in der historischen europäischen Stadt in Erscheinung trat.

Die baulich-räumliche Geschichte einer Stadt ist entscheidend für die Sicherung und Entwicklung von Identität und Unverwechselbarkeit. Das Stadtbild hat eine erhebliche Bedeutung für den Imagefaktor und somit für die Wettbewerbsfähigkeit. Die Anpassung an aktuelle Veränderungen – an den Wandel – ist daher eine Daueraufgabe für die Stadtentwicklung.

Die analysierten Gebäude, wie auch andere in der öffentlichen Wahrnehmung erfolgreichen Beispiele, folgen dem Prinzip der offenen Ganzheit, sie können deshalb als positiver Entwicklungsmotor einen Beitrag zur Weiterentwicklung der europäischen Stadt leisten und dies widerum ist der Ursprung ihres öffentlichen Erfolges. Sie sind aus bestimmten zeitlich-räumlichen Zusammenhängen hergeleitet, aufgrund ihrer "Anschlußfähigkeit" kaum von ihren Kontexten abhängig und erlangen dadurch ein hohes Maß an ästhetischer Autonomie. Es ist deshalb gestalterisch nicht notwendig, dass zwischen ihnen und den anders¬gearteten Elementen in ihrem städtebaulichen und architektonischen Umfeld Spannungen und Kontraste inszeniert werden. Stattdessen ziehen sie aus ihrem Kontext einen großen Teil ihrer Prägnanz, indem sie die in ihm angelegten Zustände und Kräfte in sich aufnehmen.

Anders als die Architekturcollagen der 70er und 80er Jahre sind diese einem Ziel der Entwicklung von neuen Formen architektonischer Ganzheit verpflichtet, die sowohl verweisend als auch dynamisch und flexibel sein können. Da die untersuchten Beispiele nicht auf einer Vermengung unterschiedlicher intakter Architektur-

Sprachen beruhen, sondern in ihrem architek¬tonischen und städtebaulichen Ausdruck geöffnet sind für neue und individuelle Bedeutungszuschreibungen, erlauben sie – ohne dabei ihre formale Integrität aufzugeben – auf architektonischer, funktionaler und semantischer Ebene die Einbindung auch in Kontexte, die einem unabsehbaren und starken Wandel unterworfen sind.

Die Bestrebungen zur Entwicklung eines dynamischen, flexiblen oder verweisenden Ganzen, in der Ganzheit und Offenheit sind als einander nicht ausschließende, sondern vielmehr als einander ergänzende Prinzipien zu begreifen sind, damit nicht zu einem Ende gelangt. So entsteht ein Modell für eine geöffnete Ganzheitsvorstellung, die nicht, wie die der postmodernen Architekturcollage zugrundegelegte, auf den Mitteln der Fragmentierung und der Redundanz beruht.

Abb. 3: Gerhard-Richter-Gemälde

Aus der vorgenommenen, zwangsläufig unvollständigen Auswahl der untersuchten Projekte soll nicht der Schluss abgeleitet werden, dass nur diese oder formal ähnliche Projekte geeignet sind, einen derartigen Umgang mit dem Gegensatzpaar von Offenheit und Ganzheit Gestalt werden zu lassen. Viel eher wahrscheinlich dürfte sein, dass sie eingebettet sind in eine Entwicklung der Verbindung des Unterschiedenen, die vielleicht im Barock, vielleicht in der frühen Moderne begonnen hat oder sogar in der Architektur seit jeher angelegt ist. Es kann damit gerechnet werden, dass in Zukunft noch andere, sehr deutlich über die hier aufgezeigten Strategien hinausweisende Techniken der Aufweitung und Öffnung des Ganzen gesucht und gefunden werden, denn die Anwendung des Prinzips der offenen Ganzheit in der Architektur eröffnet den Weg für einen langfristig nachhaltigen Städtebau des 21. Jahrhunderts.

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🏆 *reviewed paper*

Parking Regulations and Urban Development – Poznań's Case Study

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1 ABSTRACT

No matter if at home, at work or on shopping, they are always around us: the parking places. Yet, surprisingly little attention has been paid to their impact on our cities. That is perhaps because they tend to be treated as a part of the respective properties (housing projects, office parks, shopping centers etc.), and not as elements of urban structure per se. Yet, it is a parking policy what still is an important tool for the development of mobility. On one hand, the proximity of parking places to home has got a strong influence on the choice of means of transport for everyday journeys (Knoflacher 2007). On the other, parking policy in the city center may discoruage from (or encourage to) a car trip to the downtown. It is the most important "element of the push-and-pull strategy" (Topp, Pharoah: 1994). However, any limitations in access to parking space usually face opposition, as there exists a quite widespread opinion that people have a „right" to free parking. To apply this argument consequently would mean that the basic principles of urban economics do not apply to parking space. In fact, there is much evidence that free parking tends to negatively affect the functioning of the entire local economy. Shoup (2005) puts the argument right: free parking or free markets.

We approach the problem with a case study method, using the city of Poznań as in-depth case. Motorization has been on the rise in Poland in the last years, and it seems that public authorities are not able to deal with increased demand for parking, save for turning public space into space for cars. On the other hand, cities in Western Europe have been experiencing mass motorization for decades, and some of them have developed policies based on regulating parking space, which may also mean reducing supply, if necessary.

Beginning with an overview of the legal and institutional framework, we then follow to examine the parking policy, truly – the lack of an efficient parking policy – on two examples: of the city center (especially the development of a paid parking zone and its influence), and of a large housing estate (functional changes, pressure on green areas, changes in urban structure etc).

2 BACKGROUND

Poznań is one of the oldest cities in Poland. It takes the fifth place in terms of pupulation (551,627 inhabitants in 2010), and the fourth in terms of industry and university education. It is also the capital of the Wielkopolska Voivodeship. Since the 19th century the city has belonged to the richest communes in Poland. Poznań has got a relatively extensive system of public transport: normally, the city is served by 19 daytime tramway lines (mostly in 10' frequency), one night tramway line (30' frequency), 54 daily bus lines (usually in 12'-30' frequency), and 21 night bus lines (mostly in 30' frequency). Yet, the number of passengers has been slowly but systematically falling down (see fig. 1). Simultaneously Poznań has been witnessing increasing motorization. At the end of 2010 there were 525 cars per 1000 inhabitants, which was one of the highest motorization levels among Polish cities. Hence the streets of Poznań are under strong motorization pressure.

There are various reasons for the regress of public transport. Obviously the social factors play a role (keyword: post-socialist "fascination with automobile"), but there are other serious problems at the city level. The most important of them is an inappropriate network of public transit connections. Many important destinations are located far away from fast, high-frequency lines. The most spectacular example is the new university campus, which is attended by several thousands of students everyday, but does not have a tram connection. The same problem applies to new high-density residential areas. In general, the network is adjusted to old urban structures, e. g. to former heavy-industry areas, and not to the present trip matrix (see: Gadziński, Beim 2010; Radzimski 2010).

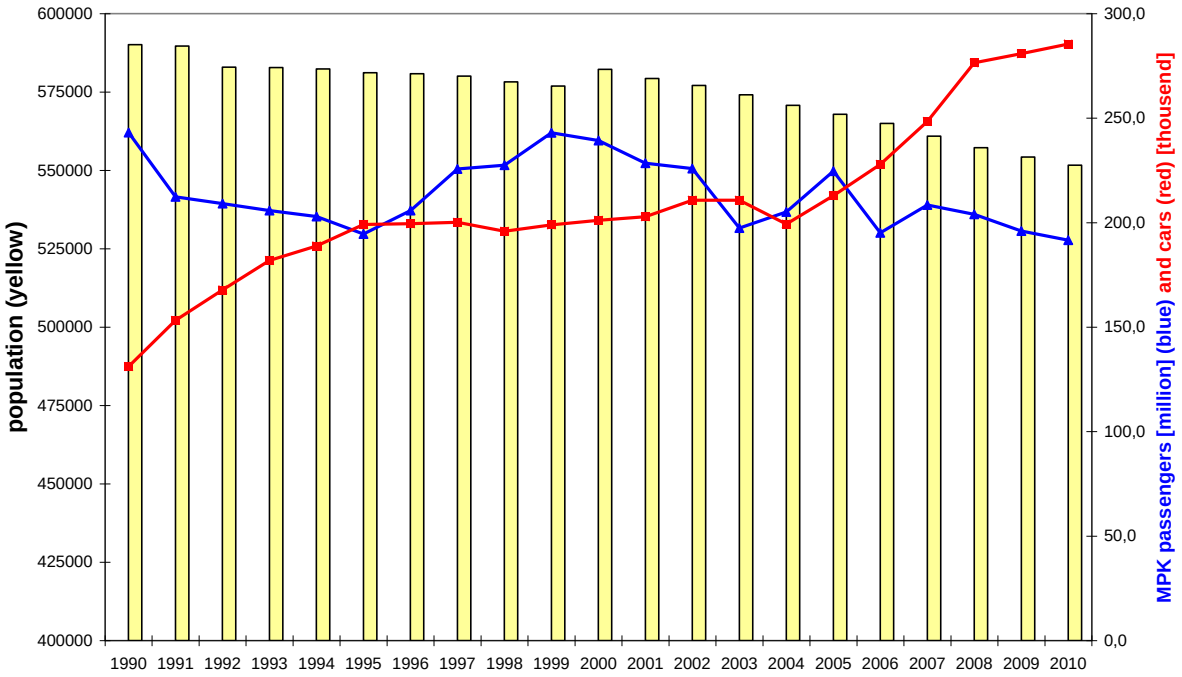

Fig. 1. Urban public transit passengers (MPK), number of cars, and population of Poznań between 1990 and 2010. Source: own compilation based on Polish Central Statistical Office (GUS).

Traffic situation has been worsened by the process of suburbanization. Since 1990 significant changes in urban development and living preferences have been observed (see: Beim 2009, Radzimski at al. 2010). Mostly due to migrations to the suburbs the city has lost about 35,000 inhabitants during that period. At the same time the population of surrounding communes (in Poznań County, powiat poznański), has risen sharply by about 95,000 inhabitants. In effect, at the end of 2010 there were 327,110 inhabitants in the Poznań County. The process of urban sprawl, both within and outside the city limits, is the primary cause of transport problems in the whole metropolitan area. But there is also a need for an efficient public transit system, which would cover both city and suburbs. However, the process of fare integration has been taking place very slowly, because the communes cannot agree on financial terms, and so only a few of them use the same tickets as the city of Poznań. Although there is an almost perfect star-shaped pattern of railway lines around Poznań, no metropolitan railway has been created so far. Most suburban communes are served only by regional trains, with various frequency. Railways are not integrated into a one fare system with urban transit, so the commuters need to buy two tickets. It is therefore not surprising that in the absence of a reasonable alternative the inhabitants become more dependent on their cars. The motorization level in Poznań County in 2010 amounted to 516 cars per 1000 inhabitants. Since the most important services like education and culture, and many workplaces are located in Poznań, the everyday commuting leads to high congestion, and strongly increases the demand for parking places.

3 LEGAL FRAMEWORKS

According to Polish law, users of public roads may be obliged to pay for parking motor vehicles on public roads in paid parking zones (art. 13 and 13b of Law on public roads; 21.03.1985). Parking fees may be introduced in specially designated areas with a deficit of parking space, desirable level of parking traffic circulation, restricted access for drivers, and also there where the local authorities want to give priority to the public transport. Fees may be charged during certain working days/hours or round the clock. Some parking spaces (envelopes) may be reserved for exclusive use.

The rates of parking fees are set by the municipal council, but they must not exceed the maximum set by the parliament. The maximum fee for parking a motor vehicle cannot exceed 3 PLN (1 EUR = ca. 4 PLN) in the first hour, and in the second and third hour it may not increase by more than 20%. In the fourth hour and later the fee must be the same as in the first hour. It means that the local road management authorities have

limited flexibility in shaping the demand for parking spaces. These solutions are a result of quite a long legal "battle".

In the mid-90s the maximal fee used to be regulated regionally, by voievode (the governor of a voivodeship appointed by the central government) and it was defined as an equivalent of the average price of 1.5 l of gasoline 98 RON (nowadays it would be about 8,80 PLN). After that, the maximum fee level was established by a governmental regulation. This solution was sentenced by the Constitutional Tribunal as not compliant with Polish Constitution (Sentence of Constitutional Tribunal; 10.12.2002). The main question was whether the parking fee is a price for service or a "local fee" (according to Polish law), thus, a special kind of tax. The Tribunal settlement proclaimed it to be a "local fee", which has to be regulated by an act passed by parliament, not by governmental regulation. Despite the fact that former law lost its power, the drivers were not allowed to have old fees refunded. Except inflation correction, the maximum fee levels have not been updated since 2002.

Furthermore, restrictive conditions need to be met in order to establish a paid parking zone. Paid parking places need to be marked by both traffic signs and road surface marking. The regulations addressed to road management are more restrictive than general parking regulations addressed to road users. According to art. 47 of law on road traffic (20.06.1997) it is legal to park a car partially on a sidewalk if at least 1.5 m for pedestrian passage was left, and the parked car does not block the traffic. However, a car may be parked entirely on a sidewalk if such parking places have been marked with the respective sign. These regulations had created until September 2000 (until changes in decree on traffic signs) a kind of a "loophole" in the law: if a car had met the above criteria, it had been parked legally. It could be parked for free, even in a paid parking zone, unless the driver had parked on a marked paid parking place. In practice these legal but free places had been the primary target of drivers. There are certainly illegally parked cars, too. Those drivers do not pay a parking fee, but they are at risk to be fined. Yet, the enforcement of parking fees in practice turns out to be much easier than the enforcement of parking fines (the first ones are "administrative fines", and so the ticket can be send by post to the car owner, while in the latter it needs to be given personally to the driver), so it actually pays off to park illegally. Furthermore, the parking tickets are not very restrictive 50 – 100 PLN. These problems concern all major Polish cities.

Government regulations of parking policy also include the law on spatial planning. A single regulation is of great importance here, namely the required number of parking places for each land use. This number ought to be specified in local development plans. To sum up, the legal system makes it very difficult for urban planners to apply a sustainable parking policy.

4 TRANSPORT AND PARKING POLICIES IN POZNAŃ

The main direction of transportation and road policy in Poznań is to support the development of ring roads. Large parts of the two inner ring roads already exist, and the third ring of approximately 7.5 – 9.5 kilometres in diameter is planned for the years to come. It is designed in a standard of a high-quality dual carriageway, and its construction costs are estimated at ca. 9.2 billion PLN. The system of ring roads within the city is intended to be linked with outer automobile bypass roads (A2, S5, S11), according to the City of Poznań Road Program for the Years 2008-2015. Directing the main traffic volume to the three ring roads, together with successive widening of existing main radial streets, is expected to cause more convenient conditions for traffic throughput. The additional advantage, according to the document, would be benefits for public transport and, indirectly, better conditions for parking program implementation (Park&Ride on the outskirts of the city; and multi-storey car parks – called in Poznań "Park&Go" – on the periphery of the centre itself).

Some general directions of parking policy are given by the Study of Conditions and Directions of Spatial Development of the City of Poznań (a general spatial planning document for the entire city area) adopted in 1999 (with significant changes in 2008). It has been recognized that in certain areas demand for parking exceeds supply, especially in the city centre. The establishment of a paid parking zone (SPP) has been positively evaluated, since it "helped to bring order into the public spaces, and the project implementation, control, operation and maintenance of the system are assessed as one of the best in the country" (Studium…, Volume 1, Part II, Section 8.9), while in other areas without similar regulations, opposite effects occurred.

According to the norms and provisions, and existing local development plans, additional parking needs (for example, those resulting from the continuing absence of a Park&Ride system) should be met by parking on

users' own plots, or commercial parking lots. Polish planning law states that local development plans should include records of the required number of parking spaces, in particular, the number of parking spaces in relation to the number of dwellings or number of employees or the surface of the manufacturing and service facilities.

Land use	Reference unit	*Studium 1999*	*Studium 2008*	Parking Policy 2008
		in city center / outside city center		
Offices	per 1000 m^2 of usable area of premise	11-24/15-30	11/30	24/30
Industrial and craftsmanship's areas	per 100 employees	8-14/15-32	8/32	14/32
Shops, shopping malls	per 1000 m^2 of usable area of premise	7-20/10-45	7/45	20/45
Restaurants, bars etc.	per 100 places	12-20/15-36	12/36	20/36
Theaters, cinemas	per 100 places	12-23/15-37	12/37	23/37
Stadiums, arenas, concert halls etc.	per 100 places	6-12/10-20	6/20	12/20
Hospitals	per 10 beds	2-3/10-20	2/20	3/20
Hotels	per 100 bed	20-30/20-50	20/50	30/50
Multifamily residential areas	per 1000 inhabitants or flats	220-260/330	1/1,5	1/1,5
Single family houses	per one house	1-1,5/1,25-2	1,5/2	1,5/2

Table 1. Evolution of parking standards (minimum number of parking places) in Poznań. Source: own compilation based on Studium 1999, Studium 2008 and Poznań Parking Policy.

The basic principles of transport policy in Poznań have been adopted by the municipal council in 1999. According to this document, the general purpose of transport policy is to "achieve a sustainable transportation system, from the point of view of economy, space, society, and ecology". Further documents which identified guidelines and described categorized areas of transportation policy are as follows:

- Sustainable Public Transport Development Plan for the Years 2007-2015 (24 October 2006);
- Poznań City Bike Program for the Years 2007-2015 (15 January 2008);
- City of Poznań Parking Policy (10 June 2008);
- City of Poznań Road Program for the Years 2008-2015 (16 December 2008).

The most severe disadvantage of Poznań Transport Policy is the lack of quantitative and qualitative objectives. The document contains a long list of policy guidelines and recommendations, but it fails to define such important terms like 'sustainability', nor does it establish a legible general goal, e. g. modal shift, reduction of travel time or CO2 emission limits. In consequence, it is hardly possible to evaluate the results of the implementation of this policy.

The overall purpose of Poznań Parking Policy is to define general directions of management and development of public parking spaces. However, it is not a statutory obligation of the local government in Poland to supply parking space. Therefore, the Parking Policy is not an operational program (i.e. it does not include technical and legal aspects, parking rules, financial sources of funding, time framework or measurements for evaluation). It is rather a non-binding "declaration of intent". According to the this document, the parking policy should be mainly driven by the need to reduce demand in individual car traffic, rather than by the obligation to protect the environment.

One of the aims of Poznań Parking Policy is to "encourage travel behaviour aimed at counteraction of increasing traffic congestion". This goal is to be achieved by such instruments like: traffic calming zones in

central area, support of public transport, encouraging non-automobile traffic (pedestrian and bicycle), and levelling anti-urban effects of automobile traffic, like urban barriers weakening the integrity of neighbourhoods. On the other hand, somewhat contradictory to the goal stated above, the need for more comfortable automobile traffic conditions is expressed, including improvement of traffic flow. Parking Policy concludes that most of the traffic could be (theoretically) operated by public transport (in indefinite future and under favourable urban conditions). Yet, the overall impression is that it is still the car, which is perceived as a symbol of comfort, freedom and speed, and so it should be the privileged means of transport within the city. According to the forecast, the phenomenon of giving up public transport in favour of private cars, is referred to as a 'natural' result of an increase in living standards, at least till 2020 (City of Poznań Road Program for the Years 2008-2015). To sum up, one of the official priorities is to encourage alternative means of transport. However, at the same time the conditions of driving are going to be improved via successive extending of total road network in relation to increasing car number.

5 PAID PARKING ZONE

Currently, there are approximately 300 parking lots and 59.5 thousands parking places in Poznań (Parking Policy, p. 3). Roughly a half of the parking places (53%) within the city centre are on-street places. On 1 July 1993 the city council of Poznań has established a Limited Parking Zone (Strefa Ograniczonego Postoju, SOP). The name has been later changed to Paid Parking Zone (Strefa Płatnego Parkowania, SPP). Additionally, there are about 1000 parking spaces within eight existing 'buffer' parking lots around the city centre.

SPP has been extended two times, in 1999 and 2011 (fig. 2). Also, in 1999 the parking fees have been differentiated by zones (red, yellow and green), and 'buffer' parking lots have been introduced. In 2011 the paid parking zone has been extended beyond the historical city centre to cover the district of Jeżyce, an old neighbourhood constructed at the turn of 19th and 20th century. Before that decision, there had been only some sections of streets with paid parking there.

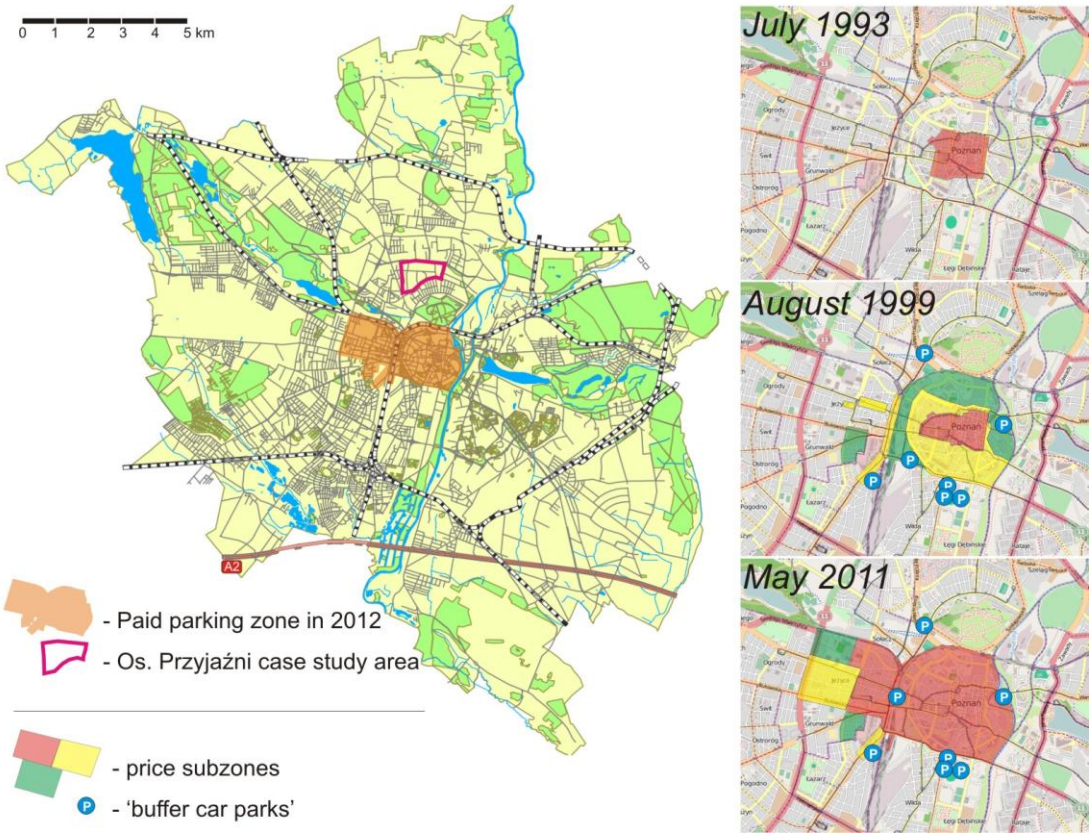

Fig. 2. Development of paid parking zone in Poznań. Source: own elaboration; maps based on OpenStreetMap.org

Paid parking zone in Poznań operates only on weekdays from 10:00 a.m. to 6:00 p.m. The most expensive sub-zone is the red one, with a base fee of 3 PLN/h, so the maximum permitted by law. In the yellow sub-zone the base fee is 2.80 PLN/h, and 2.00 PLN/h in the green one. Limits established by Polish parliament do

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not allow to create parking policy based on supply and demand equilibrium. Therefore, during peak hours of demand (from 11:00 a.m. to 1:00 p.m.) it is difficult to spot vacant places in the city centre.

It is less expensive to use the 'buffer car parks' than to park in the zone. The price amounts to 2.00-2.50 PLN/h during SPP working hours, and 3 PLN/h in other times. The inhabitants of the area covered by SPP can buy an inexpensive ID (parking license) for a car. It costs only 10 PLN per month for the first car and 150 PLN for each additional. Other users can buy a subscription for 16 - 24 PLN per day (depending on sub-zones). There are some allowances (usually 25%) for companies and institutions located within the SPP as well as special fare for disabled persons (5 PLN per month). Parking licenses and subscriptions can be bought at the office of the operator, and short-time tickets are sold at the machines. Fines apply in the case of parking without a valid ticket, and, depending on time and form of payment, they range from 10 to 50 PLN. According to the data of the operator, 21% of places are taken up by users who have not paid the fee, and only 20% of them are fined by parking controllers (see: fig 3).

It is worth to mention that in comparison to fines for free riding in urban transport, the fines for unpaid parking are very low. A passenger caught on free riding has to pay from 100 to 200 PLN (in the past it used to be even 300 PLN). The parking fees are also low in comparison with bus and tramway tickets: a normal ticket valid for a half an hour costs 3,00 PLN, what is an equivalent of one hour parking in the red (most expensive) sub-zone. Therefore, legal limitations of parking fees have negative influence of the competitiveness of public transport.

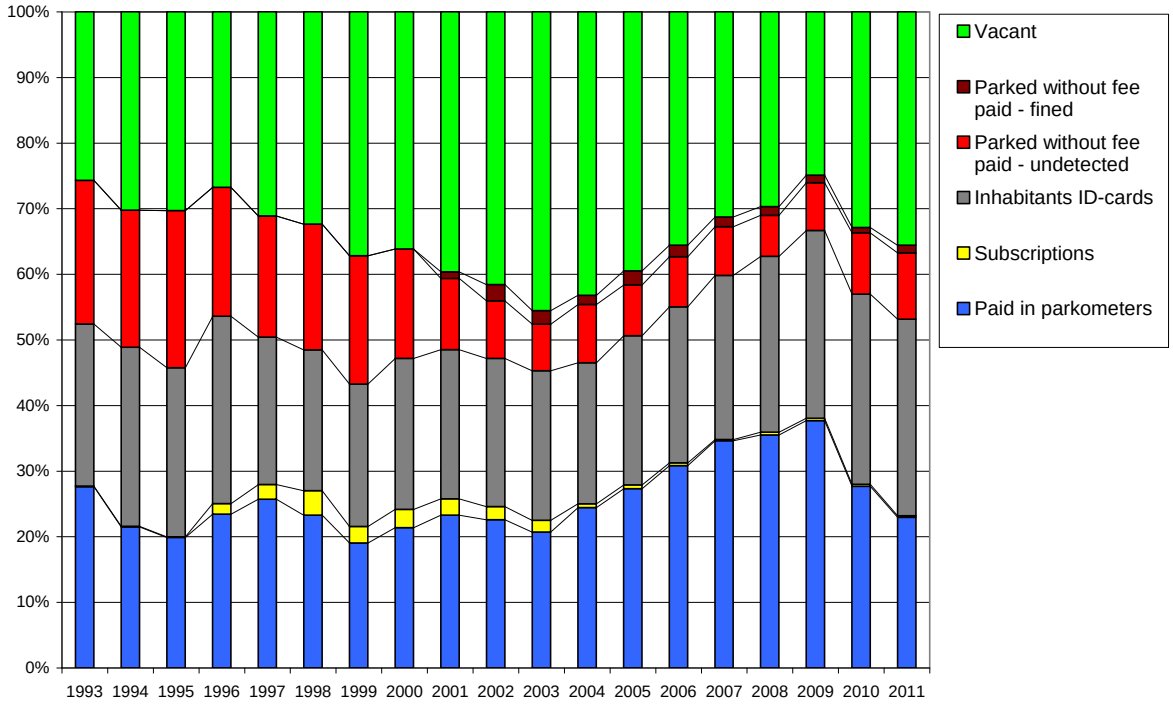

Fig. 3. Average usage of Paid Parking Zone (SPP) in 1993-2011. Source: own compilation based on data of Urban Road Management (ZDM Poznań)

After the extension of SPP in 2011, the public revenue from paid parking has increased by about 4 million PLN per year. The costs of the SPP extensions (including renewal of sidewalks and street greenery as well as some small improvements for cyclists) amounted to about 11 million PLN, and are expected to be covered within 3 years period. Estimated income for 2012 is 20 million PLN. Although there is a quite widespread opinion that public paid parking is "a repression against drivers and unjustified source of money", during last years incomes from the SPP covered only about 2-3% of general expenses on road construction and maintenance in Poznań. In Poland, parking fee is the only one collected directly from drivers by communes. Excises, fees and other taxes paid by drivers go to state budget, and in fact they have been recently lower than the spending on state roads and motorways (Beim 2011).

One of the most urging problems of the parking policy is illegal parking (see: fig. 4). This problem results, among other things, from a lack of progress in the implementation of P&R policy, the state of public

transport and demand for parking in the area. Estimated average rate of illegal parking within SPP is approximately 15%. Some cars are parked at the gates, other at a pedestrian crossing, or just before the beginning of a sign designating parking zones (and thus formally outside the zone). In order to discourage illegal parking, repressive measures are applied, i.e. installing bollards (traffic poles) on streets with most severe parking problems. Moreover, some drivers used (until September 2000) above-mentioned "loopholes" to park legally outside designed parking spaces but without fee paid.

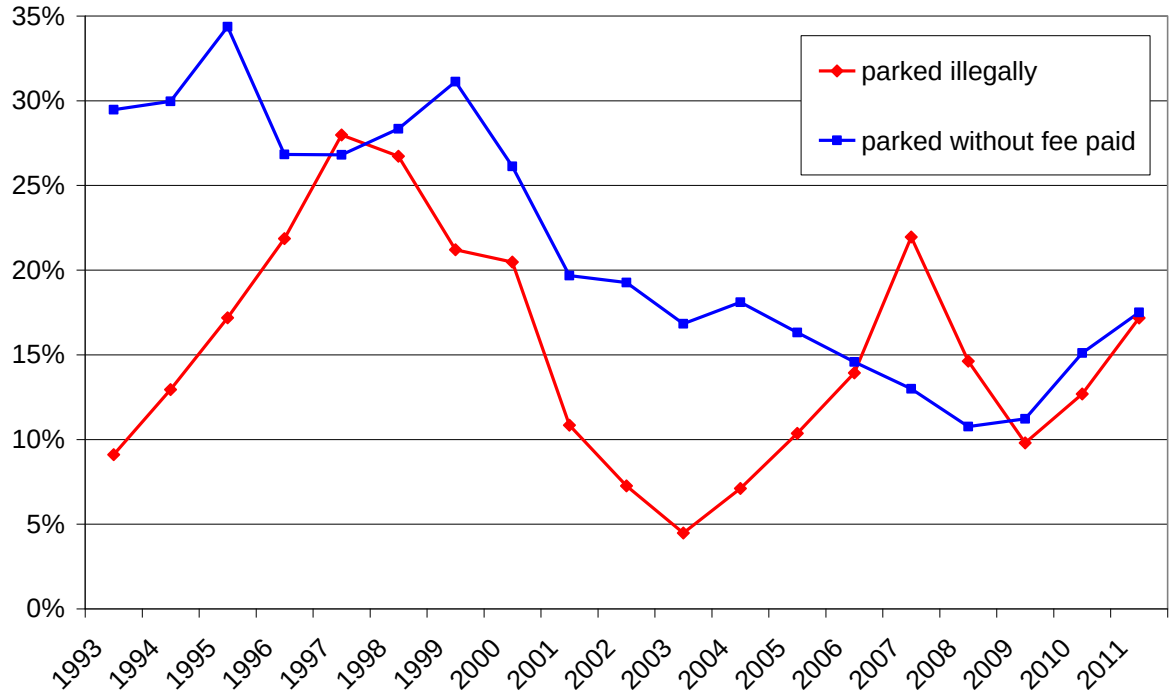

Fig. 4. Percentage of cars parked illegally and without fee paid (on designed parking spaces) the SPP (Paid Parking Zone) in 1993-2011. Source: own compilation based on data of Urban Road Management (ZDM Poznań)

Another extension of the paid parking zone is planned by the local authorities for the coming years. This time SPP should cover two another old neighbourhoods (Łazarz, Wilda). Recently, the municipal council has decided to extend paid parking hours from 8:00 a.m. on weekdays, and from 10:00 a.m. to 2:00 p.m. on Saturdays. This change should become effective in the middle of 2012.

In the absence of a sufficient amount of multi-storey parking lots, which would meet the needs of parking for cars, Parking Policy calls for 13 such facilities in the city centre. The first and so far the only one underground parking was opened at the Liberty Square (Plac Wolności) in 2006. The cost amounted to about 140 million PLN, and the capacity is 540 parking spaces. It has been developed in a build – operate – return system. Together with the opening of the new underground car park, the City of Poznań eliminated about 450 parking places on sidewalks, although the official plans stated that 540 places should be removed. After negotiations with the investor, the city lowered the number of closed places by 90 (surprisingly, on the initiative of local authorities themselves). Moreover, a significant part of the removed places is only "closed" during the operating hours of the car park (10 a.m. – 6 a.m.), so in fact they can be used for illegal parking. Not surprisingly, the occupancy of the underground car park has turned out to be below the assumed targets. Despite numerous attempts from the side of the local authorities, no potential investors for other 12 planned parking lots have appeared so far.

6 DRIVERS CONQUER SPACE. A STORY OF A HOUSING ESTATE

As the city of Poznań expanded in the post-war period, a huge demand for housing space occurred. The response of government for this demand was a large-scale project nicknamed "northern development axis". A suburban development, with large housing estates supplemented by other functions (for example, a university campus), but a linear one, with all the elements located along a rapid tram line. The plan was divided into several phases, and the first of them to be developed was the closest to the city centre – Winogrady. It was then subdivided into five housing estates, and one of them was named Osiedle Przyjaźni

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(Friendship Estate – the Polish-Soviet friendship was meant, in accordance with the political climate of that time). The estate has been built in the 1970s by a housing cooperative, which is still responsible for management and owns most of the land.

From the perspective of urban design, the estate is a superblock. This spatial form is inseparably linked to the rule of traffic mode separation, the quasi-dogma of modernist planning. To make things clear, traffic separation was not an original idea of modernists, since it had already been applied, for example, in the famous planned community of Radburn in the U.S. state of New Jersey (1929), which bears more similarity with garden cities than with large housing estates. Yet, in the socialist "shortage economy" there was little demand for villa suburbs, but rather for mass housing.

This economy was also incapable of large-scale automobile manufacturing. Waiting time of several years for a tiny "Polish FIAT" (produced in Poland under a license) was nothing unusual. Under these circumstances the planners reasonably assumed that the ratio of automobile ownership would not exceed the range of 100 – 200 cars per 1000 inhabitants. The residents were supposed to commute mainly with the public transit, and so they did, notwithstanding that the rapid tram has not been constructed until 1997, so more than a decade after the last part of Winogrady had been finished (eventually, the original idea of "northern development axis" has been only partly realized). Moreover, the planners assumed that most basic goods and services should be provided in a walking distance. Unfortunately, the "estate centre" fell victim to financial cutbacks, and only a couple of years later shopping malls have filled the niche, certainly equipped with multi-storey car parks.

Following the rule of traffic separation, the estate was conceptually divided into three concentric zones. Car drivers should only have convenient access to the outer zone, whereas the two inner zones, with housing, schools, and leisure facilities, should be a domain of pedestrians and cyclists, with limited access for cars (Marciniak 2005). No through traffic was allowed within the superblock, and also no public transit. As the projected ratio of motorization was low, not much space was allocated for parking. The basic solution was to allow on-street parking, which to some extent collided with the idea of traffic-free internal zone, but with a relatively small number of drivers the negative effects were tolerable. Yet the conditions have changed as the wave of mass motorization reached Poland.

Rapidly increasing level of motorization, especially after the accession of Poland to the EU (2004), which allowed for duty-free import of used cars, and so made car ownership as cheap as never before, created a high demand for parking space. This caused a trouble especially for large housing estates, which as already mentioned, have been designed mainly for non-motorized mobility.

There are several kinds of parking spaces on the estate. In the two blocks of flats that have been constructed in last years there are underground car parks, which serve mostly their inhabitants. Then there are paid parking spaces with a capacity for several hundred cars, with monthly fee of about 150 PLN. Those who do not wish to pay, can park their car on the street, although in certain times they need to spend some time cruising for a free place. And if they are unable to find one, or simply want to park closer to the door, they can use another option – wild parking. It means parking the car in such a way which is either illegal (for example, does not leave enough space for pedestrians), or forces other drivers to disobey the rules (for example, to drive where it is not allowed to). Finally, there are over 500 parking places in car parks adjacent to shopping centres, mainly in the northern part of the estate.

The story of a last couple of years is a story of drivers taking more and more space of the estate. The settlement of parking places has also affected driving behaviour, which will be mentioned in the later part. The process of taking over the space has been in part spontaneous, and in part an organized one. Paid private parking lots have been created between the blocks of flats, where – according to the principles of modernism – much "social" space was left. Yet it turned out to be not enough.

Demand for parking space increased when a private developer built a new block in the north-western part of the estate. The weak system of spatial planning has been usually unable to prevent such "in-fill" developments in large housing estates that have become quite common in the last years because of the "housing boom". The building is equipped with an underground car park, but the number of parking spaces turned out to be insufficient (62 places per 188 dwellings). This led to a conflict between the residents of the block and of the neighbouring buildings, who claim that new neighbours leave their cars on a parking lot which belongs to the housing cooperative. In their opinion, as non-members, they are not entitled to do that.

To solve the conflict, the authorities of the housing cooperative have decided to turn another bit of green space into a parking lot. Yet, some residents of the nearest block protested against having cars park too close to their windows. They proposed to limit access to the existing lot to the members of cooperative only. They also demanded a change of authorities of the cooperative, but the attempt was unsuccessful. Successful on the contrary has been until now their opposition against the new parking lot.

Having learned from the experience, the authorities of the housing cooperative had planned a much larger underground car park, when they have built a new block of flats a couple of years later. They have also consequently pursued the goal of increasing parking space by taking over the green space. Recently a new parking lot for about 50 cars has been built at the very heart of the estate, in a zone that in original plans was considered as "internal", so essentially free from car traffic. However, as the construction of new blocks has already shown, the old plans are hardly obeyed.

The new parking lot is located next to Hercena street, which runs from east to west through the middle of the estate. Originally it was only allowed to drive in the eastern and western part, and the central part was only accessible for pedestrians and cyclists. This was a convenient and safe solution since a small park is located in the northern part of the street, and many people with small children go through. Because of the construction of the new parking lot, traffic rules on Hercena street have been changed (fig. 5). About 100 m long section of the pedestrian route has been converted into a street with sidewalk. In the western part, the pedestrian section separating the traffic from another street (running from north to south) is now only about 20 m long. There is no physical barrier that would stop the traffic, and it is not possible to establish one, because the street is used by emergency vehicles. And how do the drivers behave in such situation? Many of them do not hesitate to drive through the pedestrian part. A short distance, but some rule has been broken.

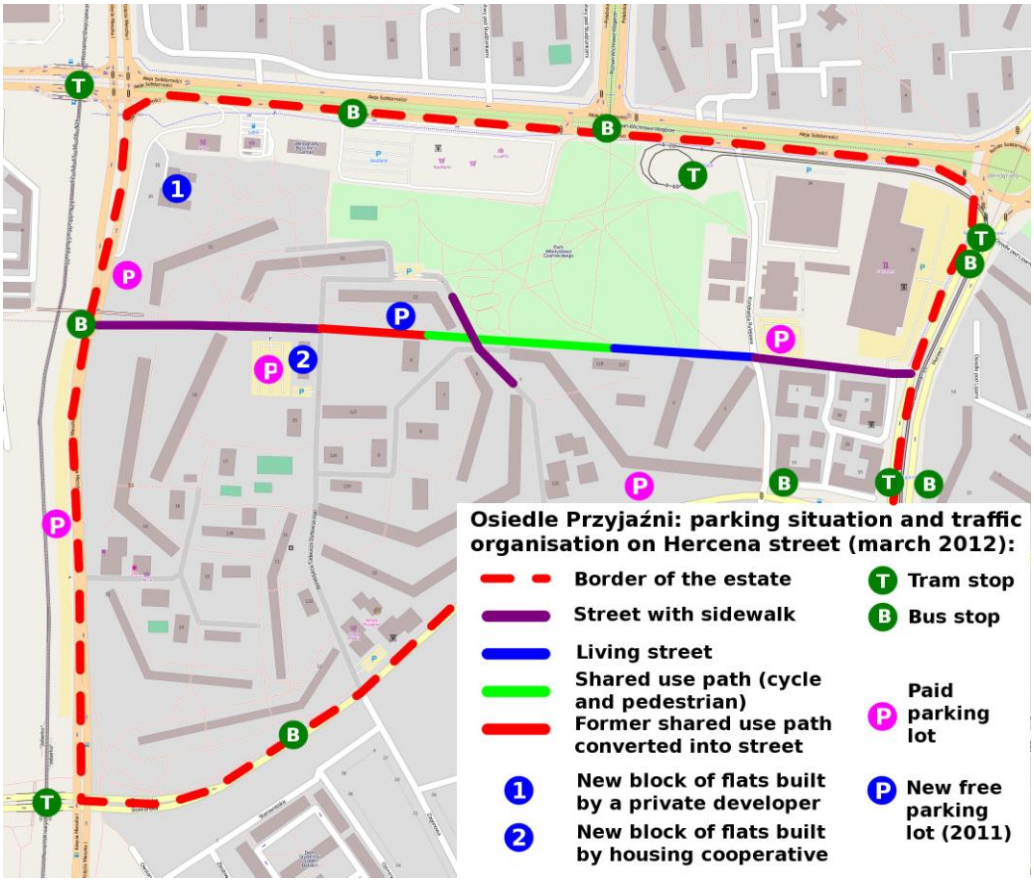

Fig. 5. Case study: changes in traffic organisation caused by a new parking lot. Source: own elaboration; maps based on OpenStreetMap.org.

And this was not the end. The changes had a psychological effect. As the drivers have noticed that many people disobey the rules, they felt encouraged to do the same. And so more drivers appeared on the longer part of pedestrian route, the one which is close to the park. First just a small step, then a bigger one. Each day several dozen of cars drive through the pedestrian route, and the number is growing. They have a very small chance to be fined, because the municipal police does not make controls frequently. The pedestrians seem to

be accustomed to the new situation, just the parents need to look after their children more carefully. Recall, many pedestrians are at times drivers and vice versa.

Some general conclusions can be drawn from this particular case. Several decades ago the rule of traffic mode separation was seen as a great progress in urban design, or even the salvation for "dying" cities. A great example of this popular belief is Hans Bernhard Reichow's work "Die autogerechte Stadt", and especially its very enthusiastic reception among planners throughout Europe (Reichow 1959). The basic idea of traffic mode separation was to divide the city into a "realm of drivers" and a "realm of non-drivers". Both "realms" should coexist peacefully, respecting each other's rights. Yet, the concept turned out not to work very well. The drivers were not only unwilling to respect the rights of non-drivers as "minority" in their own realm. They have also invaded the realm of non-drivers, as they felt that driving was not convenient enough yet. So traffic mode separation in fact turned into a "battle of realms", with one side having a huge advantage of power over the other. The positive benefits of this battle for the city are rather questionable.

7 CONCLUSION

Poznań, like other Polish cities, remains under strong automobile pressure. The dominance of cars in urban space is clearly visible, not only within the city center area, but at modernistic housing estates as well. Downtown streets are losing their representative character, while housing districts are deprived of recreational areas and walking routes. The original urban design and layout of the city is being distorted. One of the greatest obstacles to restore spatial order are the legal provisions, which, on one hand, do not protect sidewalks effectively against illegal stopover, while allow for destruction of spatial structures on the other. Lack of stringent legislation makes the construction of multi-storey car parks unprofitable. Parking chaos continually deepens. Yet, flawed legislation does not necessarily imply passivity. The city has a great potential to organize the urban space through design. But surprisingly it is not using it. Nor does it use the possibility of lobbying for improved legislation, as there is no political will. This kind of thinking is grounded in the realities of the 1990s, when it was the criterion of car accessibility what marked the fashionable investments. Nowadays, one can see that the investors interested in central locations expect primarily the improvement of pedestrian conditions. In 2011 local media reported two cases with a symbolic meaning. In the first case, a German investor withdrawn from the purchase of the "House of Books" (multistory shopping mall of 1970s.) due to insufficient volume of pedestrian traffic, even though the building is located straight in the city center. In the second case, an Irish investor, who modernizes an office complex at Ratajczaka St., explained that among the main reasons for his investments were plans for a "zone 30" and new tram line.

Poznań, without a proper parking policy, exposes itself to the risk of stagnation, which will foster the escape of people and commerce to the suburbs.

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Pathology of Urban Space Based on Standard Designs for Wheelchair Users, Sari 2011

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1 ABSTRACT

Purpose: In recent years the practitioners and sociologists apply all urban standard design so that all citizens can equally make use urban facilities and live in their privacy. Persons with disabilities are members of society that have limitations and don't live like normal people. Environmental conditions should be in such a way that they can increase their ability and quality of life. In this study we analyzed the urban space according to standard design for wheelchair users in Sari. This historically attractive city is located in north of Iran.

M&M: This was a cross-sectional study done in spring 2011. A checklist was developed according to governmental and international standards. Thirty restaurants, 20 streets and 20 bus stations were randomly selected. All of Public drinking-fountains, Parks, Cinemas, Libraries, Museum, Gyms and Public toilets were assessed. Content validity was obtained by consultation with experts. These places examined by experienced wheelchair users. Reliability was tested "test-re-test" method (Pearson Correlation Coefficient, r=0.78). Scales for evaluation were as; existed as standard, existed but not as standard. Data entered the SPSS (16) software to analyze.

Results: Sari has 300.000 population and 3923 square kilometer area. This city has 4 parks, 3 public toilets, 3 Public drinking-fountains, 2 cinemas, 2 libraries, 2 gyms and one museum. One hundred percent of all intended pedestrians, bus stations and restaurants and other items are inapplicable for persons who always use wheelchair in their life and relied on them.

Conclusion: This survey showed that since urban design isn't based on international standards, the disabled especially people who utilize wheelchair can't use urban facilities and have to stay at home and therefore the quality of their life reduces. It seems it is necessary to revise urban design, governing and performing of correct a fair law.

2 INTRODUCTION

Many people become physically disabled in some occasions in their lives. There are few people who remain healthy and able in whole period of their life. Enjoying life, attending and progressing in society are the right of all people. A major outcome of the "International Year of Disabled Persons" was the formulation of the World Program of Action (WPA) concerning disabled persons, adopted by The United Nations General Assembly (UNGA/GA), that was important act towards recognizing the rights of the disabled, understanding of their needs and appreciation of their capabilities on 3 December 1982, by its resolution 37/52 (1-3). The WPA is a global approach to promote disability prevention, rehabilitation and equalization of opportunities, which pertains to full participation of the disabled persons in social life and national development (3). The conference on the capabilities and needs of disabled persons in the economic and social commission for Western Asia (ESCWA) region was held in November 1989, recommended that city planning and construction legislation, should take into account the conditions that facilitate the movement of disabled persons and ensure their safety, including in the design of infrastructural services, transport and the entrances and interiors of buildings. Early in 1994, ESCWA was requested to provide Lebanon with assistance in developing construction standards and policy recommendations to accommodate disabled people. ESCWA began with an assessment of the magnitude of the issue on the national level, hoping to devise a long-term strategy and aiming at placing urgent short-term measures within an integral capacious perspective. The Lebanese company for the development and reconstruction of Beirut central district (SOLIDERE) and ESCWA provided the manual that it can also be used as a reference by designers and planners (1). A barrier-free environment is a space that allows free and safe movement, function and access for all, regardless of age, sex or condition. A barrier- free environment can be of four domains (1, 4):

- Inside buildings

- In the immediate vicinity of buildings
- On local roads and paths
- In open spaces and recreational areas.

As far as the built-up environment is concerned, it is important that it should be barrier-free and adapted to fulfill the needs of all people equally. As a matter of fact, the needs of the disabled matches with the needs of the majority, and all people are at ease with them. As such, planning for the majority implies planning for people with varying abilities and disabilities. The disabled people should be to take an active part in society and lead a normal life. To be active, a disabled person should be able to commute between home, work and other destinations (1). This research analyzed the urban area according to the international codes for wheelchair users in Sari.

3 MATERIAL & METHODS

This was a cross-sectional study. A checklist was created by consulting the experts and according to the national codes. Ten items was looked for. Thirty restaurants, 20 streets and 20 bus stations were randomly selected. All of Public drinking-fountains, Parks, Cinemas, Libraries, Museum, Gyms and Public toilets were assessed. Scales for evaluation were as; "existed as the standard" and "existed but not as standard". Content validity was obtained by consultation with experts. Examiners were experienced wheelchair users familiar with design codes. Reliability of checklist was examined by retesting the 10 random selected items in 2 weeks (Pearson Correlation Coefficient, r= 0.78). For analyzing data we used of SPSS (16) soft ware.

4 RESULTS

Sari is a historical city and locate in north of Iran. It has 300,000 population and 3923 square kilometer area. This city has 4 parks, 3 public toilets, 3 Public drinking-fountains, 2 cinemas, 2 libraries, 2 gyms and one museum. One hundred percent of all intended pedestrians, bus stations and restaurants and other items are inapplicable for persons who always use wheelchair in their life and relied on them (Table 1).

	Items	Standard No. (%)	Existed/Not standard No. (%)
1	Pedestrian	0 (0)	20 (100)
2	Bus station	0 (0)	20 (100)
3	Restaurant	0 (0)	30 (100)
4	Park	0 (0)	4 (100)
5	Public drinking-fountain	0 (0)	3 (100)
6	Cinema	0 (0)	2 (100)
7	Library	0 (0)	2 (100)
8	Public toilet	0 (0)	3 (100)
9	Museum	0 (0)	1 (100)
10	Gym	0 (0)	2 (100)

Table 1: Condition of urban facilities for wheelchair users, Sari, 2011.

Figure 1: The public drinking-fountain is located on platform. Figure 2: The ramp in the public toilet isn't standard.


Figures 3 and 4: The design of bus stations aren't standard for all people especially wheelchair users.


Figures 5 and 6: Park has stairs and bollards. There isn't any ramp for the disabled.


Figures 7 and 8: As it is shown in the pictures, the disabled couldn't walk in the pavement.


Figures 9 and 10: The junction point between pedestrian and street should be flat but in these pictures we are faced to some levels.


Figures 11 and 12: Street has a level that wheelchair users couldn't go across the street.

5 DISCUSSION & CONCLUSION

The study showed Sari has not urban design standards minimal for the disabled therefore they cannot present in society actively and their physical and mental situations deteriorate. Eleven years after the distribution of regulations of appropriateness of buildings for the disabled, few officials and constructors observed such

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issue (5). Concept of the quality of life is multifaceted and comparative. It is affiliated to time, place, personal and social features (6). There are two approaches in the studies of urban quality of life, subjective and objective. Approaches are used often separate from each other and are rarely combined to assess the quality of life. (7). Quality of life in subjective aspects reflects people perception and evaluation of their own life. It is measured by social and material indices (8). In these recent decades many countries have emphasis on the role of people, local communities and civic society in urban management at global levels (9). The principles of the urban management include:

- urban civility and citizens' education
- continuous poll from citizens
- codified rules for informing and guiding citizens
- gaining trust of public and private sector
- verifying and revising the actions which have been done (10)

Australian Capital Territory (ACT) provides design standards for urban infrastructure. In section 13, pedestrian & cycle facilities are described. This standard aims to provide Practitioners with a suite of planning considerations and design measures to ensure a consistent approach is maintained in the provision of pedestrian and cycling facilities. Pedestrians and users of wheelchairs, including motorized wheel-chairs have right of way over cyclists and users of wheeled recreational devices including roller blades, roller skates and skateboards (11). There are lots of urban standard designs were performed in many countries especially the developed countries therefore the disabled could work and attend in the society (12-19). Each city does not belong to especial type of people. Indeed, city looks like a family. By planning the cities correctly, all members can take a good advantage in their residence. It seems necessary to revise teaching in university and performance in urban management. In order to give a chance for all to use equal value from urban facilities, historical construction should be rebuilt and the government should make sure to perform the correct laws. Because almost all cities in Iran don't have standard designs for people with disability, we recommend the international conventions to provide Iran with assistance of standards of developing construction to accommodate disabled people.

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Pedestrian Crossing Behaviour in Signalized Crossings in Middle Size Cities in Greece

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1 ABSTRACT

Pedestrian road safety is a key point of the transport road safety policy in urban areas. Pedestrians are vulnerable road users and despite their limited representation in traffic events, pedestrian involved injuries and fatalities are overrepresented in traffic collisions. This paper presents the findings from the examination of the pedestrian crossing behaviour in signalized crosswalks. The study took place in the city of Volos, Greece, in peak traffic hours, during the summer of the year 2010. The target of the study was to count the pedestrian crossing time and velocity for each crosswalk. Furthermore, the target was to identify the illegal pedestrian crossing with red traffic light, criticize their behaviour and propose remedial actions.

More than 1300 pedestrians were recorded using a video camera in twelve signalized crossings located in the center of the city, across main arterials. The pedestrians were categorized according to their sex in men and women and their age in three age groups: 0-20, 20-50 and over 50 years old. The analysis of the pedestrian video data was achieved with the use of a state of the art tool, the Captiv L2100 (TEA). The researcher entered the video data in avi format and created the project, the description protocol and the video configuration. The researcher tested each video, marking each pedestrian crossing in the video sequence window, with great accuracy in a short period of time. After the data analysis and the creation of the post coding file, the results were exported in excel format, where they were following analyzed.

Some of the results of the study were that the 17% of the pedestrians crossed the streets with red traffic light. The velocity of the younger pedestrians was 1,32m/sec and of the older ones was 1,19m/sec. Men walked faster (1,32m/sec), than women (1,25m/sec). Furthermore, the pedestrians walked faster crossing the streets with red traffic light (1,34m/sec), than with green one (1,28m/sec). Finally, this study criticizes the lack of pedestrian road safety education and illegal crossing behaviour.

2 INTRODUCTION

2.1 Pedestrian road safety

Pedestrian road safety is a key point of the transport road safety policy in urban areas. Pedestrians are vulnerable road users and despite their limited representation in traffic events, pedestrian involved injuries and fatalities are overrepresented in traffic collisions. Crosswalks are sites where pedestrians face lower levels of road safety, because they have to cross the street and must be aware of the incoming traffic. Intersections with high vehicle flows should be signalized in order to prevent accidents and raise the level of road safety for both pedestrians and vehicle drivers.

The pedestrian illegal crossing behaviour is a major fact in the road safety issue. The main concerns are the following:

- Pedestrians cross the streets without noticing the incoming traffic, usually because their attention is distracted.
- Pedestrians usually miscalculate the traffic gaps.
- Pedestrians walk across the street, usually due to lack of space on sidewalks.
- Pedestrians cross the streets in midblock location or out of designated crosswalks.
- Pedestrians do not follow the indications of the traffic lights.

2.2 Objective of the study

This study examines the pedestrian crossing behaviour in twelve signalized crosswalks located across main urban arterials in the city of Volos, Greece with the use of a new tool that analyzes video data: Captiv L2100 (TEA). The pedestrians were categorized according to their age and sex. The main questions of the study were the following:

- How much is the pedestrian crossing time.

- How much is the pedestrian crossing speed.
- Do pedestrians cross the street with red or green traffic light.

3 LITERATURE REVIEW

3.1 Pedestrian crossing behaviour

Many studies have examined the pedestrian crossing behaviour analyzing several factors. Rosenbloom (2008) analyzed the behavior of 1392 pedestrians in signalized crosswalks. The first hypothesis was that pedestrians' behavior waiting to cross the street depends on the factor of being alone or in group. It was expected that the pedestrians would be more optimistic of crossing the street with red traffic light if they were accompanied. Furthermore, the second hypothesis was that he pedestrians would be more optimistic of crossing the street with red traffic light if another pedestrian crossed before him. The first hypothesis did not come true, but the second did so. Moreover, men were more optimistic to cross the street with red traffic light than women. At last, the longer waiting time in red light phase and the less waiting pedestrians increases the possibility of a pedestrian crossing the street with red traffic light.

Hill and Holland (2008), analyzed the factors that influence the pedestrians' crossing behavior. Using video data they checked the crossing decisions of 213 pedestrians. They counted safe or not traffic gaps for every person, according to their walking speed. The most unsafe choices were taken from men and especially the older ones. Factors like the pedestrians' driving experience, their physical skills, walking speed, sex, age and understanding of the traffic characteristics, were important in order to decide where and when to cross the street.

Pedestrian risk decreases as pedestrian flow is also decreased (Leden, 2002). He made that conclusion after studying pedestrian accident data from 300 signalized intersections in Hamilton, Ontario, during the years 1983-1986. Pedestrian safety at semi-protected schemes, where left-turning vehicles face no opposing traffic but have possible conflicts with pedestrians, was compared with pedestrian safety at normal non-signalized approaches, where right-turning vehicles have potential conflicts with pedestrians. Pedestrian safety seems to be affected much more by the traffic pattern (left or right-turning traffic). At low vehicular flows, right turns and semi-protected left turns tend to be equally safe for pedestrians, but right turns are safer for pedestrians than semi-protected left turns at high vehicular flows. If risk for pedestrians is calculated as the expected number of reported pedestrian accidents for pedestrian, the risk decreases with increasing pedestrian flows. One explanation could be increased driver alertness with increasing pedestrian flow. However, an increased pedestrian flow might lead to more pedestrian accidents if promotion is not accompanied by appropriate safety measures.

Ekman (1996) examined 95 non-signalized intersections in Malmo and Lund in Sweden and concluded that the rate of pedestrian conflicts per pedestrian was not influenced from pedestrian flow. According to Ekman the individual pedestrian does not seem to benefit from the presence of other pedestrians. Another explain is that the motorists expect the presence of pedestrians (at least if pedestrian flow exceeds 30 pedestrians per hour. Ekman also found that if risks for pedestrians are calculated as the expected number of reported pedestrian accidents or conflicts for pedestrian, the risk increases as traffic flow is also increased.

Signalized intersections should consider signal phases for pedestrians which do not significantly delay them. Wang et al (2008) concluded that with high delay, pedestrians are likely to violate the signal. From field observations, most pedestrians searched for traffic gaps and crossed the street without following the traffic signal indications. Furthermore, pedestrian intervals should adjust to the vehicle crossing phase, based on the rule that no conflicting phase should be on together.

Pedestrian road safety depends on their exposition on traffic flow. Many studies have concluded that about 25% of the pedestrians cross the streets illegally (Mullen et al, 1990). Keegan and O'Mahony (2003) reported that 35% of the pedestrians cross during the red light phase. Pedestrians usually cross the streets in sites they consider as more convenient or located across their desire route in order to achieve minimum time delay of physical effort.

Many studies have used video data in order to examine the pedestrian crossing behaviour (Hao et al, 2008; Jiangang et al, 2008; Eliou and Galanis, 2009). Some of them use state of the art equipment. Ismail et al (2009) used a real time video data analysis system, which registers vehicle and pedestrian tracks and

recognizes traffic conflicts. Relative equipment can examine bicyclists' behaviour. Constant et al (2010) used an "Intelligent Video Analysis System" (IVAS). Connecting an internet protocol (IP) with a video camera in a building above the tested street they could track the bicyclists' route and count their speed.

4 METHODOLOGY

4.1 Data collection

The crosswalks where located across the Benizelou St. and Kartali St, which are main arterials located in the center business district of the city (Fig. 1). The crossing streets were the following:

- Gallias St. (collector arterial)
- 28 Oktovriou St. (collector arterial)
- Dimitriados St. (main arterial)
- Iasonos St. (man arterial)

The data collection took place in June 2010, during peak traffic hours (12:00-14:00). A video camera was put in the opposite of each crosswalk in order to have a complete view of the pedestrians waiting and crossing the street in both sides. The time duration of each video record was 30min for each crosswalk. After the video data collection, certain amount of photos of the crosswalks were collected and the crosswalks' length was noticed in order to count the pedestrians' speed.

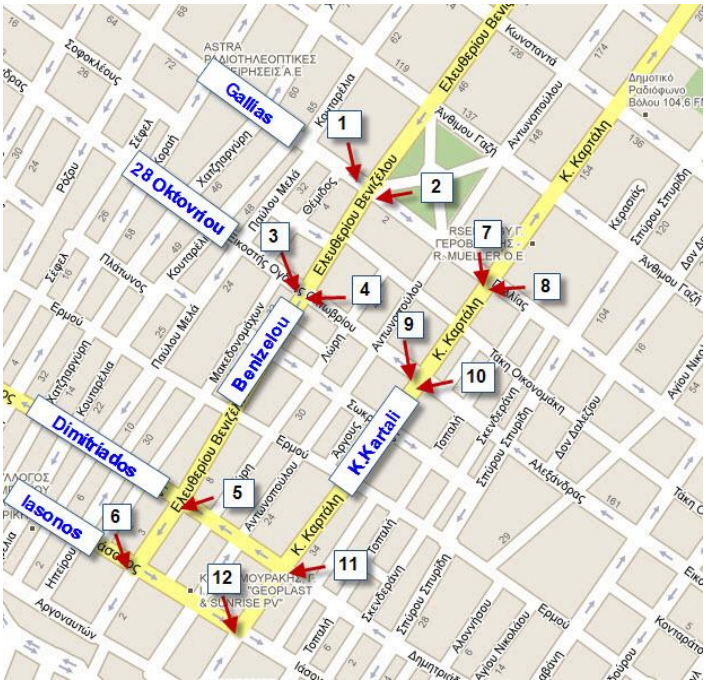

Fig. 1: Study area

4.2 Data analysis

After the video data collection, the video was exported from the camera to the pc in avi format in order to be compatible with the Captiv L2100 software. The first step of the analysis was the creation of the project in the site: C:\Program Files\Captiv L2100\Project. The second step was the formation of the "Description Protocol", which is the most important step of the analysis because the researcher forms the coding (Fig. 2). The pedestrian crossing behaviour was analyzed according to their sex and age. The columns of the description protocol were the following:

- Code: 020mrs (abbreviation of the characteristic)
- Coding: 020 man red start (analytic presentation of the characteristic)
- Class: 1man
- C: Color of each code

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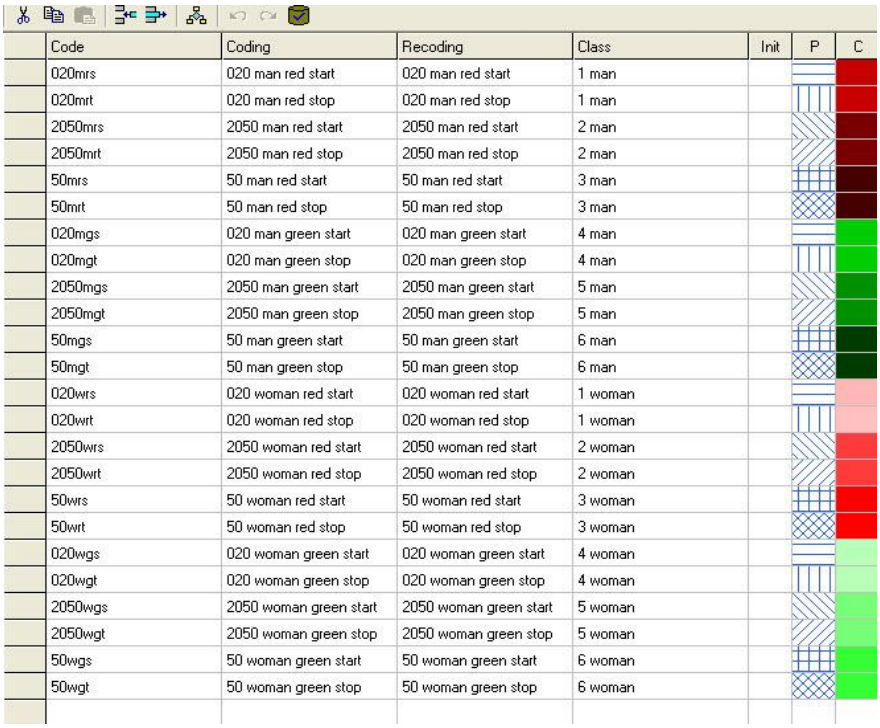
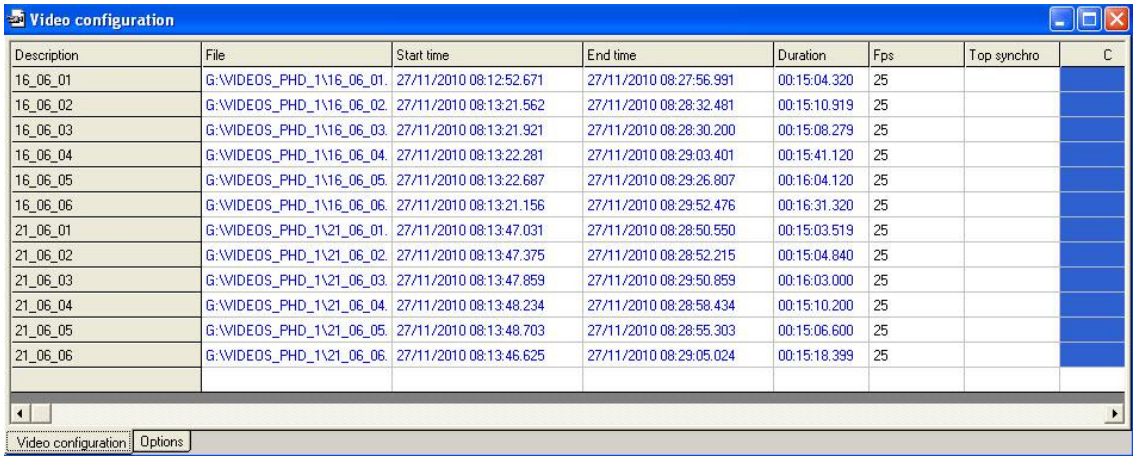
12 classes and 24 codes were formed because in order to notice the time when the pedestrians start and finish crossing the street. So, the coding "020 man red start" describes a pedestrian in the age group of 0-20 years old who starts crossing the street with red traffic light and the coding "020 man red stop" describes the pedestrian in the age group of 0-20 years old who stops crossing the street with red traffic light. For each coding line a proper colour was selected. With red color was marked the coding referring to pedestrians who crossed the street with red traffic light and with green colour the ones who crossed with green traffic light. Darker colours referred to men and brighter to women.



Code	Coding	Recoding	Class	Init	P	C
020mrs	020 man red start	020 man red start	1 man			
020mrt	020 man red stop	020 man red stop	1 man			
2050mrs	2050 man red start	2050 man red start	2 man			
2050mrt	2050 man red stop	2050 man red stop	2 man			
50mrs	50 man red start	50 man red start	3 man			
50mrt	50 man red stop	50 man red stop	3 man			
020mgs	020 man green start	020 man green start	4 man			
020mgt	020 man green stop	020 man green stop	4 man			
2050mgs	2050 man green start	2050 man green start	5 man			
2050mgt	2050 man green stop	2050 man green stop	5 man			
50mgs	50 man green start	50 man green start	6 man			
50mgt	50 man green stop	50 man green stop	6 man			
020wrs	020 woman red start	020 woman red start	1 woman			
020wrt	020 woman red stop	020 woman red stop	1 woman			
2050wrs	2050 woman red start	2050 woman red start	2 woman			
2050wrt	2050 woman red stop	2050 woman red stop	2 woman			
50wrs	50 woman red start	50 woman red start	3 woman			
50wrt	50 woman red stop	50 woman red stop	3 woman			
020wgs	020 woman green start	020 woman green start	4 woman			
020wgt	020 woman green stop	020 woman green stop	4 woman			
2050wgs	2050 woman green start	2050 woman green start	5 woman			
2050wgt	2050 woman green stop	2050 woman green stop	5 woman			
50wgs	50 woman green start	50 woman green start	6 woman			
50wgt	50 woman green stop	50 woman green stop	6 woman			

Fig. 2: Description Protocol (Captiv L2100)

After the formation of the description protocol, was formed the "Video Configuration" file (Fig. 3). This file was created when the videos were entered in the project. Each video was characterized from its description name, the file where it was saved, the start and end time and its duration (about 15min).



Video configuration

Description	File	Start time	End time	Duration	Fps	Top synchro	C
16_06_01	G:\VIDEOS_PHD_1\16_06_01.	27/11/2010 08:12:52.671	27/11/2010 08:27:56.991	00:15:04.320	25		
16_06_02	G:\VIDEOS_PHD_1\16_06_02.	27/11/2010 08:13:21.562	27/11/2010 08:28:32.481	00:15:10.919	25		
16_06_03	G:\VIDEOS_PHD_1\16_06_03.	27/11/2010 08:13:21.921	27/11/2010 08:28:30.200	00:15:08.279	25		
16_06_04	G:\VIDEOS_PHD_1\16_06_04.	27/11/2010 08:13:22.281	27/11/2010 08:29:03.401	00:15:41.120	25		
16_06_05	G:\VIDEOS_PHD_1\16_06_05.	27/11/2010 08:13:22.687	27/11/2010 08:29:26.807	00:16:04.120	25		
16_06_06	G:\VIDEOS_PHD_1\16_06_06.	27/11/2010 08:13:21.156	27/11/2010 08:29:52.476	00:16:31.320	25		
21_06_01	G:\VIDEOS_PHD_1\21_06_01.	27/11/2010 08:13:47.031	27/11/2010 08:28:50.550	00:15:03.519	25		
21_06_02	G:\VIDEOS_PHD_1\21_06_02.	27/11/2010 08:13:47.375	27/11/2010 08:28:52.215	00:15:04.840	25		
21_06_03	G:\VIDEOS_PHD_1\21_06_03.	27/11/2010 08:13:47.859	27/11/2010 08:29:50.859	00:16:03.000	25		
21_06_04	G:\VIDEOS_PHD_1\21_06_04.	27/11/2010 08:13:48.234	27/11/2010 08:28:58.434	00:15:10.200	25		
21_06_05	G:\VIDEOS_PHD_1\21_06_05.	27/11/2010 08:13:48.703	27/11/2010 08:28:55.303	00:15:06.600	25		
21_06_06	G:\VIDEOS_PHD_1\21_06_06.	27/11/2010 08:13:46.625	27/11/2010 08:29:05.024	00:15:18.399	25		

Video configuration | Options

Fig. 3: Video Configuration (Captiv L2100)

The next step was the formation of the "Video Sequence" file, which was the basic tool for our analysis (Fig. 4). Each button referred to a coding and its one colour (Fig. 2). We run the videos and marked each pedestrian start and stop time, based on our coding. We were able to stop the video (pause), play it back or synchronize it in a selected time when a pedestrian crossed the street. All the registrations were saved in a "Post Coding" file, which refers to the start and stop time of the pedestrian crossing according to the coding.

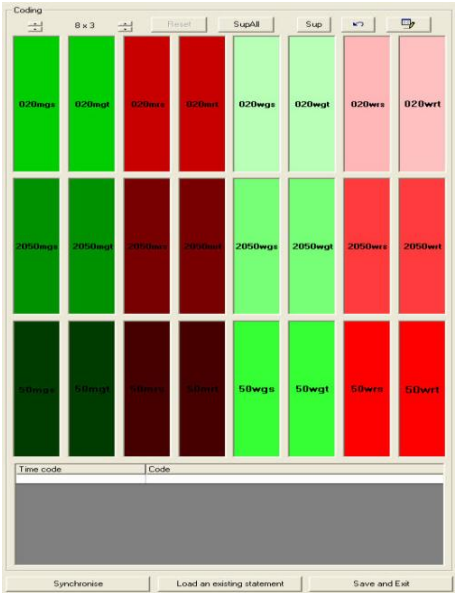


Fig. 4: Video Sequence (Captiv L2100)

After the creation of the post coding file, all the data were exported in the excel software for further analysis. The basic benefit of this analysis procedure was the speed, convenience and reliability of the process, comparing to the manually video analysis.

5 RESULTS

5.1 Pedestrian and traffic flow

The first result of the data analysis was the counting of the traffic flow (Table 1). The highest traffic low were noticed in crosswalks No5-6 and No11-12, located in Iasonos St and Dimitriados St, which are main urban road arterials.

The traffic flow is those streets was about 300% higher than the other crosswalks No1-4 and No7-9, located in Gallias St and 28 Oktovriou St, which are collector arterials. The duration of the traffic signal phases in each crosswalk is presented in Table 2. Higher percentage of green traffic light was noticed in the crosswalks located across the collector streets.

Traffic (1hr)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Vehicle	360	348	108	168	1176	924	312	288	384	408	1044	1212
Motorcycle	180	120	120	108	576	240	96	180	60	48	468	456
Bicycle	24	36	12	12	36	24	24	36	12	24	12	24
Bus	0	0	0	0	48	60	0	0	12	12	48	72

Table 1: Traffic flow data (1 hr)

Time (sec)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Green	45	45	45	45	30	30	50	50	30	30	35	25
Red	25	25	25	25	40	40	25	25	25	25	35	45
Sum	70	70	70	70	70	70	75	75	55	55	70	70
%Green	0,64	0,64	0,64	0,64	0,43	0,43	0,67	0,67	0,55	0,55	0,50	0,36
%Red	0,36	0,36	0,36	0,36	0,57	0,57	0,33	0,33	0,45	0,45	0,50	0,64

Table 2: Traffic signal phase (sec)

In Table 3, are presented the pedestrians who crossed the streets during the data collection time (30min for each crosswalk) and their percentages according to their age, sex and traffic light (Table 4). The crossing behaviour of 1322 pedestrians was analyzed. Separating them by age, 304 pedestrians were under 20 years old (23%), 664 between 20 and 50 years old (50%) and 353 over 50 years old (27%). Separating them by sex, 529 were men (40%) and 793 women (60%). Analyzing their crossing behaviour, 185 pedestrians crossed the street during the red traffic light phase (15%) and 1137 during the green traffic light phase

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(85%). The highest illegal crossing behaviour was noticed in collector streets (8%-28%) and the lowest in main arterials (4%-16%).

Pedestrians in the age group of 20-50 years old were more optimistic to cross the street with red traffic light (55%) and also women (63%) than men (37%), (Table 5), comparing to the sample percentages (Table 4).

N	1	2	3	4	5	6	7	8	9	10	11	12	SUM
0-20	36	8	12	24	21	11	16	39	19	59	28	31	304
20-50	38	51	28	52	67	57	42	70	42	77	96	44	664
50+	21	38	13	29	23	36	24	20	23	46	58	22	353
Men	34	40	19	46	37	50	36	36	38	74	87	32	529
Women	62	57	34	59	74	54	46	93	46	108	95	65	793
Red	8	27	14	23	9	17	13	18	18	23	11	4	185
Green	88	70	39	82	102	87	69	111	66	159	171	93	1137
Sum	96	97	53	105	111	104	82	129	84	182	182	97	1322

Table 3: Pedestrian sample (30min)

N%	1	2	3	4	5	6	7	8	9	10	11	12	AV
0-20	0,38	0,08	0,23	0,23	0,19	0,11	0,20	0,30	0,23	0,32	0,15	0,32	0,23
20-50	0,40	0,53	0,53	0,50	0,60	0,55	0,51	0,54	0,50	0,42	0,53	0,45	0,50
50+	0,22	0,39	0,25	0,28	0,21	0,35	0,29	0,16	0,27	0,25	0,32	0,23	0,27
Men	0,35	0,41	0,36	0,44	0,33	0,48	0,44	0,28	0,45	0,41	0,48	0,33	0,40
Women	0,65	0,59	0,64	0,56	0,67	0,52	0,56	0,72	0,55	0,59	0,52	0,67	0,60
Red	0,08	0,28	0,26	0,22	0,08	0,16	0,16	0,14	0,21	0,13	0,06	0,04	0,15
Green	0,92	0,72	0,74	0,78	0,92	0,84	0,84	0,86	0,79	0,87	0,94	0,96	0,85
Sum	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00

Table 4: Pedestrian sample (%)

Red%	1	2	3	4	5	6	7	8	9	10	11	12	AV
0-20	0,63	0,00	0,21	0,30	0,00	0,24	0,08	0,44	0,44	0,17	0,18	0,00	0,23
20-50	0,25	0,59	0,5 7	0,35	0,56	0,53	0,85	0,44	0,44	0,57	0,45	1,00	0,55
50+	0,13	0,41	0,21	0,35	0,44	0,24	0,08	0,11	0,11	0,26	0,36	0,00	0,22
Men	0,25	0,37	0,36	0,52	0,44	0,71	0,31	0,22	0,22	0,39	0,45	0,25	0,37
Women	0,75	0,63	0,64	0,48	0,56	0,29	0,69	0,78	0,78	0,61	0,55	0,75	0,63
Sum	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00

Table 5: Pedestrians crossing with red traffic light (%)

In Table 6, is presented the pedestrian crossing time in each crosswalk according to their age, sex and crossing behaviour. Due to the difference of the crosswalks' length it was better to count the pedestrian crossing speed (Table 7). The pedestrian crossing speed was analyzed according to their age (Fig. 5), sex (Fig. 6) and traffic light (Fig. 7). It is clear that pedestrians under 50 years old cross the streets faster (1,30m/sec) than pedestrians over 50 years old (1,18m/sec). Furthermore, men walked faster (1,31m/sec) than women (1,25m/sec). Finally, pedestrians realize the danger for their road safety and cross the streets faster during the red traffic light phase (1,35m/sec) than during the green traffic light phase (1,26m/sec). The speed profile was relative smooth and steady in all categories (Fig. 5, 6 and 7).

Time (sec)	1	2	3	4	5	6	7	8	9	10	11	12	AV
0-20	4,51	5,00	3,59	3,69	6,73	7,72	3,72	4,24	3,27	3,44	5,68	6,08	5,63
20-50	4,61	4,44	3,71	3,56	6,57	7,62	4,17	4,43	3,50	3,57	6,44	6,76	5,48
50+	5,06	4,89	4,41	4,06	7,04	7,80	5,54	4,87	3,82	3,90	7,21	7,61	6,16
Men	4,47	4,41	1,22	3,64	6,91	7,39	4,40	4,24	3,43	3,48	6,53	6,83	5,37
Women	4,77	4,83	1,20	3,80	6,60	7,98	4,55	4,52	3,62	3,69	6,60	6,69	5,87
Red	4,34	4,27	1,25	3,62	6,00	7,43	3,75	4,16	3,67	3,56	6,97	5,38	5,65
Green	4,70	4,81	1,19	3,76	6,76	7,75	4,62	4,49	3,50	3,61	6,54	6,8	5,64

Table 6: Pedestrian crossing time (sec)

L (m)	5,5m	5,5m	4,5m	4,5m	9m	10m	5,5m	5,5m	4,5m	4,5m	9m	9m	
V (m/sec)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**AV**
0-20	1,26	1,14	1,26	1,25	1,37	1,31	1,36	1,32	1,39	1,29	1,46	1,36	1,31
20-50	1,24	1,29	1,25	1,31	1,39	1,38	1,24	1,27	1,33	1,34	1,32	1,23	1,30
50+	1,13	1,20	1,06	1,16	1,32	1,31	0,98	1,17	1,25	1,31	1,19	1,11	1,18
Men	1,28	1,31	1,22	1,29	1,34	1,42	1,23	1,34	1,38	1,33	1,32	1,25	1,31
Women	1,19	1,20	1,20	1,23	1,39	1,28	1,16	1,25	1,28	1,26	1,27	1,24	1,25
Red	1,29	1,33	1,25	1,29	1,55	1,44	1,36	1,34	1,27	1,31	1,32	1,49	1,35
Green	1,22	1,21	1,19	1,25	1,36	1,33	1,16	1,26	1,34	1,29	1,30	1,23	1,26

Table 7: Pedestrian crossing speed (m/sec)

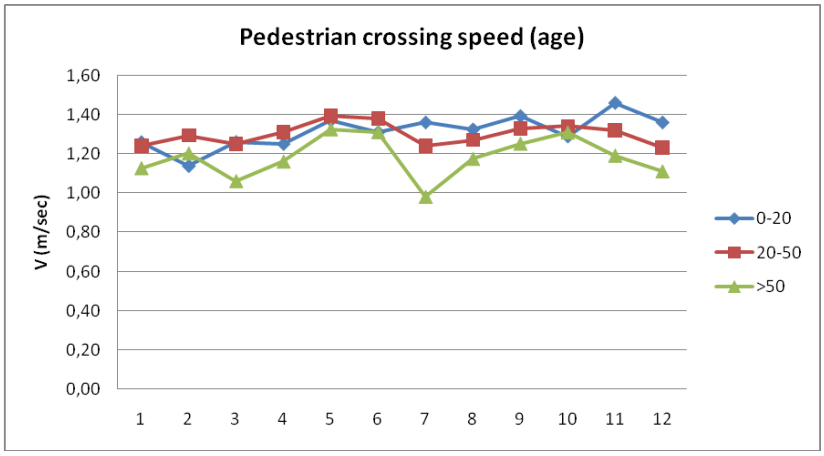

Fig. 5: Pedestrian crossing speed (age)

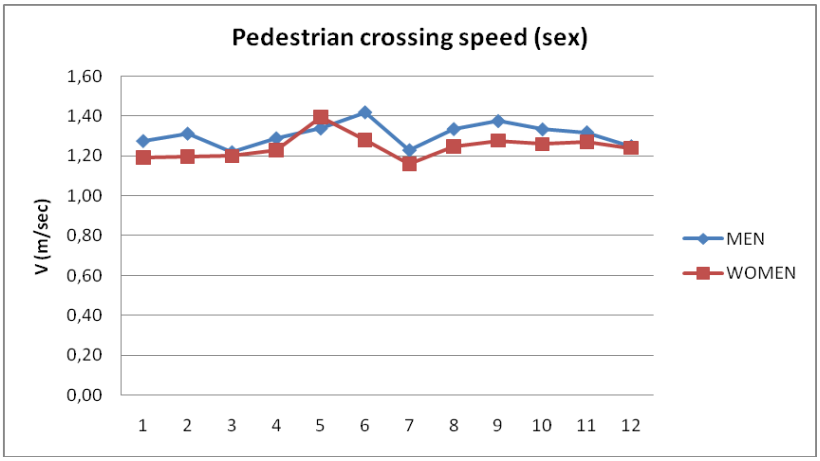

Fig. 6: Pedestrian crossing speed (sex)

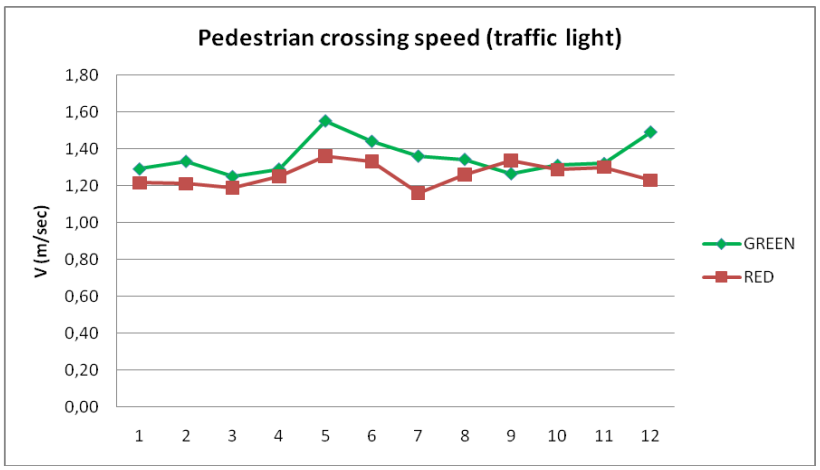

Fig. 7: Pedestrian crossing speed (traffic light)

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6 CONCLUSION

The implementation of the Captiv L2100 (TEA) software was a very useful tool to analyze the pedestrian crossing behaviour with convenience, reliability and speed, using video data. The main conclusions of our study were the following:

- The quantum of pedestrian data collection using this age scale was representative. The 50% of the pedestrians were aged between 20-50 years old, 23% under 20 years old and 27% over 50 years old.
- The 60% of the pedestrian sample was women and 40% men. We noticed a significant dominance of women walking in the center of the city during morning time.
- The 85% of the pedestrians crossed the streets with green traffic light and only 15% with red traffic light. More pedestrians crossed the streets illegally where the traffic flow and speed are lower.
- Older pedestrians crossed the street with lower walking speed (1,18m/sec) than pedestrians 20-50 years old (1,30m/sec) or under 20 years old (1,31m/sec).
- Men crossed the streets faster (1,31m/sec) than women (1,25m/sec).
- Pedestrians walked faster when they cross the streets with red traffic light (1,35m/sec) than green traffic light (1,26m/sec).
- The highest walking speed (1,55m/sec) was noticed when the pedestrian crossed main arterials during the red light phase when the traffic flow gaps are minimized.
- The most illegal crossing behaviour was noticed in women and pedestrians 20-50 years old.
- Pedestrians usually respect the traffic light indications, crossing the street when they judge that there is a safe traffic gap, according to their physical skills and traffic road safety education.

The conclusions of our study can help engineers and local authorities to understand better the pedestrian crossing behaviour and promote remedial actions in urban road network. Furthermore, we propose the implementation of a road safety training program to older citizens in order to improve their walking behaviour.

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Pedestrian Evacuation Planning for Major Events – a New Approach Combining Planning Aspects and Human Factors

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1 ABSTRACT

People's safety and security in urban space has a high priority for planning decisions. Especially at major events pedestrian planning aspects play a decisive role for associated evacuation scenarios. A well-developed urban design of spatial environments, with its escape routes and infrastructure on-site, is consequently most important for a fast evacuation.

The research project REPKA (Regional Evacuation: Planning, (K)Control, and Adaptation), funded by the German Federal Ministry of Education and Research, focuses on open space evacuation of major events, especially in case of national soccer matches. The soccer stadium of the 1st FC Kaiserslautern/Germany (up to 50.000 visitors), located in the inner city with a difficult topography, is centered in the project. First project results show that there are two determining factors to be regarded in context of pedestrian evacuation planning: a) urban design of escape routes in the event's surroundings and b) human factors, like socio-psychological mechanisms on the behavior, environmental perception and orientation of crowds under stress. The combination of these two factors, missing in research on open space evacuation until now, is discussed in this paper. Hence, in the research project REPKA, a spatial analysis was done to identify physical characteristics of escape routes and infrastructure. In addition, research in literature, standardized interviews (with visitors and security services) and observations concerning human factors were conducted. It became evident that different guidance systems (guidance staff, signage, new technologies) are essential for effective use of existing escape routes and a fast evacuation. Totaling, the results reveal that a well-regulated evacuation depends on a well-developed urban design combined with a guidance system including human factors. By this, evacuation time is reduced and thereby people's safety is improved.

This paper aims to make a contribution to a new holistic approach in the field of pedestrian evacuation planning. Moreover, the findings have consequences for interdisciplinary approaches like modeling of pedestrian flows in computer evacuation simulation.

2 INTRODUCTION

At present, mass events are continuously becoming more popular and take place more frequently. Security of attendees is of prime importance, but often not assured. Perilous situations can arise at any time when many people get together in a narrow place. Referring to the Hillsborough Disaster in Sheffield 1989, for example, or recently the Love Parade in Duisburg, Germany 2010, when too many people surged into a place already overcrowded. As a consequence, many people died and hundreds were injured because of too much pressure. There are a lot of other risks and accidents, which necessitate the breaking off or even the evacuation of a mass event. These may be a fire, bomb threat, technical faults or health hazards because of climatic conditions (heat, storm). There is a lot of research on evacuation of buildings, because the planning of escape and emergency routes are part of preventive fire protection and corresponding regulations. Furthermore, various simulation models regarding flight behavior during evacuation of buildings have already been developed (e. g. Shi et al. 2009, Waldau et al. 2003 or Xiaoping et al. 2008).

It is not assumed that visitors are out of danger after they have left the building in which the event was taking place. Not every venue of a mass event is outlying a city center and easy to access for arriving emergency services, such as firefighters, police and ambulance crews. Depending on the kind and extent of the threat or damage, it is necessary to bring visitors further away to safety. However, existing research on evacuation of buildings provides only first benchmarks for open-air events or crowds in public space. This is because "the movements of large number of people are distinctively different in public buildings as opposed to public event venues such as theatres, stadiums, open-air stages, etc." (Waldau et al. 2003, p. 308). For a spatially wide-ranging evacuation of mass events there is a research gap and therefore there is assumed to be a gap in security.

In case of various emergency situations or sudden break-offs of events, people have to be guided adequately for several reasons. Visitors have to be guided in order to avoid perilous situations and accidents within the mass of people, when the density of the multitude of people becomes a threat. They also have to be guided in order to get them to assembly points in a safe place. By splitting off the crowd, emergency access routes can be kept free. This is important, especially in a closely built-up environment, where evacuees stream into a public place with a lot of traffic circulation. The main stream of visitors moves towards the access route of rescue services, who get to the venue time-delayed. At soccer matches perilous situations can additionally arise when hostile fan groups meet each other.

3 INFLUENCING FACTORS ON FLIGHT BEHAVIOR

3.1 Urban design of escape routes

One dominating factor to guarantee a safe evacuation is the urban design of escape routes. Here, it is possible to take influence on the construction of the event's surroundings. So, the planning of elaborated escape routes is the precondition for a safe evacuation. In this research, the escape routes in public space, beyond the property boundaries of the event (e. g. a soccer stadium), are regarded. There are a lot of laws, standards and regulations (e. g. public assembly by-law, state building codes, fire regulations, etc.) concerning the design of escape routes inside the building and the outdoor area within the property boundaries. But what happens after the people have left the venue? People have to be guided controlled away from disaster as far as possible in order to prevent new risks arising from the crowd itself.

Important characteristics of well-designed escape routes are already known. Partly they can be transferred from the broad field of building evacuation standards to open space evacuation in combination with some extra aspects. The aim is to accelerate the pedestrian stream's speed and to raise the quantity of people getting away from disaster as safe as possible. Helbing et al. (2000, p. 489), for example, pointed out: "Improved outflows can be reached by columns [intended obstacles] placed asymmetrically in front of the exits, which also prevent the build up of fatal pressures." Also the barriere-free design of environments is often underestimated. Besides slowdown effects, handicapped people could become active hindrances in the pedestrian flow. The following table shows the most important aspects for a good urban design of escape routes and their consequences for the pedestrian flow (table 1).

Urban design aspects	Consequences for pedestrian flow
Path widths	Determinate the pedestrian flow rate
Soil conditions	Potential risk of stumbling
Barrier-free design	Handicapped people can hinder a pedestrian stream
View-shafts	Orientation and perception of the optimal route away from danger (as safe and fast as possible)
Lighting	Orientation and perception of the optimal route away from danger (as safe and fast as possible)
Intended obstacles	Intentionally positioned obstacles to avoid bottlenecks

Table 1: Urban design aspects and their consequences for the pedestrian flow.

Not only the urban design in its constructional character is an important fact to help people to get away, but also the equipment of public space with emergency signage. After identifying the constructional possibilities to accelerate the pedestrian flow, it is now indispensable to know how people exactly react and behave in case of disaster. As consequence, the question is raised how human factors determine the requirements for urban design.

3.2 Human factors

A mass of people always consists of small or large groups of people. Especially attendants of mass events mostly visit the event in company of friends or family members. They stay together during the event and even travel to, arrive at and depart from the venue frequently together. Therefore, social groups within crowds have to be considered to understand and explain the crowd behavior. Research about crowd dynamics confirms that mass dynamics cannot solely be explained by the behavior of single members of the

crowd. Individual persons in turn are influenced by other individuals and groups, e. g. how they notice and act on signpost or on other instructions and if they decide for or against the usage of a certain route.

Different factors have an impact on crowd behavior (this concerns the behavior of single members, social groups and the crowd as a whole). Helbing et al. (2000) assume "a mixture of socio-psychological and physical forces influencing the behavior in a crowd". This includes aspects like walking speeds (Helbing et al. 2002), distances kept to other pedestrians or obstacles, "clogging" (Helbing et al. 2000, p. 488), "faster-is-slower effect" (Helbing et al. 2000, p. 489) or "herding" (Helbing et al. 2005, p. 20). Herding behavior occurs in situations with low visibility or insufficient orientation, e. g. in unfamiliar environment (Helbing et al. 2005, p. 21): "People either follow other people who are believed to know the best way, or they use the exit they are familiar with (typically the main exit they have entered)." This applies to buildings, but is definitely also true for flight behavior in the event's surroundings, particularly when people have less knowledge of the place or view-shafts are limited. People will take their familiar routes and/or follow other people, especially in stressful situations, where orientation is all the more important. Because of herding effects, alternative escape routes are easily missed and therefore existing routes are not used effectively. Helbing et al. (2002, p. 23) pointed out that "pedestrians feel a strong aversion to taking detours or moving opposite to the desired walking direction, even if the direct way is crowded." To reduce people's uncertainty where to go and to guide them effectively on existing routes a well-elaborated urban design is needed.

Unlike visitors of most major events, who are relatively unfamiliar with the venue, e. g. soccer fans are characterized by high familiarity with the stadium and its surroundings and use the same paths many weeks a year. Extensive knowledge of the event's venue has an impact on the visitors' compliance with security service instructions. If some roads are blocked, it will be quite hard to prevent visitors from using their habitual routes. In many cases it will implicate uncertainty or resistance and therefore time delay for overall evacuation. Perilous situations can always arise, if single persons feel confident to find the "best way" completely on their own. This also became apparent in Love Parade 2010 immediately before the disaster occurred, when single persons started to use narrow stairs to escape and many people tried to follow.

If, e. g. a soccer stadium has to be evacuated for some reason, it is assumed that not tens of thousands of visitors are expected to flee from the building at once. As far as possible, only several sections of the building will be evacuated, not the whole stadium at once. Apart from that, it is known from evacuation of burning buildings, that people do not start leaving the building immediately. A "pre-movement time" delays evacuation for a few seconds to several minutes, in which people try to find out what is happening and to warn and gather family and friends (Proulx 2003, p. 34). The essential factor for reducing evacuation time is to optimize the time in which visitors start moving. "Design parameters such as exit width and travel distance, which have been equated traditionally with predicted escape times, are less likely to be related to overall evacuation times than is the time for people to start to move to safety" (Proulx/Sime 1991, p. 844). Definite information and concrete behavior instructions are important to implicate prompt reaction as well as to make sure that people are guided effectively and safely. Existing routes – in and outside the building – have to be able to manage the stream of people pouring out of different building exits.

Contrary to general opinion, there is little ruthless and egoistic behavior during and immediately after disasters, "panic is actually rare" (Drury/Cocking 2007, p. 9), but mutual assistance is at the very fore (see also Quarantelli 2003, p. 4). Socio-psychological research about fear and panic behavior in flight situation shows that groups of people, especially families and friends with strong ties, stay together if possible (Mawson 2005). This is even, or rather especially, in cases of emergency (Mawson 2005). In fact, making contact with affiliated persons takes precedence over individual flight (Sime, 1983). The loss of companions and uncertainty about their well-being has a destabilizing effect for people affected by disaster, whereas the presence of companions is reducing fear (Mawson 2005).

The presence of groups has great impact on crowd behavior in case of evacuation. As mentioned before, the presence of groups delays the starting point of evacuation. Mawson (2005, p. 107) emphasizes that "people in groups of familiars […] wait to assemble with their primary group before evacuating." Because of their "primacy of attachments" (Mawson 2005, p. 107), families and friends try to stay together, and if this fails, they are expected to stop or even turn back to search for lost companions. This again will hinder the stream of fleeing people and will complicate access of emergency services to the venue in the case of a large-scale

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accident. That fact strengthens the need for an adequate guidance system outside the building. The following table shows the most influencing human factors and their consequences for the pedestrian flow (table 2).

Human factors	Consequences for pedestrian flow
Social groups (members stay together or search for each other)	Time delay and physical obstacles
Herding and familiar routes	Existing route grid is not used effectively + Difficulties in directing people on alternative routes
Environmental perception and orientation	Basic requirement to guide people and to give instruction
Mutual assistance	Evacuation is relatively ordered, panic is rare

Table 2: Human factors and their consequences for the pedestrian flow.

4 CASE STUDY SOCCER STADIUM

The research project REPKA deals with open space evacuation of the soccer stadium in Kaiserslautern/Germany. Here, a large scaled crowd with up to 50.000 soccer fans leaves almost every second week the stadium and the area around. Especially such events are vulnerable to many potential and realistic dangers: fan riots, attacks, large scaled accidents.

The soccer stadium is located in the inner city of Kaiserslautern. It is situated 40 meters above other parts of the inner city and lies in the middle of a residential area (Fig. 1). The consequences are clear – a difficult topography with steep slopes and a close link to the residential neighborhood complicate an ordered and fast evacuation. Making things not easier, the escape routes mostly are access routes for rescue teams at the same time. Here, a high risk and conflict potential is obvious. Due to land-use type, topography, basic traffic grid and a moving mass of people, the installation of completely free access routes is very complicated. Depending on the scenario, the declared safety areas are far away from the stadium, because of the high building density in the stadium's surroundings. Declared safety areas need an open ground to serve as assembly points for injured people and to set up emergency equipment.

Consequently, it is not enough only to let the crowd leave the building in good order. The crowd has to be brought further away to safety. As figured out from the presented influencing factors on flight behavior, the crowd itself and the event's surroundings play a decisive role. As shown in chapter 3.2 it is relevant to reduce the time in which people start to move, but here the focus of the research is on the situation after the crowd has already left the building.

Fig. 1: View on the Fritz Walter Soccer Stadium in Kaiserslautern from the South (source: REPKA project).

4.1 Methods

Urban spatial inventory-taking and analysis

The usage of escape routes is due to the interdependency of the individual perception and the behavior of the crowd around (herding etc.). The factual perception is also guided by environmental factors. Thus, in a first step there is the need to take a closer look at the research area with the help of a spatial inventory-taking and analysis. The general traffic routing is the basic grid for escape routes outside a building. Internally it consists of streets, sidewalks and footpaths distant to the streets. These three categories have their own characteristics, which are important to be suited as good escape routes for a fast evacuation. Especially the width is linked to a fast flow of persons away from disaster. Further influencing values are soil conditions, barrier-free design, existing view-shafts, signage and routes which have to be free for rescue teams. Here, research in law literature concerning evacuation of buildings can help to identify first benchmarks for outdoor regulations. The transport connection to safe areas and the means of transport available are also important. In a next step a spatial analysis follows, where neuralgic points and routes hindering a fast evacuation are identified. Serious deficits in the field of urban planning and design are revealed, which can be improved to assure an unhindered pedestrian flow. From the results of urban spatial and socio-psychological analysis, optimized escape routes are determined.

Socio-psychological analysis

At the Fritz Walter Soccer Stadium in Kaiserslautern 328 interviews with visitors were conducted in the run-up to two home matches of the local soccer club '1st FC Kaiserslautern' (1. FCK) in spring 2010. The interviews were carried out in short face to face interviews (5 to 10 minutes) using standardized questionnaires. The interviews deal with the visitors' perception of escape routes, their knowledge of the stadium and its surroundings, their information seeking behavior and preferred contact persons in case of emergency. Also included are aspects concerning shared arrival, like group size and companions attending the event. Interview participation was voluntary and analysis was anonymized. Most visitors showed great interest in taking part.

In addition, further findings on human behavior in emergency and flight situation were explored by literature research and studies about previous disasters. This expert knowledge is applied to an evacuation scenario of the soccer stadium in Kaiserslautern with regard to the local urban design characteristics. Evaluation occurs according to own experience (several observations of visitors going home after the end of the match) and the experience of the involved local security services.

4.2 Results

Urban design of the event's surroundings

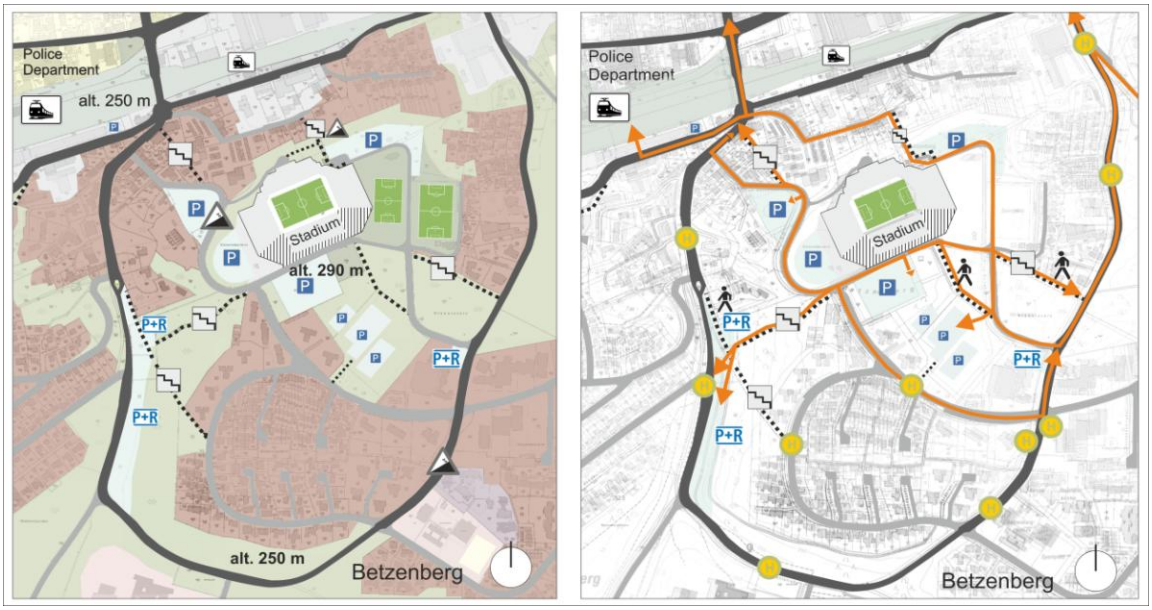

Fig. 2 and 3: Urban spatial inventory-taking and analysis (map not scaled) (own source).

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Main contents of the urban spatial inventory-taking (Fig. 2) are the basic traffic grid, the parking, the topography and the surrounding land-use type. The traffic grid is extremely branched, because the stadium is intimately connected with the residential neighborhood. There are no linear routes leading away from the stadium, so the existing view-shafts are limited. The different path widths, especially in the intersection from streets to footpaths, cause "bottleneck effects" (Helbing et al. 2000). Potential destination for a part of the crowd is the parking, which is widespread all around the research area. "Park & Ride" stops are also far away from the stadium (defined as pedestrian flow source), which gives the crowd a chance to disperse. That could help to prevent congestion or "clogging".

The spatial analysis (Fig.3) is geared to the situation after a soccer match and concerns itself with the terminating traffic of the pedestrians. The main destinations are the main train station, the city center in the North, the "Park & Ride" stops and also the parking in the stadium's surroundings. The pedestrians encounter many different path widths with different soil conditions. Especially in the context of stairs, there are more than a few bottlenecks. In a next step, the results of the urban spatial inventory-taking and analysis can be compared with findings in the human factor analysis.

Characteristics and behavior of the crowd

The study of crowd characteristics at the Fritz Walter Soccer Stadium reveals that most attendees of the soccer match visit the event in small groups of two to four people (63 %) or even large groups of five and more people (26 %). More than half of the interviewed visitors are accompanied by friends (58 %) and many interviewees said that they visit the soccer match in company of their partner (25 %) or other relatives (24 %).

Visitors, who attend the soccer match in company of others, predominantly travel to the venue in this group constellation (77 %). Even larger groups of five and more people travel to the stadium together (53 %; small groups: 84 %). Many visitors (48 %) solely use the car to get to the stadium, 34 % use train or bus and 10 % use a combination of car and park and ride bus. Three persons use one car on average. The quantity of people using the respective means of transport modifies the destinations for parts of the pedestrian flow. This may increase bottleneck effects at narrow places. Summing up, soccer fans rarely visit the event alone, but in small or larger groups. These groups will try to stay together if somehow possible as ties are strong and they are reliant on each other, e. g. for going home by car.

Visitors are highly familiar with the stadium and its surroundings for the most part (79 % do not need any maps or signs to get to the venue and 68 % characterize their knowledge of the place as "excellent" or "good"). Because of their high familiarity with the venue, it will be difficult for security staff to send them on alternative routes. Thus, definite instructions from the guidance staff and sophisticated urban design are all the more relevant.

The study shows that members of the event's security team obviously are the preferred contact persons if attendees have to ask for help. Present on location, clearly visible and accessible at any time (which is the case at soccer stadium), they are favored contact persons for visitors searching for help because of injuries (56 % would ask a member of event's security team for help when their companion got injured; instead of asking other visitors (16 %) or calling for help via mobile phone (26 %)). This is confirmed by Coellen (1992, p. 105), who showed that people in extreme situations look for somebody to get a better orientation. This could be a person nearby who takes over leadership of the group in the first moment. Normally, this would be an official person.

In addition, the study shows that in information seeking behavior there is clear preference in use of personal information. Being asked about an actual situation in which they have to seek shelter from their actual position, most visitors (72 %) in our study definitely prefer personal information (that means information about what to do or where to go communicated by other people) to signpost (23 %) or technical support (3 %).

Awareness of risk and potential danger is obviously increased: Many visitors (44 %) said that they pay attention to emergency exits and escape routes intentionally when they are visiting major events. The older the people the more they do so (17 to 25 year olds: 27 %; 46 years and older: 63 %). Almost as many of them (41 %) said that they stay near emergency exists as possible.

4.3 Combining analysis

After getting some insights in the urban spatial characteristics on-site and the specification of the relevant human factors, the merging of both is the next logical step. The most interesting results are identified neuralgic points and routes, where clogging effects and congestion arise (Fig.4).

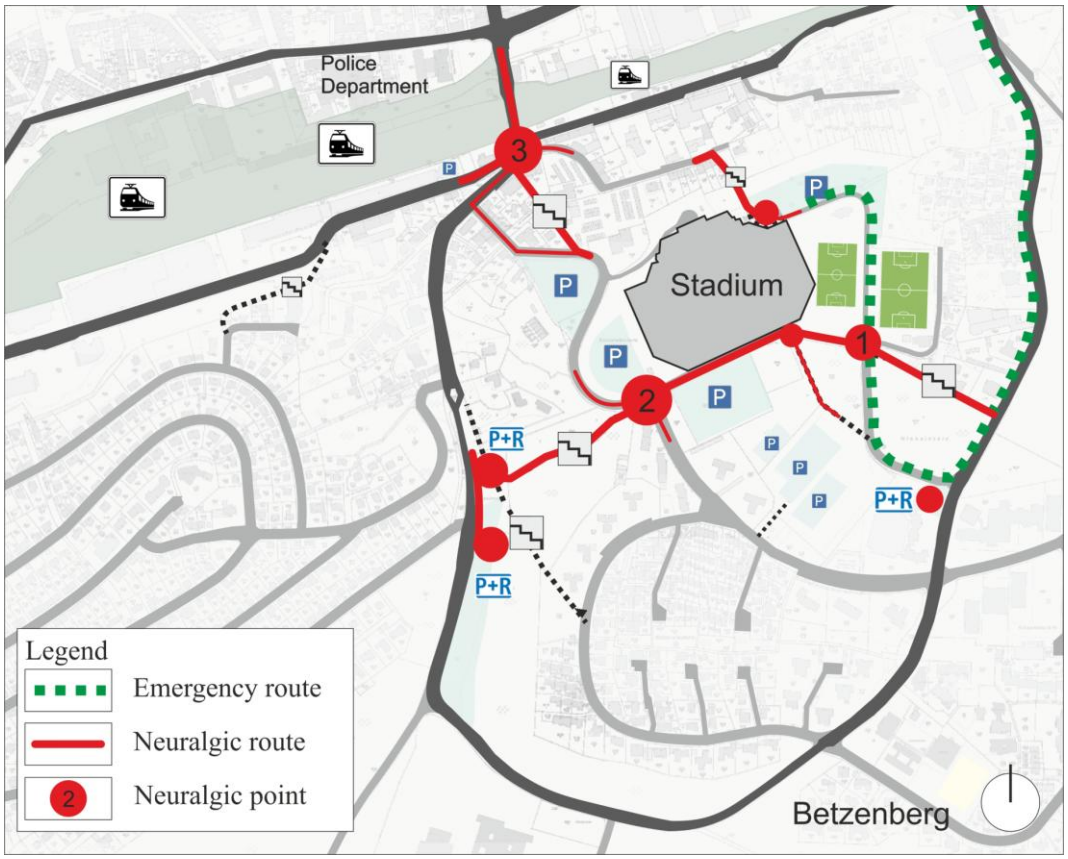

Fig. 4: Neuralgic points and routes (map not scaled) (own source).

These effects actually occur after every regular soccer match. In case of disaster, it is assumed that the effects will have much more fatal consequences. The reason is the lack of a good urban design in consideration of a large crowd moving to appointed destinations. But not only urban design plays a decisive role at these neuralgic points and routes. Also the crowd with its behavior and environmental perception, its composition of different group sizes and partly its unerring knowledge of the place is strengthening congestion and clogging effects.

A special case is the traffic routing of the emergency route, which should ensure fast access and departure of emergency vehicles. This route is crossed by a main pedestrian route in an eastward direction (neuralgic point 1). In order to keep the emergency route free of pedestrians, they have to be directed to the West. This causes more congestion at neuralgic point 2. Here is the most critical bottleneck (also at regular soccer matches) in the intersection from street to footpath. More than that, the footpath, at first slightly descending, gives way to long and steep stairs down to the Park & Ride stop. As consequence, the congestion spreads far into the adjoining streets. From the hitherto results of the influencing factors, an exemplary optimization is done (Fig. 5). With the help of guidance staff and signage the pedestrians find their optimal way to their destination. The guidance staff helps to organize an ordered pedestrian flow. More staff has to be positioned in the adjoining streets to split up the crowd. This aims for a more effective dispersion of the pedestrian stream. Furthermore, the existing foot path and following stairs can be widened without difficulty so that a higher quantity of people can take this path (green band). Consequently, the adjoining streets can be pressure reduced and balanced. Other aspects to be regarded are the visibility conditions in the evening after end of the match. Special lighting, like a traffic light system, can also be very helpful in guiding people safely away from disaster.

Fig. 5: Exemplary optimization of neuralgic point 2 (own source)

Also important is the situation at neuralgic point 3, where three different pedestrian streams come together at one choking point. In this area, where originally a traffic roundabout is situated, the streams are crossing each other, because the people are going to their main destinations: the train station and the city center.

5 INTERDISCIPLINARY APPROACH FOR OPTIMIZATION OF ESCAPE ROUTES

Essential factors influencing the crowd behavior in flight situations are identified and described in their consequences on pedestrian flow. It became clear that urban design aspects and human factors highly depend on each other. It is not sufficient to consider only one of them for a good planning of escape routes and improving evacuation. Figure 6 illustrates the combination of all identified aspects for a new approach for pedestrian evacuation planning.

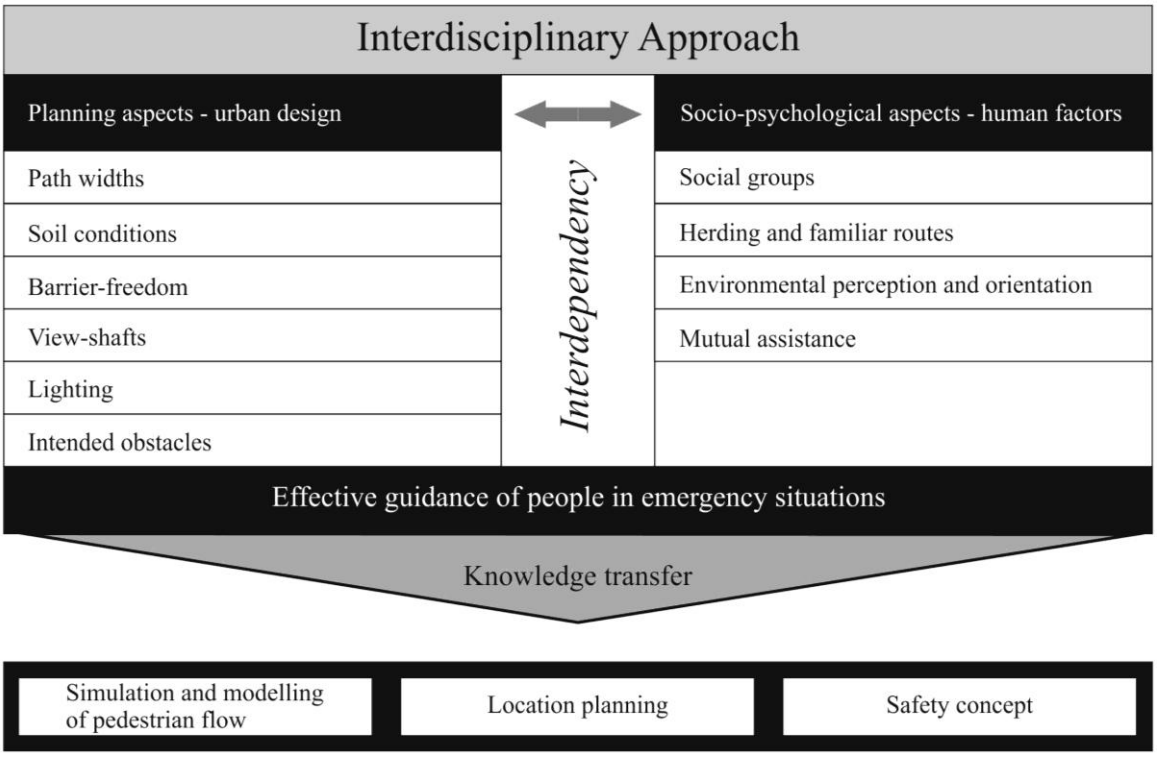

Fig. 6: Combining planning and socio-psychological aspects for interdisciplinary approach.

The combination of urban design aspects and human factors results in a definitely more effective guidance of people in emergency situations (as exemplary illustrated in figure 5). These findings can be transferred to research on modeling of pedestrian flows in computer evacuation simulation. Regarding human factors in simulation models, simulation of pedestrian flow becomes more realistic (Köster et al., 2011) and helps to identify neuralgic points, which can be optimized by urban planning intervention. Location planning of major events, including planning or modification of parking, access routes, positioning of security staff, etc. up to the elaboration of the event's safety concept, also benefits from this interdisciplinary approach.

Further research should consider more detailed the behavior of crowd and groups encountering obstacles and behavior in stress situations. Conditions of a spatially wide ranged evacuation should be regarded in events' safety concepts to more extent.

It became evident that the planning of escape routes and the effective use of these routes need a wide and holistic consideration – regarding human perception and behavior. Humans are in the focus of urban planning and design, so new approaches, including aspects of social psychology, are needed. This makes a contribution to a new holistic approach in the field of pedestrian evacuation planning.

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Planning Emergence via Sustainable Partnerships in Urban Ethiopia

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1 ABSTRACT

The advent of Complex Adaptive Systems thinking has seen most urban planning authorities becoming relentless in adopting sustainable participatory approaches in strengthening their adaptive capacities for unforeseen events. To developing countries like Ethiopia, this view is based on anecdote rather than reliable empirical evidence. This analysis seeks to close the knowledge gap by evaluating the extent to which urban planning authorities are engaged in sustainable partnerships to boost their adaptive capacities under a climate change scenario. First a conceptual model for sustainable partnerships relevant to a developing country context is developed. Such a model is then applied. Finally, a number of factors that explain the adoption and / or non adoption of sustainable partnerships by some planning authorities are deciphered. Empirical evidence relate to a Delphi study conducted in 2009 in which 64 urban planners from 23 cities / town were surveyed. The binary logistic regression model was employed to decipher some of the factors that explained the adoption and / or non-adoption of sustainable partnerships by some planning authorities. Results reveal that adaptation efforts by most local authorities have not benefited much from forging of working partnerships at various planning scales. Both vertical and horizontal collaboration were found to be limited. Major hindrances included on one hand absence of credible participatory structures and on the other hand the general divide that exists between the environment and planning institutions. Efforts that strive to build proper participatory structures, bridge the current divide and reconcile science and practice would go a long way in fostering sustainable partnerships for improved adaptation.

2 INTRODUCTION

For years, partnerships between actors in environmental governance issues have formed a common means of providing infrastructure and services where state funds or expertise were found lacking (Forsyth, 2005). With climate change high on the agenda, recent years have seen this role expand. In addition to this traditional role, partnerships have now become sites where norms of climate change concern and political accountability are formulated and replicated. The need for such a much diversified role of partnerships has seen international groupings such as the United Nations (UN) calling for a greater adoption of partnerships in development policy through the Global Compact, Millennium Development Goals, and 'Type 2' partnerships proposed at the World Summit on Sustainable Development in Johannesburg in 2002. Perhaps the greatest and most visible manifestations of partnerships at work has been their role as means to overcoming some of the political standoffs in implementing global environmental agreements, such as the UN Framework Convention on Climate Change (1992) and its Kyoto Protocol (1997) - (Cosbey et al., 2005). Such a partnership discourse has often centred on climate mitigation at both the international and national planning scales (OECD, 2010). At the local urban scale, climate change partnership discourse has focused more on climate change adaptation issues (UN-HABITAT, 2008; Kharen et al, 2011).

The multiplicity of actors that shape and are affected by climante change outcomes has led to a renewed interest in the implementation of sustainable partnerships at the urban scale. Since climate change issues are increasingly viewed from the complex systems thinking lense – a new paradigm that sees the effects of climate change as so encompassing and far reaching, an integrated effort of governmental, non-governmental and private individuals and organizations is required (Nath and Behera, 2011). Such a partnership approach requires a comprehensive framework if coping with the effects of climate change are to become a reality. It is beleived that a much more cohesive and closely knitted approach from stakeholders is very important in underdeveloped countries where resource crunch is a major hurdle in the path to adaptation (Nath and Behera, 2011). Such a partnership stance is however underesearched and underdeveloped for most urban areas in developing countries (Mani et al. 2008). Yet most scholars agree at least in principle that a number of factors ranging from scientific uncertainty, through to the current state of technology, the availability of financial resources and short time horizons - which mostly constrain effective adaptive planning (Smit and Pilifosova, 2001; Lorenzoni et al., 2000a, b; West and Gawith, 2005; EEA, 2005; EU, 2007) can be overcome through the adoption of inclusive partnerships.

Such a limited research scope on the policy context of adaptation to climate change (Lim et al, 2005), has had a dent on efforts targeted at exporing best options aimed at enhancing longterm adaptive capacity of many urban local authorities (Lim et al, 2005; Niang-Diop and Bosch, 2005) – particularly those found in Africa. This paper assesses planning emergency via sustainable partnerships in urban Ethiopia. It specifically analyzes the extent to which urban planning authorities in Ethiopia are engaged in sustainable partnerships to boost their adaptive capacities under a climate change scenario.

2.1 Partnersips, climate change and urban planning

Partnerships for sustainable development (also called the UN-Type II partnerships) are voluntary, multi-stakeholder initiatives aimed at implementing sustainable development (Parthan et al, 2010). Most climate change partnerships are launched by governments and international governments. Such partnerships tend to be regional or global in scope and reach and are aimed at supporting the practical implementation of climate change initiatives as defined by the Intergovernmental Panel on Climate Change (IPCC), the United Nations Framework Convention on Climate Change (UNFCCC) and other related international groupings (Craik, 2011). Partnerships are considered both in principle and practice as innovative approaches that seek to overcome existing deficits in global governance regulation, implementation, and participation (Szulecki et al., 2010). The discussion of 'climate policy integration' through partnerships has however tended to focus on mitigation decisions mostly taken at the international and national levels (Urwin and Jordan, 2008). In the recent past, a number of such partnership initiatives have continued to be developed (refer to table 1) with little or no bearing on climate change adaptation decisions that are normally taken at the local scale.

Name of Partnership	Partners	Objectives/purpose
[1]The Earth Systems Science Partnership (ESSP)	A partnership that represent a concerted effort by DIVERSITAS, IGBH, IHDP, and WCRP	To enable a partnership that: (1) enables the community to identify and carry out research on scientific problems of high social and policy significance in a unified and integrative manner; (2) initiates and supports capacity building; (3) provides a high-level platform for effective engagement with stakeholders and the policy community; and, (4) facilitates efforts to ensure the continued vitality of the scientific enterprise
[2]The Renewable Energy and Energy Efficiency Partnership (REEEP)	Was established in 2002 by the United Kingdom (UK) government together with other committed governments, businesses, and NGOs	Established to deliver World Summit on Sustainable Development (WSSD) commitments made at the 2002 Johanesburg summit.
[3]The US Department of of Energy's Regional Carbon Sequestration Partnerships (RCSPs)	The seven partnerships include more than 350 state agencies, universities, national laboratories,private companies, and environmental organizations, spanning 42 states, two Indian nations, and four Canadian provinces.	The partnership was tasked with determining the most suitable technologies, regulations, and infrastructure for carbon capture, transport, and storage

Table 1. A sample of global partnerships on climate change related issues

It is therefore apparent that a more locally focussed adaptation dimension to climate policy integration has not been explored (Urwin and Jordan, 2008). There is therefore an urgent need to 'glocalise' partnerships so

[1] (Leemans et al, 2009)
[2] (Florini and Sovacool, 2009; Parthan et al, 2010).
[3] (Litynski, et al, 2009)

as to facilitate the effective implementation of adaptation decisions at the city or local scale. Such a focus on city level planning is not misplaced given that cities are (undoubtedly) centers of economic growth and population – a dominant feature that has seen them becoming a focal point of both climate change related risks and disasters and the solutions thereof. The OECD, (2009) has for instance advanced three reasons why climate change and adaptation policy should be redirected to municipal level planning. The first argument holds that climate change impacts are manifested locally, affecting city-wide systems (including, economic systems, livelihoods, infrastructure, water and so on). The second thinking holds that vulnerability and adaptive capacities are determined by local conditions. Finally, it is believed that adaptation activities are often observed at the local level and it is therefore easy to tailor actions to the specifics of a particular city (OECD, 2009; Gondo and Kori, 2012). A city based strategy therefore plays an instrumental role in shaping successful climate change adaptation practices.

Defining successful adaptation at all scales (regional, urban and local) is however complicated because the criteria for success are generally contested and context specific (Dessai and Hulme, 2007). It is however usually assumed that elements of effectiveness, efficiency, equity and legitimacy are important in judging successful adaptation (Adger et al, 2005). Many scholars however agree that a path towards sustainable partnerships can help realize such elements and subsequently smooothen the terrain for the achievement of efective adaptation (Schreurs, 2002; Mani etal, 2008; Huntjens et al, 2011; Nath and Behera, 2011). It is therefore imperative that, the workings of, and the interaction between city authorities (as an important arm of government) and other stakeholders be closely monitored if important climate change decisions are to be taken at the urban local scale. Such an expandend role of urban planning has been underscored by the Stern Review, (2008).

The Stern Review (2008) holds that market forces if left alone are unlikely to lead to efficient adaptation decisions. Public intervention is therefore necessary for many different reasons. The usually advanced aims and benefits of such public intervention include but are not limited to: (1) to protect those least able to cope by addressing the causes of vulnerability; (2) to provide information for planning and stimulating adaptation by non-state actors; and (3) to protect important public goods such as ecosystem services, public resources, land use and early warnings of extreme events (Tompkins et al, 2010).

2.2 Path to 'sustainable' partnerships

This analysis defines 'sustainable partnerships' as collaborative efforts that breeds a win-win situation for each of the stakeholders involved. If adaptation measures are to address the concerns of, and build on the latent energy from each of the stakeholders, then such measures are more likely to be sustainable. The OECD (n.d) contends that, with access to up to date climate science, impacts and vulnerability assessment, urban local authorities should work with other stakeholders to design and implement effective adaptation strategies. This according to Khare et al, (2011) can be achieved via the formulation of programmes and initiatives that benefit from the existence of an integrated continuous and long term strategy. Such conditions are however not yet present in most developing countries in Africa (Nath and Behera, 2011; Gondo and Kori, 2012).

Most programmes geared towards long term sustainability tend to be confronted by a number of significant hurdles. This is because each of the stakeholders has issues that tend to work against long term adaptive solutions (Kharen et al, 2011). To this end enlisting cooperation among climate change agents, before forging of working partnerships is crucial. Such a stance forms the hallmark of what has been referred to as 'co-operative environmental governance' (Glasbergen, 1998; Meadowcroft, 1998; Klausen and Sweeting, 2003). In climate change mitigation, co-operative governance has over the years sought to overcome the conflictual nature of negotiations through the creation of a positive negotiating space between climate change actors. At the urban planning scales, such co-operative governance may be deliberate in the sense that it permits local actors to participate in the identification and implementation of norms of climate change concern and political accountability to a variety of adaptation decisions taken (Klausen and Sweeting, 2003). Co-operative governance may make urban planning behaviours that seek to winnow the intricate, and often complex problems associated with actual and potential effects of climate change more functional. Not only will this help boost the adaptive capacities of concerned stakeholders to deal with actual and pending climate change challenges, but this could also increase the number of options by which this objective is achieved. Forsyth, (2005) beleives that co-perative governance facilitates this process by increasing local participation in deciding how investment decisions (in climate change adaptation) are made. Most partnerships based on

cooperative governance, however tend to be discurve in nature and run the risk of collapse due to challenges of fostering long term trust building processes (refer to figure 1).

Such challenges require knowledge, approaches and a much more localized understanding of the workings of such solutions that cannot be easily generated through co-operative governance, including all known forms of 'conventional' research programmes. A much more broader structure for climate change and adaptation is therefore required. Related efforts in environmental governance and / climate change issues have often identified forging of working partnerships between and among actors as the single most important approach to dealing with such challenges. Such partenerships may take avariety of forms as summarized in figure 1.

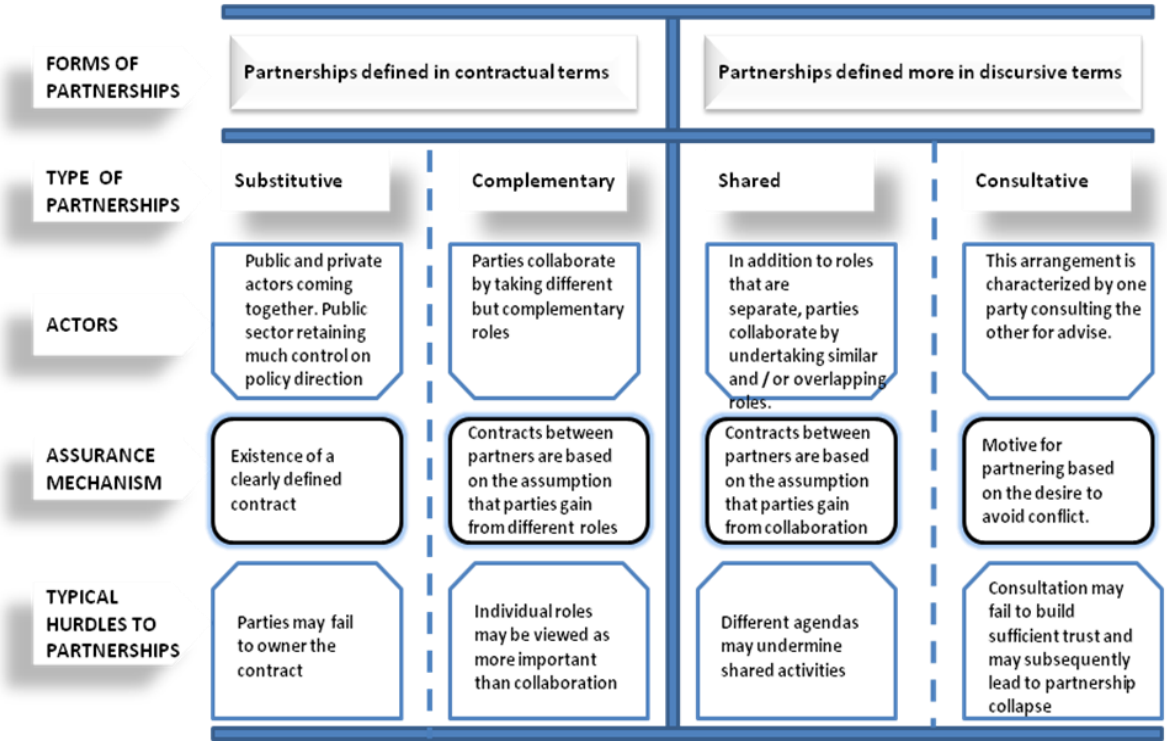

Figure 1. Forms of partnerships

According to figure 1, partnership forms are usually twofold. On one hand are discursive partnerships that often lack any contractual obligations on the part of stakeholders. Specific types include consultative and share partnerships. The other mode of partnerships include stakeholder arrangements defined by binding known contractual agreements. These are usually substitutive and complementary in nature. The path towards sustainable partnerships should be viewed as the gradual transition from consultative type of partnerships through to shared, complementary and finally substitutive types. A review of partinership discourse and practice in developing countries however reveals that such a transitional perspective is not complete. Based on a review of obstacles to climate change adaptation in developing countries, Nath and Behera, (2011) contend that adaptation policies work best when climate changes initiatives help create synergies with other goals and policies. Such a move towards integration has been mooted by policy makers and other societal actors who beleive that the policy and or partnership context in which adaptive decisions are made must also be considered (see Burton et al., 2002; Lim et al., 2005; EU, 2007). Such thinking has also been taken up by the United Nations Development Programme which recently investigated how to integrate climate change into all strands of policy making in ways that support adaptive planning (Lim et al., 2005).

Drawing on the different forms of partnerships ranging from discursive through to contractual forms of partnerships and integration, three important levels – including cooperation, co-ordination and integration may be defined as important phases that can define the path towards sustainable partnerships for city authorities in developing countries. A simplified version of this conceptual model is given in figure 2.

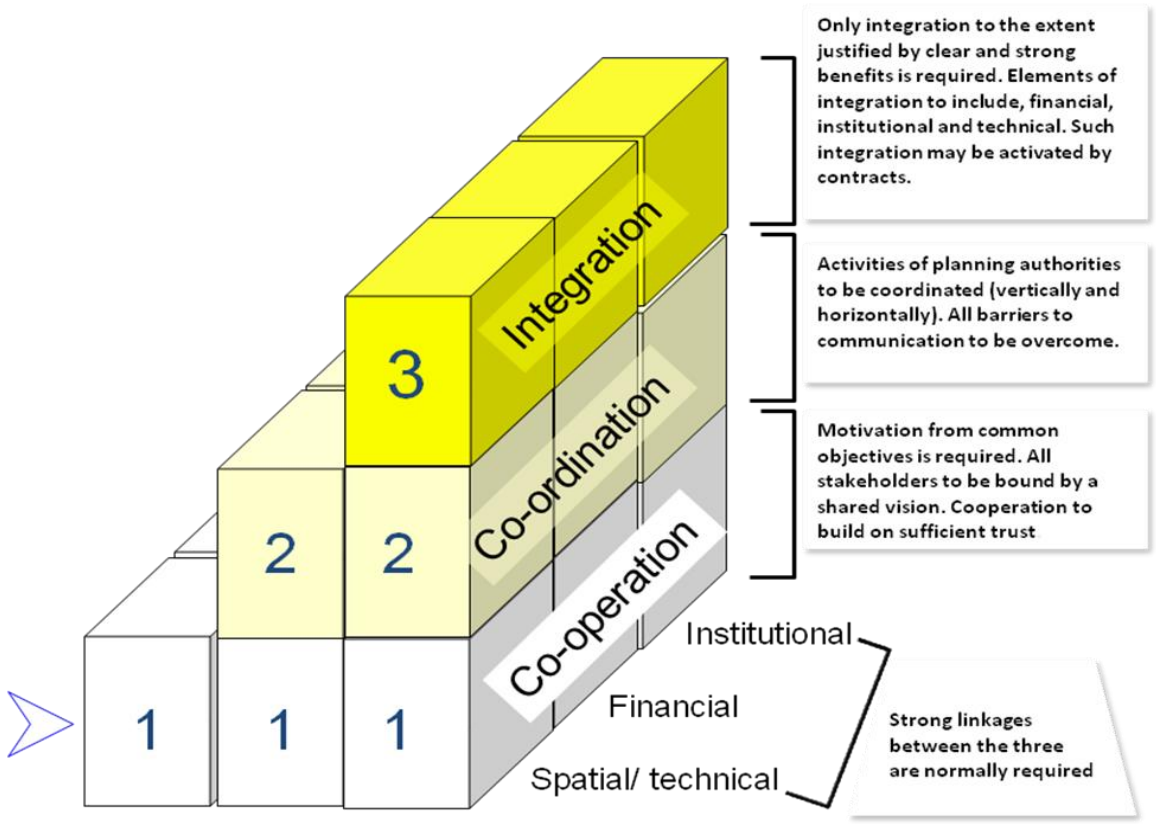

Figure 2. A conceptual model to understanding partnerships for climate change adaptation in developing countries.

2.3 Obstacles to 'sustainable' partnerships

Most urban planning authorities in the West are becoming relentless in adopting sustainable participatory approaches in strengthening their adaptive capacities for unforeseen events. As argued earlier on, such adaptation practices have been more visible at the national scales rather than the local scales. At the local scale, there exists a multutude of challenges that limit planning emergency via sustainable partnerships.

Khare et al, (2011) for instance observe that most city programmes and initiatives respond to climate change in the absence of any integrated, continuous and long-term strategy. Available empirical evidence on stakeholder involvement in environmental governance issues from elsewhere suggest that collaboration happens incrementally rather than systematically. Most research scholars have argued that most stakeholders partcipate in socially responsive activities when it serves their self centred interests (Bird and Hughes, 1997; Ferrarini et al, 2001; Pickett-Baker and Ozaki, 2008). Lack of will to engage in partnerships is one other limiting factor often mentioned. Some political scientists for instance have argued that the political implications of partnerships outweigh the potential benefits of enacting environmental policy (see Osbourne, 2000; Rosenau, 2000). Some critics have argued that forging partnerships with the private sectors poses important contadiction to the principles of climate equity. The usual line of argument is that such partnerships weaken environmental regulation through processes such as 'regulatory capture' – a situation where policy makers represent the interests of investors at the expense of poor communities (Gouldson and Murphy, 1998; Singleton, 2000).

Using partnerships as a functional means to implementing climate change and adaptation policy has been viewed by some as a neo-liberal attempt to 'hollowing out' the role of the state. This has often been viewed as a new trend towards 'New Public Management.' Such a 'new' trend has often been blamed on the grounds that it reduces public space for governing the provision of essential services – a sitiuation that subsequently erodes the democratic accountability of local governments (Rhodes, 1996; Skelcher et al, 2003; Forsyth, 2005). A much more developmental perspective to climate change partnerships at local level suggests that implementing partnerships without critical attention to questions of participation and governance may result in policy that is not pro-poor (Evans, 1996; Fischer, 2003).

2.4 Climate change In Ethiopia

Despite the economic reform made after the political change in 1991 that brought significant improvements in the economy, Ethiopia is still one of the least developed countries (LDCs) in the World (MoFED, 2006). This development status makes the country more vulnerable to climate variability and change. Climate related hazards in Ethiopia include drought, floods, heavy rains, strong winds, frost, and heat waves (high temperatures) among others (NAPA, 2007). The much broader environmental concerns that have attracted interest from government, the private sectors, Non-Governmental Organizations and international donor agencies include land degradation, soil erosion, deforestation, loss of biodiversity, desertification, recurrent drought, flood and water and air pollution (NAPA, 2007). Going into the future such concerns are likely to deepen as temperatures and rainfall amounts are projected to surge. For the IPCC mid-range (A1B) emission scenario, it is projected that the mean annual temperature will increase in the range of 0.9 -1.1 °C by 2030, in the range of 1.7 - 2.1 °C by 2050 and in the range of 2.7-3.4 °C by 2080 over Ethiopia (Figure 3) compared to the 1961-1990 normal. A small increase in annual precipitation is also expected over the country. Higher temperatures in Ethiopia have potentially serious impacts on the lenth of growing season (for crops), the aridity of the soil, the risk of deaseses such as malria and dengue, and the timing and the intesity of rainfall. At the national level.

Owing to their potentially damaging impact to both rural and urban communities climate change issues have become a high government priority through the National Adaptation Programme of Action (NAPA). The National Adaptation Programme of Action (NAPA) is a mechanism within the UNFCCC, designed to help the Least Developed Countries (LDCs) including Ethiopia to identify their priority adaptation needs to climate change and to communicate these needs to the Conference of Parties (COP) of the UNFCCC and other concerned bodies. I addition, the Ethiopia has already put in place policies, strategies and programs that enhance the adaptive capacity and reduce the vulnerability of the country to climate variability and change. Such programs include Plan for Accelerated and Sustainable Development to End Poverty (PASDEP), Environmental Policy of Ethiopia, Agriculture and Rural Development Policy and Strategy.

3 MATERIALS AND METHODS

Empirical evidence presented relate to a Delphi study conducted in 2009 in which 64 urban planners from 23 cities / town were surveyed. The proportion of the sampled officials from each city / town is shown on figure 3. The share of each city / town reflects the number of completed questionnaires that were returned.

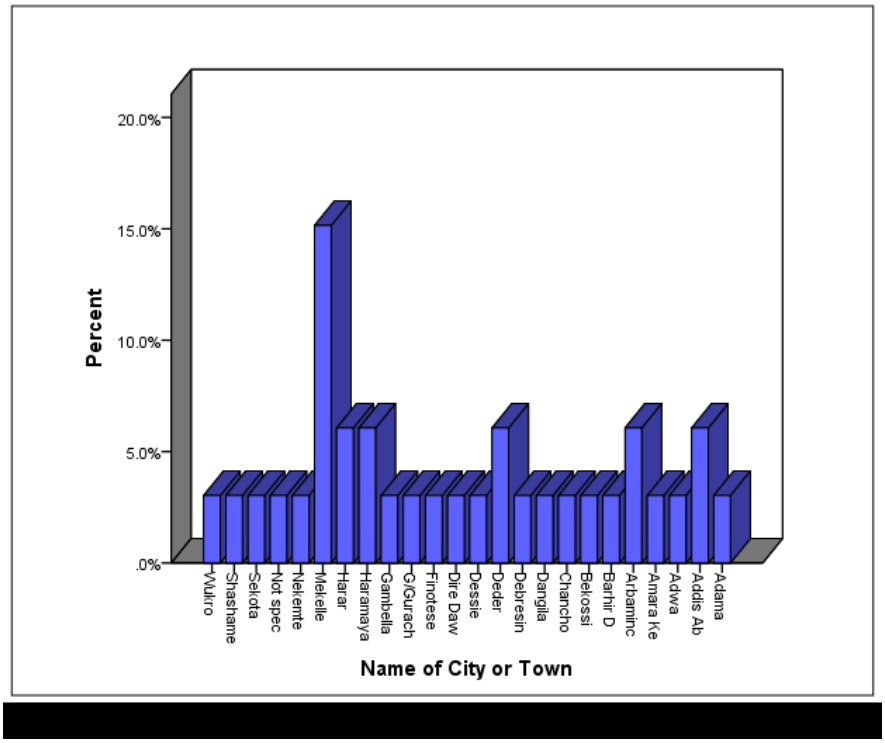

Figure 3. Sample charcteristics

The binary logistic regression model was employed to decipher some of the factors that explained the adoption and / or non-adoption of effective partnerships by some planning authorities. Data analysis was performed using the Statistical Package for Social Scientists (SPSS).

3.1 Empirical model specification

The logistic regression model was applied to determine factors that explained why some urban planning authorities engaged in sustainable partnerships in response to actual and / or potential climate change threats. When dealing with a dichotomous dependent variable - the main interest is to assess the probability that one or other characteristics is present (Peng and So, 2002; Peng et al, 2002). The logistic regression model answers the question what determines the probability that the answer is yes, or no. The special features of the model guarantees that probabilities estimated from the logistic model will always lie within the logical bounds of 0 and 1. In other words the probability that a municipality picked at random is engaged or not engaged in sustainable partnership is not a continuous variable but a discrete one. The logit regression model can be expressed mathematically as follows;

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_n x_n + ui$$ Where;

Y=is the dependent variable (i.e. probability that a municipality chosen at random is engaged or not engaged in sustainable partnerships to dealing with actual or potential climate change impacts).

B_0=is the intercept (constant) term

B_k=coefficients of explanatory variables

X_i=explanatory variables

The aggregate expression of the model can be summarized as follows;

$$Y = \beta_0 + \sum_{k=1}^{k} \beta_i x_i + ui$$

Any municipality that had its climate change and adaptation activities linked to other stakeholders through cooperation, coordination or integration of activities and policies was defined to be on the path towards sustainable partnerships. The selection of predictor variables is based on the review literature on major limiting factors to effective parnerships. Model variables were therefore defined as follows;

Y=Probability of an expert drawn from a municipality that is engaged in sustainable partnerships (i.e. probability Municipality / engaged in Partn.=1)

X1=Perceved level of financial capacity (1=better; 0=poor)

X2=Perceived benefits of partnering (1=Yes; 0=No)

X3=Perceived level of technical capacity (5 point likert scale: 1=poor; 5=Excellent)

X4=Perceved level of climate science integration in municipal affairs (5 point likert scale: 1=poor;5=Excellent)

X5=Level of uncertainty about climate policy context (5 point likert scale: 1=low; 5=high)

X6=A general concern for the poor (5 point likert scale: 1=lowest score; 5=highest score)

X7=Perceived level of institutional capacity (0=better; 1=poor).

3.2 Model evaluation

Parameters in logistic regression model were estimated using the maximum likelihood method. The statistical significance of each coefficient was evaluated using the Wald test. The enumerated regression coeficients represent the change in the logit of the probability from a unit change in the associated predictor, assuming other factors are constant (Gujrati, 2003). The goodness-of-fit test of the regression model in this study was analyzed using;

- The Omnibus test, which is a likelihood ratio chi-square test that test whether the coefficients of the variables in the model are all jointly equal to zero.

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- The Hosmer & Lemeshaw (H-L) goodness-of-fit test, which examines the null hypothesis that the model adjust well to the data and
- The Cox and Snell (1989) and Nagelkerke (1991) – two descriptor measures that reveal the amount of variation in the outcome variable that is explained by the models (Long, 1997; Hosmer and Lameshaw, 2000).

The inferential goodness-of-fit test employed is the Hosmer & Lemeshow (H-L) test that yielded a Chi-square (7 degrees of freedom) of 8.474 and was insignificant ($p > 0.05$) suggesting that the model fitted to the data well. Two other descriptive measures of goodness of fit are R2 indices defined by Cox and Snell (1989) and Nagelkerke (1991). Results suggest 43.1 to 63.6% of variations in the outcome (i.e. the probability of a municipality beeing engaged in sustainable partnership) can be explained by the model predictors.

4 RESULTS

Results suggests that 26% of the sampled municipality can be characterised as being on the path towards sustainable partnerships. Such partnerships were however found to be limited to discursive arrangement that existed between the concerned municipalities and largely unorganized community groupings, the private sector, and to some extent the respective regional governments. Such partnerships were generally on the lower end of the path towards sustainable partnerships. They are mostly cooperative partnership arrangements that are based on what other scholars refer to as 'reactive' adaptation rather that 'proactive' adaptation to climate change. No evidence of contractual agreements through such means as the signing of MOUs were discerned. More disturbing to find was the general lack of collaboration between municipalities and environmental agencies such as the Meteorologiocal department, the disaster management unit, the private sector and other civic organizations. The separtion between planning and environmental planning institutions has often meant that activities of the National Urban Planning Institute (NUPI) – a professional body of planners and those of the Environmental Management Agency (EMA) have been running parallel with little or no foreseable signs of integration. This alone has been regressive to building adaptive capacity for many municipalities. Many reasons to constrained partnership arrangements between the municipalities and other chief actors were deciphered (refer to table 2).

Variable	B	S.E.	Wald	df	*p-value*	Exp(B)
Financial capacity	.091	2.408	.001	1	.970	1.095
Perceived benefits	.839	.546	2.365	1	.124	2.314
Technical capacity	-.581	.714	.662	1	.416	.559
Climate science integration	2.422	.991	5.975	1	.015	11.263
Uncertainty about the climate policy context	-.396	.546	.525	1	.469	.673
A concern for the poor	-2.617	1.172	4.987	1	.026	.073
Institutional capacity	-4.231	1.714	6.090	1	.014	.015
Constant	4.305	3.413	1.591	1	.207	74.043

Table 2. Predictor variables for engagement in sustainable partnerships

The ability of the sampled municipalities to engage in sustainable partnerships varied according to a number of variables. The positive Beta parameter on financial capacity (i.e. $\beta=0.091$) means municipalities that were perceived as finacialy better were 1.095 times (i.e Exp [B]=1.095) more likely to be engaged in sustainable partnerships than those who had poor financial capacity. Such a finding was however not statistically significant (p-value > 0.5). Perceived benefits in engaging in sustainable partnerships were also found to be another important factor ($\beta=0.839$; p-value=0.124). Municipalities that did not perceive real benefits from engaging in sustainable partnerships were 2.314 times less likely to engage in such arrangements.

The negative Beta estimate on technical capacity means that municipalities that were perceived as better equipped technically were 0.559 times less likely to be engaged in sustainable partnerships. Such results were however insignificant (p-value > 0.4). On the contrary, municpalities that had a much better level of

climate science integration in own affairs were 11.263 times likely to be engaged in sustainable partnerships. Such findings were significant ($p < 0.05$).

Although such results were insignificant (p-value > 0.1), municipalities that were characterised by an uncertain climate change policy context, were less lekely to engage in sustainable partnerships. On the other hand a general concern with the poor and the more vulnerable urban communities was found to be a significant factor in explaing municipal attitude towards sustainable partnerships. Study results revealed that municipalities exhibiting such a concern were 0.073 times less likely to engage in sustainable partnerships than those that had a much lesser concern (β= -2.617; p-value < 0.05). The negative Beta estimate on institutional capacity reveals that municipalities that have a relatively better institutional capacity are more likely to engage in sustainable partnerships than those whose institutional capacity is weak. This is because better institutional capacity was coded 0, while poor institutional capacity was coded 1. This results were significant (p-value < 0.05).

5 DISCUSSION

The ability of munipal authorities in Ethiopia to adapt to climate change, and implementing adaptation decisions (i.e. transforming that capacity into action) has been constrained by the absence of credible partnership between the planning authorities and other key actors – including environmental agencies, local community groupings and the private sector among others. Similar observations on constrained partnerships have been made in other developing countries (Mani et al. 2008; Nath and Behera, 2011).

In the absence of sustainable partnerships it is increasingly beleived that most city authorities lose out from further mutual learning between scientists and stakeholders, new opinions, sharing of technical expertise, and the the generation of compromise solutions against actual and / or pending climate change impacts (Renn, 2006; Ceccatop et al, 2011). This analysis revealed that the majority of municipalities in Ethiopia are constrained in terms of their technical, financial, institutional capacity and a general lack of access to climate science. While other studies have revealed that the existence of knowledge, capacity and resources to undertake adaptation, is not a guarantee to taking action (Hanemann, 2000; Moser, 2009; Repetto, 2008), this analysis has revealed that municipalities that are constrained by such attributes were not engaged in sustainable partnerships. On the contrary, those who were better positioned in terms of climate knowledge, technical, financial and institutional capacities were found to the on the path towards sustainable partnerships.

Lack of access to climate science, weak institutional capacity and a general concern for the poor were three most significant activities that defined whether the municipality is engaged on not engaged in sustainable partnerships. Uncertainty over climate science information interfers adaptation decsions and can stymie local authority involvement in sustainable partnerships. It is also important to note that, other stakeholder groups such as NGOs, community groupings, environmental related groups and the business community, can play a decisive role in determining climate change related policy outcomes through their interaction with policy makers and urban local authorities in a partnership environment (Broadbent, 1999; Schreurs, 2002; Mani et al, 2008). The weak institutional capacity that charcterize the bulk of municipalitiers in Ethiopia has often meant such a decisive role has never been a reality for many. Major symptoms of such weak institutional capacity include absence of credible participatory structures and weak communication lines – factors that have seen municipalities failing to harness the advantages associated with horizontal and vertical collaboration with other key climate change actors.

Most partnerships are bound together by a general concern for the poor. It is largely beleived that an active and organized civil society can play the role of driving force to lead governments and / or municipal authorities to implement responsive adaptation policies (Kelkar et al, 2008; Nath and Behera, 2011). Interestingly, this analysis revealed that municipalities that had a general concern for the poor and most vulnerable communities were not engaged in any form of partnerships. Perhaps it is the general fear of losing control over the plight of the most vulnerable groups that have seen some municipalities going solo on climate change adaptation issues.

If adaptation decisions are to be successful, there is an urgent need for municipal authorities in Ethiopia to engage in deliberative participatory activities aimed at winnowing the most complex problems associated with climate change. It is the contetion of this study that further mutual learning between scientists and

stakeholders can be promoted, new opinions can be expressed, problems can be addressed, technical expertise shared, agreements reached, and compromise solutions found if all vested interests are voiced (Renn, 2006). Stakeholders' involvement is also essential, because stakeholders hold the necessary information that could facilitate the exploitation of scientific knowledge with high social relevance (Forsyth, 199; Griffin, 2007; Reed, 2008).

6 CONCLUSION

The advent of Complex Adaptive Systems thinking has seen most planning authorities around the world becoming relentless in adopting sustainable participatory approaches in strengthening their adaptive capacities for unforeseen events. To developing countries like Ethiopia, this view is based on anecdote rather than reliable empirical evidence. The analysis has revealed that participatory decisions have largely dominated the international and to some extent national agendas, with little or no evidence of collaborative effort at the much more local urban scale where most climate change and adaptation decisions are taken.

Using a delphi study that pitted 64 urban planners from 23 cities and / towns of Ethiopia, the analysis revealed that adaptation efforts by most local authorities have not benefited much from forging of working partnerships at various planning scales. Both vertical and horizontal collaboration were found to be limited owing to weak technical, financial and institutional capacities of the concerned municipalities. Major hindrances included on one hand absence of credible participatory structures and on the other hand the general divide that exists between the environment and planning institutions. Efforts that strive to build proper participatory structures, bridge the current divide and reconcile climate science and practice would go a long way in fostering sustainable partnerships for improved adaptation.

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🏆 *reviewed paper*

Planning Re-Mixed: Conceptual Framework of New Planning Ideas

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1 ABSTRACT

Modern planning as an autonomous research discipline, practice and education is celebrating its centenary. In 1909 the first modern legal act – Housing and Town Planning Act came into force in the UK. In the same year the first courses in planning began at the University of Liverpool and Harvard University. For the first time in history the concepts of and for the cities as the spatial response for urgent social needs emerged (garden city, ciudad linear, ville sociale). Royal axes and theoretical geometrical solution were no more relevant to the social and economic problems generated by urban growth. Interesting is that all these new complex concepts were proposed not by architects (traditionally involved in the process of urban design) but by social activists, enlightened philanthropists, progressive politicians, new professionals or even more far-sighted industrialists. Inter- and multidisciplinarity of planning as well as planning as a new profession have come into existence.

One hundred years on, cities again have to face challenges that in a number of fundamental ways are not dissimilar to when planning was first established – the liveability of cities, the quality of life, social cohesion in neighbourhoods, functional and green public spaces, healthy cities, affordable housing. The nature of the problems and the specific issues and challenges are, however, vaster, more complicated and essentially different due to not only size and complexity of the cities but also social demand for better life in the cities.

Society has become complex, is changing fast and unpredictably. Technology is speeding up. The economic and financial crisis is dominating thinking and policies. Cities have to adapt; planning has to adapt. The realisation of this major challenge amongst planners and city governments is now quite widespread. We see a variety of slogans: healthy cities, green cities, sustainable cities, intelligent cities, smart cities, resilient cities, eco-cities, low-carbon cities… Are these planning policy visions, urban concepts, diagnostics, socio-political statements, implementation strategies? Do they provide a real frame of reference to actually tackle the problems? Are they being proved useful or do we have to knuckle down and actually ask ourselves what we as planners need to do to adapt our discipline to face the challenges that face our cities.

Today planners cannot offer prêt-à-porter urban concepts – like garden city; today planners have to place the debate about new ideas in the wide cultural – social and economic – and institutional context. The crisis is evident. But the solution must be different.

How can we channel and structure this debate? How do we avoid having far-reaching intellectual debates and not reaching any particular and implementable conclusions? How do we identify and collect the good new, innovative ideas?

This paper offers an integrated conceptual framework that actually identifies the areas of new thinking necessary to adapt planning to its present-day challenges. It offers a structure, a matrix in which a number of phenomena and processes which have become so influential and omni-present in modern-day society are set against three frames of reference fundamental to the professional world of planning.

The present-day phenomena and processes are: time, knowledge, information and education, the paradigm shift, complexity, uncertainty, networks and others.

The three frames of reference are:

- the independent cultural and social background context that influences cities by the very norms and values it produces,
- space/territory itself and processes which we can observe using that space/territory,
- planning itself and planners .

If we represent the frames of reference as the columns of the table and the phenomena and processes affecting and shaping them as the rows of this matrix, we can identify the areas in which new planning ideas

need to be developed and also initiate a description and analysis of such new planning ideas in the context of processes that shape them.

The paper offers an integrated conceptual framework that actually identifies the areas of new thinking necessary to adapt planning to its present-day challenges.

There are three frames of reference we would like to consider:

- independent cultural and social background context that influence cities by the values it produces,
- space itself and processes which we can observe in the space,
- planning and planners.

Each of these frames of references is intersected by the phenomena and processes affecting and shaping them. These phenomena and processes determine cutural and social background, space itself and planning. These phenomena/processes are i.e.: time, knowledge, information and education, paradigm shift, complexity, uncertainty, networks and others. If we represent frames of reference as the columns of the table and phenomena and processes as the rows of this table we could locate planning ideas and their wider context in the matrix. This matrix would allow us to describe and analyse planning ideas in the context of processes that shape them.

2 INTRODUCTION

It is worth noting that it has been one hundred years since modern planning has been considered an autonomous discipline of knowledge, practice and education. The world saw its first coherent, modern act of law concerning planning in 1909, when the Housing and Planning Act was passed by the British parliament. In the same year, the first teaching programmes in planning were started at Harvard University in North America and the University of Liverpool in Europe.

The industrial revolution, the abrupt urbanisation and the development of transport, which all happened in the 19th and 20th centuries, gave birth to social problems unheard of before. Obviously, the problems were rooted in space, where axes of the changes crossed. The issues implied here required interventions in a scale that had never taken place earlier – interventions which were necessary and urgent. In other words, someone had to start managing the spatial processes with social and economic factors in mind, not only as "royal grand axis" designs, but with tens of thousands of people in regard.

That need became visible not only in legislation or education; it also produced a number of professional organisations, especially in Europe: Town and Country Planning Association (TCPA, 1899), Société Française des Urbanistes (SFU, 1911), International Federation for Housing and Planning (IFHP, 1913), Royal Town Planning Institute (RTPI, 1914), Towarzystwo Urbanistów Polskich (Society Of Polish Town Planners, TUP, 1923).

Holistic concepts of cities also began to appear, much removed from the ideal geometric designs of earlier times, looking for a spatial answer for various social problems (garden city, ciudad linear, ville sociale). Very interestingly, these concepts did not come from architects, but from social activists, business people or philanthropists. Inter- and multidisciplinarity of planning, and the new profession, became a fact.

A century later, our urban problems are not fewer, on the contrary: they seem larger and even more urgent. The reason for that is not only the size of cities, in which (as we are constantly being reminded) already more than half of the population of the Earth lives, but also from the complexity of the issues we are facing. That complexity is not only due to technological changes, but also social ones, ones we tend to dismiss as unimportant because we perceive them as natural and obvious. Let us remember, however, that a hundred years ago, in 1912, women had the right to vote only in five countries: the USA, New Zealand, Australia, Finland and Norway. In many European countries, which today claim to be cornerstones of democracy, such a fundamental element of citizenship was introduced as late as after World War II (e.g. France – 1944, Italy – 1945, Belgium – 1948, Greece – 1952, Switzerland 1971, Portugal – 1976). Poland, by the way, does not stand badly in this ranking, having granted women the right to vote in 1918, directly after regaining independence, a year later that it had been introduced in the Netherlands. Moreover, rights to such basic amenities as health care, education or social security, in the form that seems unquestionable to the modern, rich (despite the crisis) citizens of Europe, were reserved to the sphere of imagination. A hundred years ago, the challenge for Europe was to provide shelter and elementary level of hygiene.

Today, in spite of incredible technological progress, even in the advanced and civilized Europe illiterate and homeless people can still be found. It is not them, however, who pose the biggest challenge. Just as a hundred years ago the situation arose due to changes in quantity (population, transport modes etc), now the urgent need for intervention is caused by the changes in quality of the many facets of life.

Nowadays, people demand healthy cities, which offer opportunities for personal development and a good life. Are we – as planners – able to provide them with that? Are we able to see both the perspectives and threats in front of our profession and its public mission? Are we able to cure the disease, which troubles modern planning? And most of all – are we able to diagnose it in the first place?

We discuss many ideas for cities. Such terms as "low-carbon cities" or "resilient cities" are attempts to find solutions to some of the burning problems of modern urban reality. At the same time, a number of bottom-up ideas, such as the "slow cities", not inspired by planners, but by the citizens themselves in the drive to define their own lifestyle and their expectations for cities.

Parallel to that discussion, we are going through an institutional crisis of planning. On the one hand, politicians (and politics is a crucial component of planning) tend to reveal at present the FROG syndrome ("First Restore Our Growth"), treating planning as an obstacle on the way to grow economies and fight the crisis. They fail to ask the question, however, whether growth is identical with progress/development, or, to be more precise – with improving the quality of life. On the other hand, urban communities see little sense in heavily bureaucratic procedures in planning and tend to see it as a large set of rules, which limits their freedom to operate in space. In a way, planners lost their credibility. No one remembers that the very goal of planning is to raise the quality of life by a rational management of space; that planning concerns the spatial dimension of civilization and therefore culture. Everybody sees technocratic procedures and limitations, a façade of consultations which no one cares about and a dismissive and paternalistic (patronizing?) approach to "unprofessional ideas". Nowadays planners act frequently as surgeons do, operating on a patient regardless of whether the patient wants that or not, all while he or she is still quite conscious.

It is obvious that it is today impossible to come up with a ready-made product, like Ebenezer Howard did with the garden city a century ago. We now must locate the discussion on planning ideas in a wider territorial, civilizational, cultural and institutional context. What we have in common with the situation from a hundred years ago is the apparent crisis; its sources and character are vastly different though. Thus, the solution must be different as well.

3 THE MATRIX

In order to discuss ideas for cities today, one needs to keep in mind three frameworks of reference.

Firstly, one must consider the civilisational and cultural background, which produces values that influence our perception of cities and our "making" (or "creating"?) the cities. These values are not absolute, they are a product of our social development, and that, in turn, is obviously conditioned by our cultural, technical and economic development. If Jacqueline Beaujeau-Garnier and George Chabot can be agreed with (and we tend to do so) when they claimed the city to be an image of the civilisational system and its representation, then there is little doubt left that planners ought to not only recognize, but also anticipate civilisational trends. Without them the city is nothing but a body of buildings and infrastructure. If culture and, more broadly speaking, life as such is not behind them, then it is not a city that is in question, but some other spatial entity. An example of such phenomena are the abandoned ancient cities in South America, which can now be labelled as a sort of "witnesses of history". By the way, it may be worth noting that perhaps due to the lack of the civilisational background the functioning of the ideal cities – all the way from the Renaissance to the New Towns – is burdened with some hard to define, but easy to see, disability.

Secondly, we must describe and understand the state of the city as it is. In many modern ideas of urban studies/planning, it is difficult to tell whether they are a description of facts or a scenario of development. A diagnosis is an important element in searching the solution for the future, even if we understand that it had happened in history that good solutions were found without a deep understanding of the functioning of a city (but always with good anticipation of the trends). Unfortunately, taking into account the complexity of modern urban systems, we should not be counting on such luck. We should also not be discouraged by the fact that in the future cities will be different than today. If there is one stable feature of cities, it is their constant changing, the transformation. We should rather build knowledge and search for tools to help us

create possible scenarios for the future. These, in turn, require understanding not only the physical from, but especially the processes and phenomena, which shape them. Additionally, we should take into account the fact that it is not easy to conduct an experiment – we have no choice but to work the living body of the city and touch on the everyday lives of its residents and all kinds of "users". Our responsibility is great. We cannot return the lost time or life to anybody, nor can we return the worsened quality someone experienced due to a bad urban decision. In other words, we do not have the comfort to be wrong very often.

Thirdly and finally, there is the context of planning as such. What does our profession and we planners, see as opportunities and limitations? What role do we see for ourselves in the changing world? How do we react to reality and what tools do we have to influence it?

Each of the three frameworks of reference is crossed by the axes of phenomena or processes, which influence and/or shape it in a way. These processes and phenomena are an important determining factor and a background for the broad civilizational/cultural context, for the cities, and for planning itself.

If we imagine that framework of reference (civilisation, cities, planners) as columns in a table, and processes and phenomena as rows, we will get a matrix, in which planning ideas and its broader context are included. The described backbone will also allow us to trace the context and the meaning of planning ideas more easily against the background of more general phenomena, which in fact shape them.

3.1 Axis 1: Time

On the civilizational/cultural level we can see the clash of two opposite trends. On one side there is the ever-present in the second half of the 20th century tendency of "do it faster", "make it better", "earn more", "reach a higher level". For example, with the life expectancy extending we try to get to subsequent thresholds of education and career earlier than ever in history (PhD for 26 years old researchers). Meanwhile, a bottom-up movement of "live slower, enjoy life", concentrated on quality, not quantity, is growing and gaining strength. Some cultures have that incorporated in their model of life.

The first of these tendencies has obvious repercussions in cities. The process of transformation of cities has accelerated. City structures are changing dynamically; the model of a city as a whole is changing. That latter process is slower, but still has a dynamic never present before in history.

At the same time, the means of managing cities is focused on quick results. The authorities try to satisfy investors and to present as soon as possible (preferably before the next election) to the citizens the spectacular outcomes of their activity. In other words, the pressure of time creates in cities very unstable and often questionable values – nevertheless, ones that are "shiny" and "easy to sell". One can say, that a symptom of this race against time is a sort of pop-urbanism, concentrated on awing the audience, and not on the search for an optimal or – more modestly – rational solution.

The second of the aforementioned trends is manifested – so far in a not very popular, but already making its presence known – in a movement focused on searching for quality, and not only quantity. In many cities independently, alternative initiatives demand actions concerning the quality – such as changes in transportation, social or residential policies. The citizens themselves take up initiatives of a new kind – banks of free time, "days of neighbours" or common pro-social actions like "guerrilla gardening". People sacrifice their time, effort and financial means to work for their communities, without expecting a financial profit, but an improvement in the quality of life. More and more movements supporting the "slow cities" idea are created; that concept of city which rejects the race for profit and ever higher career positions, and celebrates tasting the everyday joy of life and the inner development of a person. That movement definitely reaps what it had sown and will reap the change in the perception of space – instead of isolation and the manifestations of differences, integration and cooperation. That, obviously, will translate onto the structure of cities. The movement also seems important because it is not "planned" – it was not "designed" by planners and "implemented" as a strategy, but is a symptom of the vitality of cities, a proof that cities have not yet lost their nature and still reflect the culture that creates them.

For planning, all of these processes mean that we are constantly one step behind the reality, that planning in institutional forms as we know it has a reactive character and thus has to always be somewhat late. Modern plans do not anticipate the civilisational trends, trying to find a spatial dimension for them. Modern plans answer current demands, concerning spatial development here and now. The investors can hardly be blamed, by the way – be it companies, institutions or private persons – that they are driven by particular interests; it is

a planner's job to see further and predict consequences. It seems, then, that strategic planning is bound to play a bigger role, as it anticipates the directions of development and setting a distant perspective, rather than concentrating on very local decision about land use. It seems more probable as we continue to observe how far removed from reality these decision prove to be after a couple of years, sometimes months. It is also important to be able to find tools that will not react to such changes in a hysterical way, but ones that would have the dynamics of the changes somehow implemented in its mechanism. The concept of dynamic planning has many references, but it seems that its most important determinant is time.

3.2 Axis 2: Knowledge, information and education

Nowadays the availability of information is remarkable. Anything can be found out in no time. The availability of information, however, does not always mean expanding of knowledge; more often it causes "information noise" – the gained information has no value, but only serves to kill time. That is the situation with much of the pop-cultural or pseudo-scientific information. An additional element of that process is the fact that virtually anyone can produce and spread information, which results in much of them being unreliable or quite simply false. As a source of knowledge, this information is not only useless, but even counter-productive, wrong, leading to a misrepresentation of reality.

Therefore, education is absolutely crucial, providing everyone with a chance to acquire a backbone of knowledge, which then allows to filter out the useful information from the useless and to segregate information due to their correctness, as sources of knowing and understanding reality.

Another civilisational aspect of that axis is the fact that the technological progress has made even the educated people ignorant. The very advanced specialization of knowledge and technology has excluded us from the possibility of understanding and interpreting all phenomena that happen. Each of us, on a daily basis, uses devices, the functioning of which we do not know and most probably would not understand, just like many of us owe their life or health to medicine, which is far beyond the intellectual grasp of nearly all patients.

There is also the concept of the "learning society", which is true, too. Without doubt, as a society, the level of our knowledge, especially in Europe, is at its highest in history. Institutional education has allowed us to reach a very high level of understanding and interpreting reality. That, however, causes a raised (compared to the past) level of expectations towards the quality of life. Modern communities in the rich world want not only to live long, but also live pleasantly. Not only the basic demands concerning work have to be met, but also expectations of our health, cultural life, recreation, entertainment and perspectives for children.

When the term "learning society" is used, one thinks of a combination of all these phenomena, amplified by the dynamics of changes.

That has huge consequences for cities. Firstly, the expectations of the quality of life directly translate to the expected spatial developments. For example, a whole new sector of services for retirees has emerged. These people cease to be "toothless, ill old people" and become people in great shape, expecting entertainment and attractions for the next 20-30 years of life. They are interested in self-development, they have a lot of free time; they are a growing group of city users. Secondly, a well-educated society can no longer be treated as a "component" of planning; it demands to be the real subject of processes and of the influence on the future. We observe how the sun sets over some half-a-decade old concepts of cooperation with and within the society, such as public participation or collaborative planning, as no longer reflecting the modern needs, which have advanced and require new institutional solutions.

At the same time, from the point of view of an individual wanting to satisfy their growing quality of life needs, rational spatial behaviour does not always translate to rational and valuable spatial development, also for that individual. In other words, there is a great need of urban education of the society. Just like everybody understands smoking is bad for your health, everyone should be aware that certain spatial behaviour has its consequences. Here a frequently discussed notion is the self-organisation of cities, which has other aspects, too. Without an understanding of that process one cannot, it seems, seek reasonable tools for planning, or in a broader sense – of managing the future.

All the mentioned phenomena pose new challenges for planning.

The knowledge of planning, as any other discipline of knowledge, is gradually more complex and acquires new internal specialisations. Some elements of that science are so complicated – prognostic models or some

issues of city infrastructure are good examples – that they invoke distrust even among planners. On the one hand, there is a natural limit of competence for the professionals, and on the other it is hard to communicate with the subject of planning – the society – using complicated mathematical formulas describing processes and phenomena that happen in urban structures. The means of communication are urgently needed though, because in planning, like in medicine, the patient must be aware of the procedures run on him or her, otherwise the probability of failing grows.

There is also the other aspect of that new urban knowledge. For example, much is spoken about "new urbanism", a movement especially active in the United States, promoting breathtaking and revolutionary discoveries of rules absolutely basic – if not classic – for urban design, which in Europe are taught to students around the second year of studies in planning. Additionally, the famous ten rules of that concept constitutes a fantastic mixture of very locally implemented elements of urban design with much broader ideas of nearly civilizational/cultural character. It produces a funny blend of knowledge and fashions, which claims to be a discovery of an innovative way of urban designing. That is an example of pop-urban knowledge, an attempt to find simple – if not trivial – rules, which would shape very complex phenomena. Rephrasing, it is an example of anti-knowledge in planning.

Unfortunately, there is one more great problem from the professional point of view. The huge amount of data available for planners does not necessarily influence the quality of decisions made – sometimes it is responsible for not making any decision at all. To put it differently, planning has its own "information noise". For example, there are amazing methods of organizing, segregating and analysing data thanks to the GIS technology; things are done to connect and use the various existing databases (e.g. Plan4All in Europe); institutional actions are taken to present these information (such as INSPIRE). All that is happening while planning is paralyzed with institutional crisis and has little more to offer than reactions. Information sometimes initiate actions that require a vision and new tools; they may also encourage – not always with a positive effect – to sustain some existing methods. Another aspect of that process is the fact that modern tools (like all advanced technologies) are very complex. This means that specialists who deal with these state-of-the-art technologies tend to focus on the advancement of only these tools and planners are left without understanding the possibilities of uses of what is new. The technological gap within the profession is widening. Modern, advanced tools, which let us describe parts of reality in a more detailed way, not necessarily bring us closer to the ability to make long-term decisions; neither do they guarantee the proper and true understanding of these long-term phenomena, which, at the end of the day, will have the most important influence on our future. This is so because the most influential processes happen in the social and cultural sphere, which is the most difficult one to fit into any measurements or frameworks.

3.3 The paradigm shift

On the one hand, every human activity has a tendency to continue its current trend or direction as far as to the level of absurdity. On the other hand, when the absurd is reached, mostly a revolution comes along, which, however, had grown in a minority movement of contestation. This rule applies to both social and scientific trends. Archives are full of foresights (totally false) of the future, based on an estimation of current trends. For example, many serious works on demographics predicted critical overpopulation of the Earth, based on phenomena that happened after WWII. Some of these prognostics assumed that some time by now we would be suffocating with our own breaths due to the amount of carbon dioxide produced by people. The revolution in the birth control has mightily changed the course of things and made that forecast only a historical fun fact. Perhaps, however, the "alarm scenarios" influence reality by intensifying human activity in threatened areas.

That paradigm shift has great importance for cities. We have a tendency to understand or, more frequently, unjustified glorification of past models of cities and to attempt to copy the solutions of the past to modern reality. A good example is the affection to medieval urban structures, which are inadequate to the modern lifestyle. It is enough to compare one factor: life expectancy in medieval Europe was, depending on the source, around 25 years (or less, especially for women). The vast majority of people lived and worked in conditions that would today be deemed as horrifying. At the same time, for unknown reasons, we believe we should have as a ideal urban concept the model of cities from the times when, as Jacques Le Goff reminds, the biggest civilisational challenge was to fend off the constant fear of hunger. That is not to mention that we

are trying to apply a model of cities inhabited by a maximum of a several dozen thousands of people to structures of multiple hundreds of thousands residents.

Sometimes the difficulties concerning the paradigm shift seem to come from the inertia of functioning. Let us consider, as an example, the growing needs of infrastructure. The growing cities require more and more complicated networks, including ones delivering the most basic amenities, such as water or energy. Answering those needs we create not the most efficient system, but the one meeting the current demand. If a specialist was presented with a plan of a city district with a request to design a network of infrastructure of any kind, it would surely be different from the one existing at that moment. There are only a few examples of radical, abrupt reorganisations of urban fabric and structure of functioning cities. Probably the best known large-scale project was the reconstruction of Paris by Georges-Eugene Hausmann. Smaller scale project, however, are still being implemented, such as the Spina in Turin or the famous (for the social protests) Stuttgart 21. To sum it up, the change in the way of thinking about reality and the redefining of our own approach to it are very difficult, but at the same time – which may seem paradoxical – unavoidable. It is not certain if we understand the happening changes correctly or if we describe the phenomena in a proper way, because our perception is distorted by a set of beliefs concerning the structure of cities. It is for certain, however, that the model of cities, which has been developing for the last two hundred years is different from all that had come before, and that our understanding of it is not full. Moreover, we are limited by our perception paradigm; and to make things even more complicated, we do not have very effective tools that would control these changes. Our influence on the human urban environment is, in fact, very limited. Putting it in an even more concise way, it is rather certain that the current transformations in the model of the city, relying heavily on spatial self-organization, are still very elusive to us, but that in no way changes their dynamics and scale.

An unbelievable challenge for planning appears here – how to include that dynamic into planning processes? How to distinguish the trends and anticipate the future? How the planning system should take these phenomena into account? How to manage changes rather than plan them, as we do it today? What tools may serve that purpose?

Perhaps this element of the paradigm shift presents the most important challenge for 21st century planners. Conversations about that happen on numerous meetings, conferences and seminars. On the one hand, the sectoral model of thinking is still in force – the division between architects, urban designers, landscape architects, transportation engineers – who are responsible for (and sometimes fight for) various elements of the city structure; that set also gradually grows with new specialists. On the other hand, more and more professionals understand the need to revaluate the models that have been dominant and to look for an integrated approach and tools to apply it. One of the proposed answers is the so-called integrated planning, operating with a wide set of tools and aiming at many aspects. The change, however, must include the new model of planning as such, and must not mean only enlargement and integration of tools existing today. The analogy to aforementioned infrastructure systems is all too obvious here. A new framework for planning is not only necessary, but also unavoidable, but its outline is still unclear.

That new intellectual paradigm may even include the conditions of spatial planning. As an example, should we not – in the context of environmental and economic threats – start considering a decrease in the number of the Earth's population as a scenario creating positive, interesting possibilities and not threats? A consequence of adopting such assumption would be the creation of a model different to the one we are building around now. Perhaps we should redefine the very notion of development, which has so far been focused on quantity.

What is certain is the fact that models from the past have very limited application today and general rules need to be revised, instead of only updating the planning inventory.

3.4 Axis 4: Complexity

In every discipline, at some point the quantity transforms into quality. In social life, however, apart from the quantitative measurement, there are also great cultural and technical changes. The former are caused by both social and economic changes, while the latter derive from the development of knowledge and technology.

We observe not only cultural transplantations and adaptations, but also demonstrations of cultural difference. In any way, we see how global trends influence local lifestyles, and while simultaneously how these global

trends accept and adapt local values. For many communities that process is extremely difficult to familiarize with and to accept. On the other hand, there is a big and growing group of "world nomads", who use every coming opportunity to expand their style of thinking and to get to know other cultures.

The idea of "cultural purity", understood as a set of firm values, have always been a myth to some extent, and is definitely a thing of the past from the perspective of today.

No one has tools to control or shape these phenomena, and their intensity and quantity make the available terms to describe it insufficient, let alone predicting and influencing them.

The unbelievable technological progress has contributed quite a lot to that situation.

In relation to city structures, the growth of the last two centuries itself would have caused changes in quality in an unprecedented scale and generated an unprecedented complexity. If we are able to talk about megacities, metropolisation, region-cities or global cities, then it is only an aspect of that complex reality. More processes and phenomena have appeared, however, the same as it happened with the general civilisational background.

The multitude alone of models and styles of life of people living in a city would be complex enough to grasp and understand, and if we add to that the economic factors and complicated technological transformations, we get an image which poses a great challenge to even describe. Additionally, the complexity has different dimensions, which create another level for it. Well, and it changes constantly.

For a planner the problem is not only in perceiving that whole complexity, but also in the obvious lack of tools for diagnosis or for foresights, which means for planning. Let us add that even if we create simplified models describing chosen aspects of reality, and we do that knowing we are simplifying, then we are still in the stage of searching for means of describing reality. Things get worse when we have the impression that we have found a wonderful, simple model of "everything" and we are able to describe and plan reality without a problem. It seems that the worst thing that can happen to a planner is to be sure they are in the know what is the "right" model of the city and how cities should look now and in the future. In other words, the main challenge would be to constantly see the complexity and to include it in visions, strategies and plans. There is no more use for the approach of simplifying reality, as it is prone to lead to very serious distortions in the functioning of societies. That is why all tools that allow to estimate the outcomes of actions are becoming so valuable. They should become one of the most important components of the new inventory of planning tools. A separate question is how new plans could include that complexity; what sort of plan in general would be able to give justice to it? For sure not the traditional one, focused on physical aspects of urban structures, and most probably not the lately popular "policies", which only reflect the approach of authorities to various fields. We are searching for a model that would not only integrate specialist knowledge, but also the various subjects and aspects of reality.

The model of the "smart city", discussed recently, is perhaps one of the first attempts to find a framework to include the complexity of urban structures into the future planning scheme.

3.5 Axis 5: Uncertainty

Theoretically, it is clear to everyone that future was never certain. However, the social peace and welfare that has been installed in the decades after WWII have given birth to an impression that every future generation will live longer, safer and better than the previous ones. The lack of logic in such assumption seems to be clear as day, but logic has little to do with social expectations. The unavoidable result, therefore, is that a fast growth of "everything" cannot be kept up: demographic growth which would support comfortably both the leaving and the coming generations, economic growth, the quality of the environment or of employment... What is not known is whether one of these will collapse permanently or if a new model will appear.

Social security, the mirage of which we have experienced for the last half a century, ceases to be; no one can be ensured of economic or political stability. We can no longer "buy things we don't need for money we don't have". The unpredictability of natural disasters or social trends is indisputable. The political protests of the year 2011 all over the world are good proof of that.

We cannot even know if we are heading towards growth or decline in any possible understanding of these words.

In cities, this unpredictability manifests itself in thousand, hundreds of thousands and millions of independent, and often opposing or contradicting spatial decisions which people, institutions and businesses make. They produce not only surprising, but also unpredictable effects in space. That is the spatial self-organization referred when speaking of "spontaneous cities" or "resilient cities". These last words are, too, a planning concept of sorts of how to construct cities in the future.

Planners have a growing difficulty in finding accurate tools of diagnosing what the "urban quality" would be all about; there is more to it, as it is increasingly difficult to reach a consensus what the spatial quality was in general, especially in the larger scale.

On top of that there are doubts whether planners have the tools to influence growth or decline, even if they have anything to say about that. And even if we optimistically assume we have an inventory to create that spatial quality, which would even at the same time contribute to growth, then there is always the issue of changes left. In other words, we are not able to construct anything perfect, applicable always and in every place; we can only search for accurate tools at a certain stage, keeping in mind their temporariness and the need to constantly look for newer ones. Which brings us again to the dynamic planning model.

A very realistic suspicion emerges that the model of managing cities as we have known it is ceases to be valid, and urban designers and politicians should work hard to devise a new mode of operation. The ideas of flexible planning or even soft planning begin to find their way into the minds of planners, who more frequently see their work as a continuous process and not a delivery of a ready-made product set for implementation; as defining the framework of operation for many stakeholders and not a restrictive struggle to define one final layout.

In comparison to our predecessors from a century ago (who were very quick to offer a new "perfect" city model) we need to be much more modest, we cannot be arrogant to the extent of offering a new model of life; we really need to focus on discovering as accurate and effective frameworks for civilization as possible. Whatever that might come to mean.

3.6 Axis 6: Networks

Human life has always been playing out in many parallel "worlds". We belong to multiple networks and connections – family, professional, friendship, hobby, accidental. Our life is multidimensional in many ways. The last years, which brought the technological shift, have multiplied the opportunities to experience the many levels of our existence. Technology has also allowed the existence of new dimensions of imagined worlds, created by each of us. If we add the fact that there are various frameworks of reference for these networks, we will not only return to the aforementioned issue of complexity, but also generate a completely new vision of reality.

In relation to cities, these multi-level networks manifest in more and more complicated matrixes of connections, which in reality shape the structure of the city. They decide about the city's blood flow – movements, intensity and dynamics – they are to a large extent responsible for whether we see an urban structure as functioning well or not. For example, the models describing city flows that were in force only fifty years ago have no longer any validity, because they no longer fit to reality. There are less clear rush hours, all movement is in general more fuzzy, new categories of connections appear very often, a growing number of work connections does not have a "from-to", but a "between" character. It is much more difficult to extract "pure" spheres of our routine activities, because they exist simultaneously in many networks.

Another symptom of existence of that multi-level networks is the metropolisation. Cities have been connecting "overhead" regions in which they lie for a long time now, perhaps always, but nowadays, thanks to the accessibility of means of transport that phenomenon has grown to a huge scale, becoming a major support factor, or maybe even the basis for globalization.

In planning, the lack of understanding for these multi-dimensional networks may result in preserving sectoral planning, which by the natural course of things needs to be limited as it does not reflect the needs derived from the network functioning, both within cities and between them. The search for an efficient model of integrated planning is one of the obvious challenges of the future. That does not mean, though, that it is an easy notion to define.

3.7 Axis 7: Resources, infrastructure and technology

The limitation of the resources requires us to cut down on the use of them; at least because some of them are non-renewable. This does not have to mean "rationing" or other restrictions – this may mean innovations or education.

It seems to be clear to everyone, that cities, constituting only a very small part of the Earth's surface, use a very large part of its resources, especially energetic resources. These, including the climate, which is also "used" by us in a way (some claim it is actually abused), are an essential fuel for the functioning of cities. The use of resources requires infrastructure, and that in an obvious way conditions the development of not only city, but also regional structures. The notion of infrastructure-led development is a good description of city structures which rely completely on supplies.

The recently popular, and – in our opinion – fitting the category of pop-urban, concepts of "low-carbon cities" belong to the sphere of dangerous simplifications (mentioned earlier inside the talk about complexity), similarly to its basis, i.e. the widely discussed issue of climate change. Basically, every human being is aware of the fact that climate changes constantly and that mankind – despite its great powers – does not influence to a really crucial extent. It is enough to mention the natural disasters that people would have avoided if they had been able to do that. The problem of climate change touches upon us because it concerns economies (damages) and threats it poses for us personally. That is way it is more responsible to discuss environmental limitations for man – as there undoubtedly are many – than to get excited over slogans concerning the climate. The matter is much more complex, and fragmentary actions deprived of the understanding of the ins and outs of the issue are more likely to harm than to do good. The climate is an important, but not the only component of the environment, which determines spatial development. Emissions are important, but not to the extent to cut them down by priority, without regard to the costs and detached from other factors. For example, fully natural volcano eruptions emit enormous amounts of carbon dioxide, let alone other dangerous substances. That is why the term "environmental limitations of development" seems to me more responsible and more accurate; it includes the whole of the issue of "using" the planet, without which our species will quite probably not survive.

From the perspective of planning everybody uses (and again probably abuses) the concept of sustainable growth, the understanding of which relies on the awareness of the limitations rooted in the environment. The next step is to understand that the free market, which regulates economic relationships (including the use of the environment) requires control, especially in that aspect. Otherwise it will not be possible to solve the riddle between the nature conditioning our lives and the economy regulating them. The answer – or at least one of the possible answers – may be the technical and technological progress, which will not release planners, though, from the responsibility for strategic decisions. The answer may also lie in a change of the model of life coming from changes in values. It is impossible to change millions of people, but it is possible to use the fact they want to change.

3.8 Axis 8: Concentration and intensity

The notion of concentration, or of density of phenomena, and their intensity does not only apply only to space, although is manifested the strongest in it. We could also locate it in ideologies, religions or preferred lifestyles. The growing professionalization is also one of its symptoms.

In cities, however, the juxtaposition of the compact city vs. urban sprawl is not only a technical question about their spatial structure. It also touches on the intensity of city life and the processes that happen in it – cultural, economic and technical ones.

Does the question whether planning today should be directed towards creating frameworks for the rising intensity of city life and development possibilities stay a valid one?

3.9 Axis 9: Mobility and accessibility

Mankind has achieved progress, i.e. cultural and technical advancement, together with gaining "transport freedom". With each push for more such freedom the scope of possibilities enlarged in every thinkable aspect. It does not seem possible that the ability to travel individually could be reverted; the means of transport, which allow for that freedom, may change, though.

Cities have always been magnets which attracted those freer movements, but they were also places where mobility manifested itself in inner movements. It should be remembered that mobility and accessibility is closely connected to the need to ensure contacts, dictated by our set of needs. Therefore both mobility and accessibility belong in a way to fundamental city freedoms. However, dark sides of that issue can easily be seen: traffic congestion, air pollution, growing difficulties, all leading to a negation of the very notion of mobility due to excessive mobility (or rather to the means that provide for it).

Perhaps the crucial task for planners is not to plan transport, but to plan contacts, which would manifest not only in physical structures providing flows, but also in an influence and the structure itself, in which the contacts are realized. That leads us once more to the search for tools allowing for integration and coherence of the process of planning.

3.10 Axis 10: Locality and globality

Perhaps the opposition of locality and globality in the civilisational dimension relies more on our paradigm, not necessarily in the planning aspect, but the civilisational one. It would be wrong to ascribe values to these notions; the important thing is to see their overlapping on various levels.

On the one hand there is a very clear global trend which shapes local behaviors; we tend to complain about that trend, seeing the same stores all around the world while forgetting freedom movements that lead to the improvement of the quality of lives of many people and which have started precisely thanks to the global trends.

It is impossible to say that the quality of life depends only on global or local trends, but it is possible to say for sure that the local context will have key meaning in reinterpreting and adapting these global trends. Nothing here can be decreed or implemented – just like with any other cultural phenomena. It is even impossible to predict the final success or failure of these trends.

The "prêt-à-porter" policy, which pastes solutions into structures without considering that context, can be seen in cities with growing frequency. Sometimes such policy is successful, and sometimes it is an utter failure. The same urban solutions, delivered by global design companies and implemented in Hong Kong and Mexico, in Southern Africa and Poland, in Australia and Greenland, on the one hand terrify professionals, and on the other sometimes happen to be desired by local communities as a sign of their prestige and globality. In other words, the description of the phenomenon is simple, but a diagnosis not so much.

For a planner, the danger of using the "copy and paste" procedure is made worse by the illusion of the importance of physical planning, and not the planning of processes and policies. Still many of us is certain that a good drawing creates a good space, and then a good life. That does happen, but not always, though.

At the same time there are many concepts which we, as planners, not only support, but which we have generated ourselves, and which are a kind of attempt to bring locality and globality closer together. The concepts of spatial cohesion and social cohesion definitely belong in that category. The word "cohesion" means that there are insignificant differences in a set of elements, but the concept of cohesion does imply important local aspects, such as relying on local resources. That shows, again, that ascribing value naively ("I am against globalism" – as if it was at all possible!) does not bring us any closer to the understanding of reality or to effective solutions.

3.11 Axis 11: Political systems and power

In Poland, a country which regained autonomy only twenty years ago, half of the citizens does not participate in elections. It may seem that something is fundamentally wrong about the citizens or about the system of power which a modern democracy offers. If that critical situation troubles only Poland, one could assume that the first hypothesis could be correct, but because that problem touches all countries of the world to a varying extent, and the free Western democracies to a large extent, the second hypothesis needs to be seriously considered.

The system of political representation seems to drastically stand away from the social reality. Political parties look like dinosaurs among primates. Social and economic concepts expressed by parties do not match the aspirations of the citizens and do not reflect values represented by them. Many citizens vote "out of despair" (or for the "lesser evil") or refuse to cast their vote, which all too often offer them nothing they would wish to have.

Politicians who fall for seducing the voters with empty promises lose not only their own credibility, but also the credibility of the democratic system as a whole. The crisis of power and of political systems is becoming clear.

On the other hand, the citizens are becoming active in demanding a more direct influence on the decision-making process and on the solutions that concern their lives, both in the short and the long term.

These two opposing trends demand some proposal of solution, which does not seem to be there yet.

In cities – in which power and politics came to be – we observe a strongly technocratic tendency. Managing is an activity for professionals who know very well what is "right" and what is "wrong". They know, for example, that a private car is "wrong", and a bicycle is "right"; they know the old town is "lovely" and new business centres are "repulsive", or "pretentious" at best; they know the compact city is "ok" and that urban sprawl is not, etc. Such beliefs are very often quite rational, but planners and local authorities have a tendency to ignore social needs while telling their citizens what is best for them. That technocratic-paternalistic approach, unsurprisingly, does not meet much enthusiasm. The search for new ways of cooperation is again shown in a light of urgency. Traditional planning tools, such as law, are too often tools of neglect, control and corruption, and of development and quality improvement.

New forms of managing cities are at the gates. What we do not know is whether they resemble sweet dreams of freedom or the nightmares of slavery.

4 CONCLUSIONS AND ACKNOWLEDGMENTS

By presenting chosen planning ideas in the form of a matrix we intended to somehow organize the variety of descriptions, concepts and reference frameworks of urban issues that are discussed in the literature of the discipline and at professional meetings. We do not claim it to be a perfect format, or even a good one, but it allows us to achieve intellectual order. On the one side there are many people dedicated to planning, who see the complexity of the situation, while on the other side there are many who still conform to the "fashions" in planning. That is also supported by the fact that it is still much easier to receive funding if the research is about "climate change" or "smart cities" than when we are trying to describe the complexity of a phenomenon which does not have one clear, measurable dimension. For us, building that matrix meant a significant step in search of at least a description of the state of knowledge in which planning is at the moment and of its relation to our planning skills and chances to intervene.

The first outline of this construct was conceptualised in August 2011 and then discussed with many persons.

Most probably, we have failed to present in this paper all planning ideas, but we tried to show what many people in Europe, interested in the state of cities, have been talking about in the recent years. They comment reality using their own experience, but remain open to new ideas and new trends which hang in the air.

That is why we owe words of gratitude to many of them for many hours of conversations and the exchange of experiences. We will not be able to name all of them, but we will mention those whose thoughts are reflected in this text (and the shortcomings of which are only our responsibility). They are: Pedro Gadanho, Jan Gehl, Anna Geppert, Nikos Karadimitriou, Stephen Marshall, Diogo Mateus, Gustavo Ribeiro, Modjtaba Sadria, Ulysses Sengupta, Tadeusz Zipser.

🏆 *reviewed paper*

Potenziale und Wirkungen standortbezogenen Mobilitätsmangements

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1 KURZFASSUNG

Städtebauliche Mischung und Stadtentwicklung in integrierten Lagen scheitern häufig an Nutzungskonflikten, die mit dem (erwarteten) induzierten Verkehr der (vorgesehenen) Nutzungen zusammenhängen. Neben kurzen Wegen und einer guten Infrastruktur für alternative Verkehrsmittel zum Kfz (Nahmobilität, Öffentlicher Personennahverkehr) kann Mobilitätsmanagement als Baustein einer Mobilitätsstrategie den Kfz-Verkehr bestehender und neuer Nutzungen reduzieren und somit zur Lösung dieser Nutzungskonflikte beitragen. Bislang fehlen allerdings anerkannte Verfahren, die Minderungswirkungen von Mobilitätsmanagement abzuschätzen. Um zu bewerten, ob eine auf Mobilitätsmanagement basierende Strategie Erfolg haben kann, ist es erforderlich, die Verkehrsfolgen von bestehenden und geplanten Nutzungen an einem Standort in Abhängigkeit von Nutzungstyp und Erreichbarkeiten möglichst zuverlässig abzuschätzen und die zusätzlichen Einsparpotenziale durch die Maßnahmen des Mobilitätsmanagements zu quantifizieren.

Grundlage für die Standortbewertung bildet ein Ansatz aus „effizient mobil“, dem Aktionsprogramm für Mobilitätsmanagement der dena (Deutsche Energie-Agentur GmbH), der zur Kopplung mit Verkehrsmodellen und GIS weiterentwickelt wurde. Die auf der Unternehmensstruktur am Standort, der Erreichbarkeit sowie den Pendlerverflechtungen beruhenden Indikatoren werden zu einer groben Eignungsbewertung zusammengeführt.

Über Erreichbarkeitsanalysen werden für die Standorte Erreichbarkeitspotenziale für die verschiedenen Verkehrsmittel bewertet und gegenübergestellt. Gleichzeitig werden Charakteristika der ansässigen Betriebe erfasst und aufbereitet. Ziel des Projektes ist es, zu unteruchen, ob das Verfahren geeignet ist, um Standorte dahingehend zu beurteilen, welche Maßnahmenbündel vor Ort besonders erfolgreich sein können und ob es Effekte der anvisierten Maßnahmen abschätzen kann. Dabei soll auf aufwändige Detailbetrachtungen verzichtet werden. Dies hilft den beteiligten Akteuren dabei, ihre Aktivitäten im Mobilitätsmanagement auf aussichtsreiche Standorte zu konzentrieren.

2 AUSGANGSLAGE UND ZIELE

2.1 Ausgangslage

Mobilitätsmanagement als Baustein einer Mobilitätsstrategie

In der Praxis hat sich gezeigt, dass unter Mobilitätsmanagement – sofern überhaupt bekannt – unterschiedliches verstanden wird. Im Rahmen des Programmes „effizient mobil“ (ILS, ISB 2010) wurde es definiert als „[...] Ansatz zur Beeinflussung der Verkehrsnachfrage mit dem Ziel, den Personenverkehr effizienter, umwelt- und sozialverträglicher und damit nachhaltiger zu gestalten. Mobilitätsmanagement bietet den Verkehrsteilnehmenden durch „weiche“ Maßnahmen aus den Bereichen Information, Kommunikation, Motivation, Koordination und Service Optionen, ihr Mobilitätsverhalten und ihre Einstellungen zur Mobilität insbesondere dahingehend zu verändern, ihre Mobilitätsbedürfnisse mit möglichst geringem Aufwand an Pkw-Verkehr zu befriedigen“. Im an Betriebe und Einrichtungen sowohl der Privatwirtschaft als auch der öffentlichen Hand gerichteten betrieblichen Mobilitätsmanagement übernehmen die Betriebe Verantwortung für den von ihnen verursachten Verkehr und kooperieren mit Kommunen, Verkehrsbetrieben und -anbietern. Betriebliches Mobilitätsmanagement kann z.B. Maßnahmen aus den Bereichen JobTicket, Parkraummanagement, Kampagnen oder Radverkehrsförderung umfassen.

Mobilitätsmanagement kann als Baustein einer kommunalen oder regionalen Mobilitätsstrategie in Ergänzung zu verkehrsplanerischen sowie verkehrslenkenden und –steuernden Maßnahmen mit vergleichsweise geringem Aufwand den Kfz-Verkehr bestehender und neuer Nutzungen reduzieren

(BMVBS 2004). Zunehmend finden sich Maßnahmen des Mobilitätsmanagements auch als Bestandteil in Aktionsplänen und Plänen zur Lärmminderung und Luftreinhaltung wieder.

Planungs- und Entscheidungsgrundlagen für Mobilitätsmanagement

Während die in der Planungspraxis verwendeten Verkehrsmodelle für infrastrukturelle und angebotsseitige Maßnahmen eine Abschätzung der verkehrlichen Effekte und Wirkungen und, in Kopplung mit Umweltmodellen, die Abschätzung der daraus resultierenden Emissionen und Immissionen erlauben, fehlt vor allem eine Methodik, mit der die Wirkungen und Effekte von Mobilitätsmanagementmaßnahmen in einem flächenhaften und netzweiten Kontext abgebildet und hinsichtlich verkehrlicher, ökologischer und ökonomischer Aspekte bewertet werden können (BMVBW 2004). Allenfalls wurden die Wirkungen von Mobilitätsmanagementmaßnahmen durch Evaluationen nur auf Einzelmaßnahmen bezogen nachgewiesen und quantifiziert (Hamann 2001). Die Wirkungen in Bezug auf das Verkehrsgeschehen im gesamtstädtischen oder regionalen Kontext sind, ausgehend von einzelnen Betrieben, jedoch in der Regel nicht mehr nachweisbar. Erst durch die Überlagerung mehrerer Einzelmaßnahmen, indem sich zum Beispiel eine gewisse Anzahl an Unternehmen im betrieblichen Mobilitätsmanagement engagiert, werden gesamtstädtische/regionale und netzweite Effekte messbar (BMVBW 2003).

In der Region Frankfurt RheinMain werden derzeit in verschiedenen Städten und Kommunen verstärkt Mobilitätsmanagementmaßnahmen auf der strategischen Ebene z.B. in Form von Verkehrs-managementplänen oder Mobilitätsmasterplänen verankert und auch im Rahmen von Aktionsplänen zur Lärmminderung und Luftreinhaltung diskutiert. Trotz einer breiten Wissensbasis zu den Umsetzungspotenzialen und Voraussetzungen des Mobilitätsmanagements in der Region fehlt eine abgestimmte, anerkannte und valide Methodik zur Abschätzung der Wirkungen.

2.2 Ziele

Das Projekt steht im Zusammenhang mit einer Reihe von Aktivitäten in der Region Frankfurt-RheinMain, die darauf abzielen, den Ansatz des (betrieblichen und standortbezogenen) Mobilitätsmanagements im Rahmen einer strategischen Weiterentwicklung systematisch und flächenhaft umzusetzen. Gemeinsam mit dem Rhein-Main-Verkehrsverbund, den Städten und Landkreisen in der Region Frankfurt Rhein-Main sowie den Lokalen Nahverkehrsorganisationen werden dabei über verschiedene Aktivitäten und Programme Unternehmen und öffentliche Einrichtungen gezielt angesprochen und bei der Erarbeitung von nachhaltigen Mobilitätsmanagementkonzepten unterstützt. Um die Ansprache und Umsetzung zielgerichtet vornehmen zu können, und um bereits vor Beginn zu einer Abschätzung der potenziellen Effekte der Mobilitätsmanage¬mentmaßnahmen zu kommen, wird im Rahmen dieses Projektes von der ivm, das aus dem Programm Staufreies Hessen 2015 vom Land Hessen gefördert wird, eine Methodik entwickelt und erprobt, die die Bewertung von Standorten hinsichtlich ihrer Voraussetzungen für die Umsetzung von Maßnahmen des betrieblichen Mobilitätsmanagements ermöglicht und, darauf aufbauend, die Abschätzung der Wirkungen auf Verkehr und Umwelt erlaubt. Ein besonderer Fokus liegt dabei auf der Untersuchung der Voraussetzungen für eine gezielte Förderung der Nutzung des öffentlichen Personennahverkehrs (auch über die Einführung von Jobtickets).

Im Rahmen dieses Projektes wurde ein Ansatz zur Bewertung und Abschätzung von Mobilitätsmanagement ohne die Nutzung von Befragungsdaten in der Praxis erstmals erprobt. Weitergehendes Ziel des hier beschrieben Projektes ist es, eine Entscheidungsgrundlage für die kontinuierliche Implementierung von Mobilitätsmanagementmaßnahmen zu etablieren. Perspektivisch soll eine Einbindung von Mobilitätsmanagement in die kommunale und regionale Verkehrs- und Mobilitätsplanung ermöglicht werden, die dem gegenwärtigen Stellenwert von Verkehrsmodellen für infrastruktur- und angebotsseitige Maßnahmen gleichkommt. Städte und Kommunen sollen ein handhabbares Verfahren erhalten, welches eine stärkere Verankerung von Mobilitätsmaßnahmen im Rahmen der Luftreinhaltung und Lärmminderungsplanung sowie in den Aktionsplänen fördern kann. Bisher ist Mobilitätsmanagement nicht in den formellen Verfahren verankert; diese sind v.a. auf angebotsseitige Projekte ausgelegt (ILS, ISB, ivm 2009) Zudem soll das Verfahren Aufgabenträgern und Verbänden Grundlagen des öffentlichen Personennahverkehrs (ÖPNV) für die zukünftige Angebotsgestaltung liefern.

3 ANSÄTZE ZUR BEWERTUNG DER EIGNUNG VON STANDORTEN FÜR MOBILITÄTSMANAGEMENT

3.1 Entwicklung eines standortbasierten Bewertungsansatzes

Der hier entwickelte Bewertungsansatz basiert unter anderem auf Ergebnissen, die im Rahmen des Programmes „effizient mobil“ (dena 2010) erzielt wurden. In diesem wurden für Einzelbetriebe die Einflussgrößen auf die potenziellen Wirkungen von Maßnahmen des Mobilitätsmanagements zur CO2-Einsparung bei den Beschäftigtenverkehren untersucht. Als wesentlich wurden dabei neben bereits umgesetzten betrieblichen Aktivitäten die Standort- und Umfeldbedingungen sowie die Mobilitätsmöglichkeiten und Mobilitätsverhalten der Beschäftigten identifiziert. Es wurde ein standardisiertes Bewertungsschema zur Beurteilung der örtlichen Mobilitätsvoraussetzungen - differenziert für die wesentlichen Verkehrsmodi Motorisierter Individualverkehrs (MIV), ÖPNV und Nicht-motorisierter Individualverkehr (NMIV) - entwickelt, weiterhin wurden die Mobilitätsmöglichkeiten und Mobilitätsverhalten bei den Beschäftigten der untersuchten Betriebe mittels Befragung erhoben und die Wohnstandorte der Beschäftigten ermittelt.

Im Rahmen des hier vorgestellten Projektes wurde das Bewertungsschema der überwiegend verkehrlichen Standort- und Umfeldbedingungen aus „effizient mobil“ aufgegriffen. Insbesondere die Kriterien zur Beurteilung des ÖPNV-Angebotes (u.a. Gehzeit zur nächsten Haltestelle, Anzahl ÖPNV-Abfahrten in der Hauptverkehrszeit) und die der Erreichbarkeiten mit unterschiedlichen Verkehrsmitteln konnten mithilfe der Kopplung von Unternehmensdaten mit dem regionalen Verkehrsmodell VDRM („Verkehrsdatenbasis RheinMain“) sowie GIS-gestützter Erreichbarkeitsanalysen (vgl. Bohnet et.al. 2006) genau abgebildet werden. Erkenntnisse zu Zusammenhängen zwischen den Eigenschaften von Betrieben und der Mobilität deren Beschäftigter flossen in die Bildung eines weiteren Indikators ein, der auf einem den Betrieben zugeordneten primären Tätigkeitsfeld beruht. Die genannten Indikatoren wurden jeweils für Einzelbetriebe errechnet und anschließend, erneut mithilfe von GIS, für die Standorte gewichtet, aggregiert und dargestellt.

Basierend auf der Feststellung, dass der Aufwand für die Ansprache sowie die Erarbeitung und Umsetzung von Mobilitätsmanagementmaßnahmen an einem Standort maßgeblich davon abhängt, ob dort ausschließlich kleinere oder zumindest einige größere Betriebe vorhanden sind, wurde die Größenstruktur der Betriebe am Standort als weiterer Indikator eingeführt. Eine Übersicht der Indikatoren der Standortbewertung zeigt Abb.1.

Der Bewertungsansatz und die sich anschließende Wirkungsabschätzung verzichtet also auf die i.d.R. üblichen aufwändigen Vorher-Nachher-Befragungen, wie sie z.B. in Großbritannien (TfL 2009) oder den USA (NCTR 2007) zur Wirkungsabschätzung eingesetzt werden.

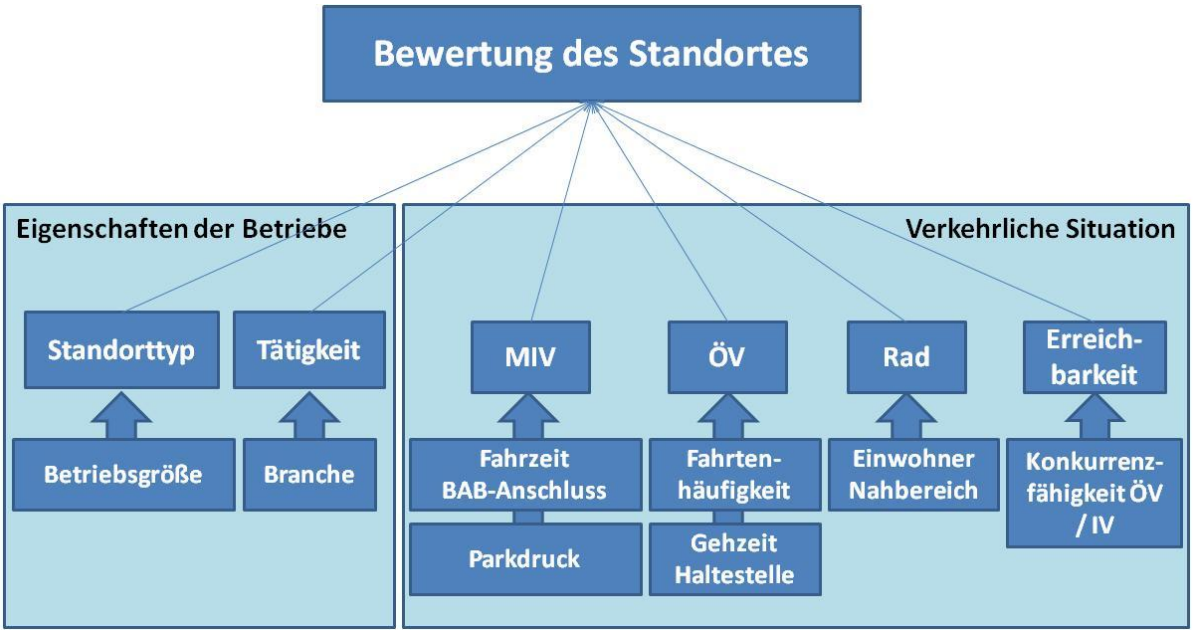

Abb. 1: Indikatoren der Standortbewertung (Quelle: Eigene Darstellung)

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3.2 Datengrundlagen der Standortbewertung, -bildung und -abgrenzung

Der Untersuchungsraum im Projekt erstreckt sich auf die Städte Frankfurt am Main, Bad Homburg vor der Höhe, Offenbach am Main und Darmstadt sowie auf den Landkreis Darmstadt-Dieburg und den Kreis Offenbach. Für diese Gebietskörperschaften wurde durch die Industrie- und Handelskammer (IHK) Offenbach der Auszug aus einer Datenbank mit Angaben zu IHK-Mitgliedsunternehmen zur Verfügung gestellt. In dieser Datenbank sind unter anderem Adresse, Branche („WZ-Nummer“) und die in Klassen eingeteilte Mitarbeiterzahl der Unternehmen hinterlegt. Unternehmen aus den Größenklassen mit weniger als 50 Mitarbeitern wurden nicht berücksichtigt (vgl. Abschnitt 3.1). Die in der Statistik der IHK übermittelten Beschäftigtengrößenklassen von wichtigen Unternehmen wurden für die jeweiligen Betriebsstandorte nachrecherchiert und plausibilisiert. Ergänzend wurde eine Recherche der Beschäftigten in Einrichtungen und Betrieben der öffentlichen Hand vorgenommen. Zum Teil konnten die Beschäftigtendaten mithilfe der Beteiligten auf kommunaler Seite geprüft und ergänzt werden.

Eine weitere wichtige Datengrundlage stellte das regionale Verkehrsmodell VDRM (Verkehrsdatenbasis Rhein-Main) dar, in dem nicht nur die Straßeninfrastruktur und das ÖPNV-Angebot abgebildet sind und zur Berechnung verkehrlicher Indikatoren genutzt werden konnten, sondern auch relevante Daten zur Raumnutzung in „Verkehrszellen“ (Einwohner, Beschäftigte,…) hinterlegt sind. Da die Verkehrszellen in der VDRM zum Teil kongruent zu bestehenden Gewerbegebieten sind, wurde sie bei der Zusammenfassung von Betrieben zu Standorten ebenfalls herangezogen.

Andere Kriterien der Standortbildung und -abgrenzung waren die Standortgröße (Ausdehnung und Anzahl der Unternehmen), die Homogenität der vertretenen Branchen (z.B. Bürostandort vs. Industriestandort), aber auch die Lage relativ zu wichtigen Haltepunkten des ÖPNV oder infrastrukturelle Trennwirkungen (BAB und -kreuze, Bahngleise).

Im Zusammenhang mit Berechnungen zur Erreichbarkeit kamen auch Daten der Openstreetmap zum Einsatz.

3.3 Kriterien und Indikatoren der Standortbewertung

Eine Übersicht der gebildeten Indikatoren zur Bewertung der Standorte enthält Tabelle 1. Die dort aufgeführten Wertebereiche stellen Vorgaben dar, die noch einer weitergehenden Überprüfung unterzogen werden. Im Folgenden wird auf einige der Indikatoren näher eingegangen: Der Indikator Tätigkeitsfeld der Betriebe am Standort etwa basiert auf der Beobachtung, dass die Affinität eines Betriebes oder einer Einrichtung zu Mobilitätsmanagement, die die Erfolgswahrscheinlichkeit einer Ansprache und die erzielbaren Effekte der Umsetzung von Maßnahmen bestimmt, mit einer Reihe von betriebsspezifischen Charakteristika korreliert. Solche sind z.B. das Bildungsniveau der Beschäftigten, vorherrschende Arbeitszeitmodelle oder Tätigkeitsmuster. Anhand der Wirtschaftszweige („WZ-Nummer“) wurden die Unternehmen sieben Tätigkeitsfeldern zugeordnet. Verwaltungstätigkeiten bei der öffentlichen Hand stellen ein eigenes Tätigkeitsfeld dar. Es wird davon ausgegangen, dass als vorherrschende Tätigkeitsfelder der Betriebe am Standort

- Spezialisierte Bürotätigkeiten (für die i.d.R. ein Hochschulabschluss erforderlich ist)
- Wissenschaft und Forschung sowie
- Öffentliche Verwaltung

gute Voraussetzungen für Ansprache und Umsetzung von Mobilitätsmanagement bieten,

- Produzierendes Gewerbe (manuelle Tätigkeit in Industrie oder öffentlichen Betrieben)
- Einfache Bürotätigkeiten (i.d.R. kein Hochschulabschluss erforderlich) sowie
- Hotel und Gesundheit

durchschnittliche Voraussetzungen bieten und dass

- Handel (Einzel- und Großhandel) sowie
- Handwerk

als vorherrschende Tätigkeitsfelder die Erfolgsaussichten eher verringern. Einem Standort wird das Tätigkeitsfeld zugeordnet, dem die meisten der dort Beschäftigten angehören.

Die Tätigkeitsfelder der Betriebe und Standorte werden im Rahmen der Wirkungsabschätzung für die Modellierung der Pendelentfernungen der Beschäftigten erneut herangezogen (vgl. Kap. 4).

Indikator	Berechnungsweise	Einteilung / Wertebereiche
Betriebsgrößen am Standort	siehe rechts	gut: Mind. ein Betrieb > 500 Mitarbeiter am Standort
		mittel: Mind. ein Betrieb > 200 Mitarbeiter am Standort
		schlecht: Alle Betriebe am Standort < 200 Mitarbeiter
Tätigkeitsfeld der Betriebe am Standort:	Ableitung von „Tätigkeitsfeldern“ aus den Branchen der Betriebe, Auswahl des Tätigkeitsfeldes, dem die meisten Beschäftigten angehören	gut: “Spezialisierte Bürotätigkeiten” “öffentliche Verwaltung” und “Wissenschaft und Forschung“
		mittel: “Produzierendes Gewerbe” “Einfache Bürotätigkeiten” sowie “Hotel und Gesundheit”
		schlecht: “Handel” und „Handwerk”
Voraussetzungen für Mobilitätsmanagement aus der mittleren Entfernung zur nächsten BAB-Auffahrt	Betriebsweise Berechnung der Fahrzeit auf Basis des belasteten Straßennetzes, Bildung des über die Beschäftigtenzahlen der Betriebe gewichteten Mittelwertes am Standort. Eine gute BAB-Anbindung wird als schlechte Voraussetzung für Mobiliätsmanagement gewertet	gut: Fahrzeit > 8 min
		mittel: Fahrzeit zwischen 3 und 8 min
		schlecht: Fahrzeit < 3 min
Voraussetzungen für Mobilitätsmanagement aus Parkdruck	abgeleitet aus der Beschäftigtendichte am Standort. Hoher Parkdruck wird als gute Voraussetzung für Mobilitätsmanagement gewertet	gut: > 150 Beschäftigte / ha
		mittel: 35 -150 Beschäftigte / ha
		schlecht: < 35 Beschäftigte / ha
Gehzeit zur nächsten ÖPNV-Haltestelle (inkl. Bus)	Berechnung in GIS, Bildung des über die Beschäftigtenzahlen der Betriebe gewichteten Mittelwertes am Standort.	gut: Gehzeit < 3 min
		mittel: Gehzeit zwischen 3 u. 5 min
		schlecht: Gehzeit > 5 min
Gehzeit zur nächsten SPNV-Haltestelle (inkl. Tram)	Berechnung in GIS, Bildung des über die Beschäftigtenzahlen der Betriebe gewichteten Mittelwertes am Standort.	gut: Gehzeit < 5 min
		mittel: Gehzeit zwischen 5 u. 10 min
		schlecht: Gehzeit > 10 min
Anzahl der Abfahrten in der Hauptverkehrszeit (werktags 7-9 Uhr)	Anzahl an Abfahrten an der Haltestelle mit den meisten Abfahrten am- oder in Nähe (300m) des Standortes	gut: > 60 Abfahrten / h
		mittel: 20-60 Abfahrten / h
		schlecht: < 20 Abfahrten / h
Anzahl der Abfahrten in der Schwachverkehrszeit (werktags 20-22 Uhr)	Anzahl an Abfahrten an der Haltestelle mit den meisten Abfahrten am- oder in Nähe (300m) des Standortes	gut: > 40 Abfahrten / h
		mittel: 10-40 Abfahrten / h
		schlecht: < 40 Abfahrten / h
Konkurrenzfähigkeit der standortbezogenen Erreichbarkeitspotenziale zwischen ÖPNV und MIV	Anzahlen der Einwohner, die innerhalb einer festgelegten Zeitspanne den Standort mit dem ÖPNV und dem MIV erreichen können, werden ins Verhältnis gesetzt. (Gewichtung nach Reisezeit)	gut: ÖPNV- zu MIV-Erreichbarkeitspotenzial > 35%
		mittel: ÖPNV- zu MIV-Erreich-barkeitspotenzial zw. 20 u. 35%
		schlecht: ÖPNV- zu MIV-Erreichbarkeitspotenzial < 20%
Radpotenzial	Anzahl der Einwohner, die den Standort innerhalb von 20 min mit dem Rad erreichen können	gut: > 200.000 Einwohner in Radentfernung
		mittel: 50.000 bis 200.000 Einwohner in Radentfernung
		schlecht: < 50.000 Einwohner in Radentfernung

Tabelle 1: Standortbewertungsindikatoren, Berechnungsweise und Wertebereiche (eigene Darstellung)

Zur Beschreibung der Situation im MIV werden die mittlere Entfernung zur nächsten BAB-Auffahrt und der Parkdruck nicht unmittelbar bewertet, sondern hinsichtlich ihres Einflusses bei der Implementierung von Mobilitätsmanagement-Maßnahmen, insbesondere der Förderung der Nutzung des ÖPNV.

Der Indiaktor Konkurrenzfähigkeit der standortbezogenen Erreichbarkeitspotenziale zwischen ÖPNV und MIV beschreibt das Verhältnis zwischen der (potenziellen) Erreichbarkeit des Standortes mit dem ÖPNV und dem MIV. Zur vergleichenden Abbildung wird für jeden Standort gegenübergestellt, wie viele Einwohner diesen innerhalb üblicher (zeitlicher) Pendelentfernungen mit dem MIV bzw. dem ÖV erreichen können. Die Einwohnerzahlen zeitlich weiter entfernter Quellorte werden dabei mittels Gewichtung über die Reisezeiten (e-0,05 * t) entsprechend schwächer berücksichtigt. 100% ÖV-Konkurrenzfähigkeit würde bedeuten, dass ein Standort von der gleichen Anzahl an Personen sowohl mit dem Pkw als auch mit dem ÖV erreicht werden kann. Das Verhältnis fällt jedoch in der Regel wesentlich kleiner aus, so dass bereits ab 35 % des Wertes für den MIV von einem guten ÖPNV-Erreichbarkeitspotenzial ausgegangen wird. Der Indikator ist deswegen von großer Bedeutung, weil allein durch diesen Reisezeiten mit dem MIV und dem ÖPNV in die Standortbewertung einfließen und weil eine Entscheidung zugunsten des ÖPNV maßgeblich von dessen Konkurrenzfähigkeit gegenüber dem MIV abhängt.

Um die Indikatoren bei der Standortbewertung ihrem mutmaßlichen Stellenwert entsprechend zu berücksichtigen, wurden diese einer Gewichtung unterzogen. Diese basierte auf der Annahme, dass die Erfolgswahrscheinlichkeit von Maßnahmen des Mobilitätsmanagement in ähnlichem Maße von der verkehrlichen Situation wie auch von der Konstellation der Betriebe am Standort abhängt. Angesichts der Vermutung eines höheren Erklärungsgehaltes erfuhren die verkehrlichen Indikatoren für die vorgenommene erste Abschätzung insgesamt gegenüber den betrieblichen eine etwas stärkere Gewichtung. Eine weitergehende Überprüfung der den Einzelindikatoren zugeordneten Gewichte steht noch aus.

3.4 Ergebnisse der Standortbewertung

Anhand einer auf Basis der gewichteten Indikatoren und eines einfachen Punktesystems durchgeführten Standortbewertung im Untersuchungsgebiet und deren kartographischer Darstellung (siehe Abb. 2) lassen sich für betriebliches Mobilitätsmanagement gut geeignete Standorte im Untersuchungsraum sowie perspektivisch auch in der Gesamtregion Frankfurt RheinMain ohne detaillierte Einzeluntersuchungen ermitteln.

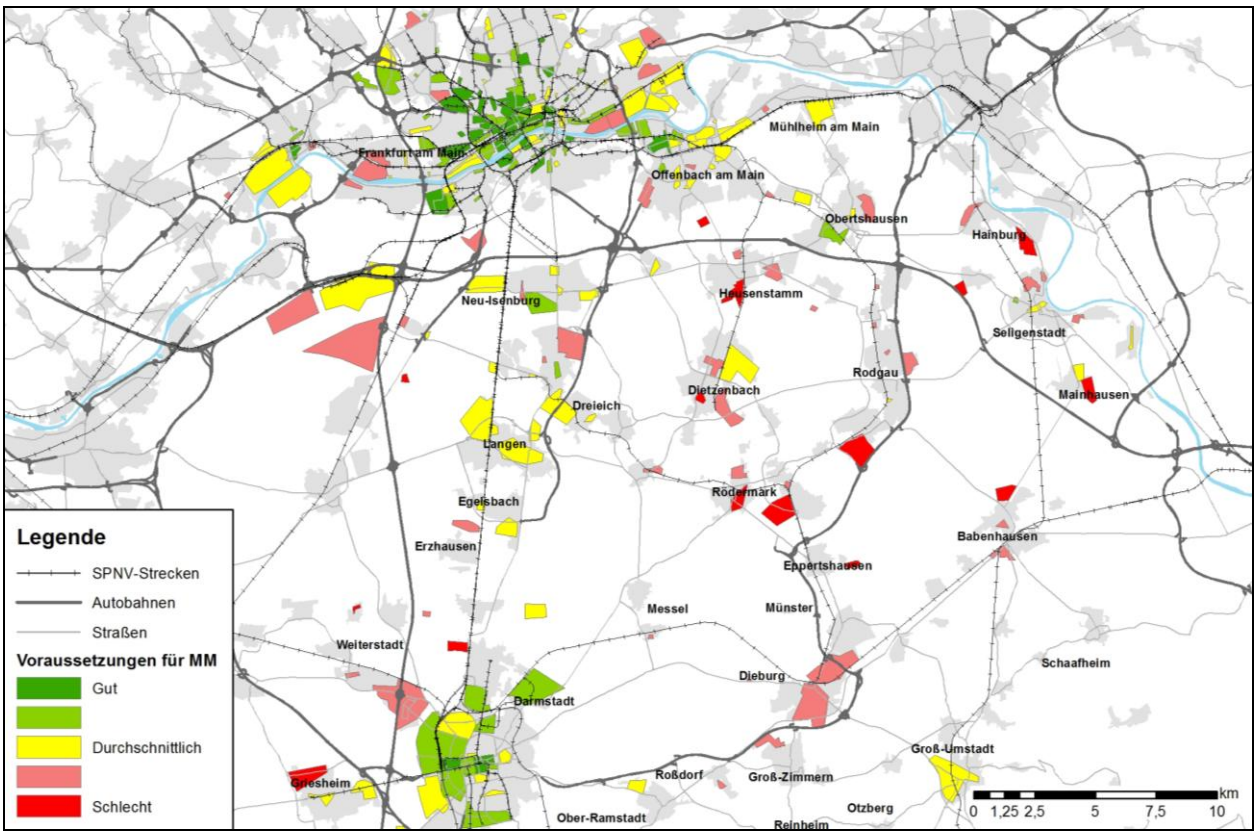

Abb. 2: Standortbewertung, Ausschnitt: Südliches Teilgebiet des Untersuchungsraumes (eigene Darstellung)

Erwartungsgemäß liegen die Standorte mit den höchsten Bewertungen in den Zentren der größeren Städte. Doch auch in Randlagen und kleineren Städten lassen sich als gut bewertete Standorte erkennen.

Bei Betrachtung der Ergebnisse über alle Standorte im Untersuchungsgebiet zeigt sich, dass sich diese über annähernd das gesamte Bewertungsspektrum homogen verteilen. Schwach repräsentiert ist lediglich der Bereich einer fast ausnahmslos schlechten Bewertung. Bei den Einzelindikatoren verteilen sich die Bewertungen bei den Indikatoren Betriebsgrößen, Parkdruck, Gehzeit zum SPNV sowie Abfahrten HVZ und SVZ auf Grundlage der festgelegten Wertebereiche zu annähernd gleichen Teilen auf die Klassen „gut", „mittel" und „schlecht". Bei den Indikatoren Tätigkeitsfeld, Entfernung zu BAB-Auffahrt, Konkurrenzfähigkeit ÖPNV/IV und Radpotenzial ist der Anteil „mittlerer" Bewertungen größer. Lediglich die Gehzeit zur nächsten ÖV-Haltestelle (inkl. Bus) wurde an knapp der Hälfte aller Standorte mit „gut" bewertet.

Mithilfe der Bewertung kann eine Vorauswahl von Standorten mit hohen Wirkungspotenzialen getroffen werden. Allerdings sind aufgrund der Zielsetzung der Standortbewertung, auf Basis von verfügbaren Datengrundlagen und erkannten Zusammenhängen (vergleichsweise grobe) Aussagen auf regionaler Ebene zu ermöglichen, deren Ergebnisse für detaillierte Standortanalysen nicht uneingeschränkt verwendbar. Daher ist es beispielsweise für die Festlegung konkreter Maßnahmen(-bündel) an Einzelstandorten erforderlich, zunächst für einige der Indikatoren eine Überprüfung der örtlichen Situation vorzunehmen. Gleichwohl sind Analysen der Schwächen von Standorten möglich, insbesondere hinsichtlich der Anbindung an den ÖPNV.

Eine Verfeinerung der Ergebnisse kann auch mithilfe der Differenzierung der Bewertung für verschiedene Wirkungsbereiche des Mobilitätsmanagement (z.B. ÖPNV-Förderung, Radverkehrsförderung, effizientere Pkw-Nutzung) erreicht werden. Für eine solche werden zurzeit entsprechende Maßnahmenbündel zusammengestellt, die später auch in die Wirkungsabschätzung einfließen.

4 WIRKUNGSABSCHÄTZUNG

Um die Wirkungen von Strategien des Betrieblichen Mobilitätsmanagements abzubilden, sind zunächst Informationen über die Pendelwege der Beschäftigten erforderlich: Wie weit pendeln die Beschäftigten? Wie gut ist das Angebot des ÖPNV im Vergleich zum Pkw für die Beschäftigten? Welche Verkehrsmittel stehen ihnen zur Verfügung und welche dieser werden heute (im Nullfall ‚ohne Mobilitätsmanagement') genutzt?

Anders als im Ansatz von effizient mobil, bei dem für Einzelbetriebe Wohnstandorte der Beschäftigten ermittelt und letztere zu ihrem Verkehrsverhalten befragt werden konnten (dena 2010), liegen bei einer regionsweiten Betrachtung von Standorten diese Informationen nicht vor. Daher wurden die Wohnstandorte und die Verkehrsmittelwahl mit Hilfe eines Ziel- und Verkehrsmittelwahlmodells abgeschätzt, differenziert nach Tätigkeitsprofilen mit unterschiedlicher Akzeptanz von Reisezeiten (höhere Widerstandsempfindlich¬keit bei gering- gegenüber hochqualifizierten Beschäftigten (Bohnet und Walther 2011, S. 27) :

So wurde zunächst für alle Erwerbstätigen i eines Tätigkeitsprofils, die in 1270 Verkehrszellen der Region Frankfurt Rhein-Main verortet waren, die Wahrscheinlichkeit Pi(jm) dafür ermittelt, dass der Arbeitsplatzstandort j mit Verkehrsmittel m aufgesucht wird. Es erfolgte dann iterativ eine Randsummenanpassung, um sicher zu stellen, dass jeder Job jeweils von einem Beschäftigten eingenommen wird. In die Nutzenfunktion des Multinominalen Logit-Modells flossen Reisezeiten, Kosten für Pkw-Nutzung, ÖV-Tarife, Umsteigehäufigkeiten und die Zahl der Jobs ein. Strukturdaten und Netze wurden aus dem regionalen Verkehrsmodell ‚Verkehrsdatenbasis Rhein-Main' (VDRM) entnommen. Die dort verwendete Spezifikation des VISEVA-Modells für den Wegezweck „Wohnen-Arbeiten" war allerdings nicht für die Anwendung für dieses Projekt geeignet, sodass die Spezifikation und die Modell-Koeffizienten im Wesentlichen aus einem von der TU Hamburg-Harburg für die Region Hannover erstellten Modell (Bohnet und Walther 2011) übernommen wurden und dann anhand der Pendlermatrix und Daten zu Reiseweiten und Modal Split aus einem Datensatz zur Aufstockung der Studie „Mobilität in Deutschland" (MiD 2008) für Hessen bzw. die Region Frankfurt-RheinMain validiert wurden. Im Ergebnis liegen Matrizen nach Tätigkeitsprofil von Wohnort i nach Arbeitsort j mit Verkehrsmittel m vor.

Aus dieser Matrix können für jeden betrachteten Standort die Wohnorte einer „synthetischen Belegschaft" und deren Verkehrsmittelwahl im Nullfall ‚ohne Mobilitätsmanagement' generiert werden (Abb. 3).

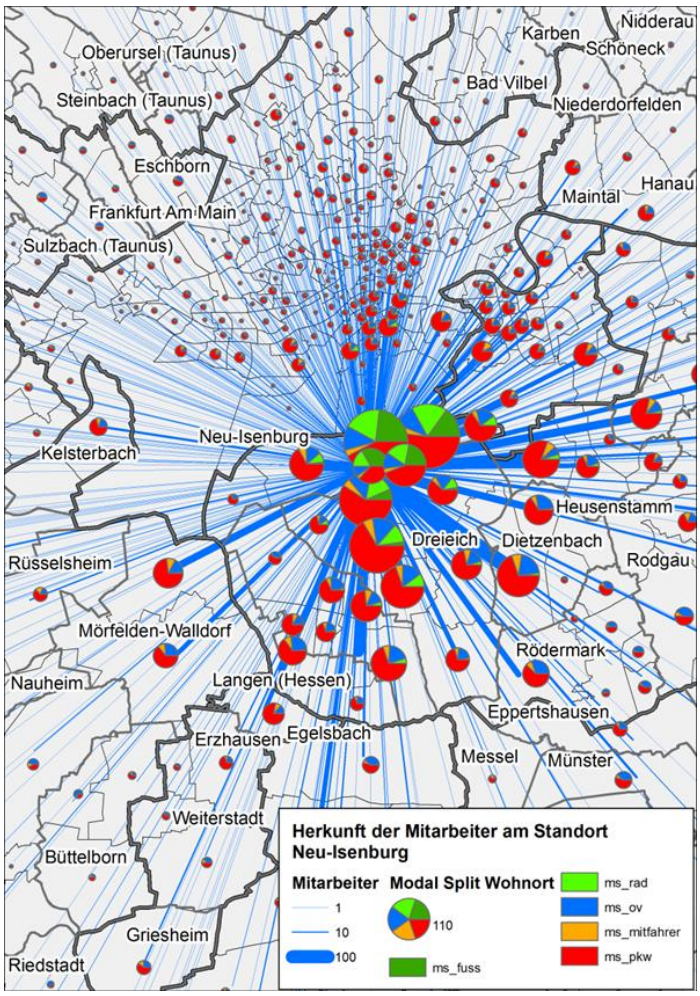

Abb. 3: Beispieldarstellung der Wohnorte und der Verkehrsmittelwahl der synthetischen Belegschaft des Standorts "Neu-Isenburg Gewerbegebiet West" (Eigene Darstellung)

Viele Beschäftigte sind über Alternativen zum Pkw nicht oder falsch informiert. Nicht-Nutzer überschätzen nach den Praxiserfahrungen der Mobilitätsberater in der Region Frankfurt Rhein-Main sowie einer Niederländischen Studie von van Exel und Rietveld (2010) die Reisezeiten des ÖPNV um mehr als 50 %. Daher wird die synthetische Belegschaft eines Standortes in nicht über Alternativen informierte „Pkw-Fixierte" und „ÖV-Informierte" unterteilt, wobei die Anteile aus den Befragungen der Beschäftigten in „effizient mobil" ermittelt werden (Fricke 2011). Die Verkehrsmittelwahl der „Pkw-Fixierten" wird dann noch einmal mit einem eingeschränkten Choice-Set bzw. unter Berücksichtigung der um 50% zu hoch wahrgenommenen ÖPNV-Reisezeit simuliert und das Modell so geeicht, dass der Nullfall ‚ohne Mobilitätsmanagement' valide abgebildet werden kann.

Daraufhin wird ein Planfall ‚mit Mobilitätsmanagement' simuliert. Dabei werden für verschiedene Standorttypen typische Maßnahmenbündel definiert. Diese umfassen verschiedene Maßnahmen, deren Wirkungen wie folgt modellmäßig abgebildet werden (vgl. Abb. 4):

- Durch das Mobilitätsmanagement werden objektive Eigenschaften von Alternativen verändert (z.B. Kosten der ÖPNV-und Pkw-Nutzung durch JobTicket-Angebote und Parkraumbewirtschaftung, Zugangshürden durch bequeme und sichere Radabstellmöglichkeiten)
- Durch individuelle Mobilitätsberatung und Aktionen wird die „empfundene" ÖPNV-Reisezeit bei der Gruppe der nicht-Informierten reduziert
- Mobilitätsmanagement generiert für einen Teil der Beschäftigten bislang nicht verfügbare Alternativen (z.B. die Alternative Pkw-Mitfahrer durch Fahrgemeinschaftsvermittlung). Daher wird das Choice-Set eines Teils der Beschäftigten um diese Alternative erweitert

- Durch Kampagnen, die Vorbildfunktion von radelnden Kollegen etc. wird die subjektive Bewertung von Alternativen (Image des Fahrrads) verbessert. Dies wird durch eine Anpassung der verkehrsmittelspezifischen Konstanten modellmäßig abgebildet.

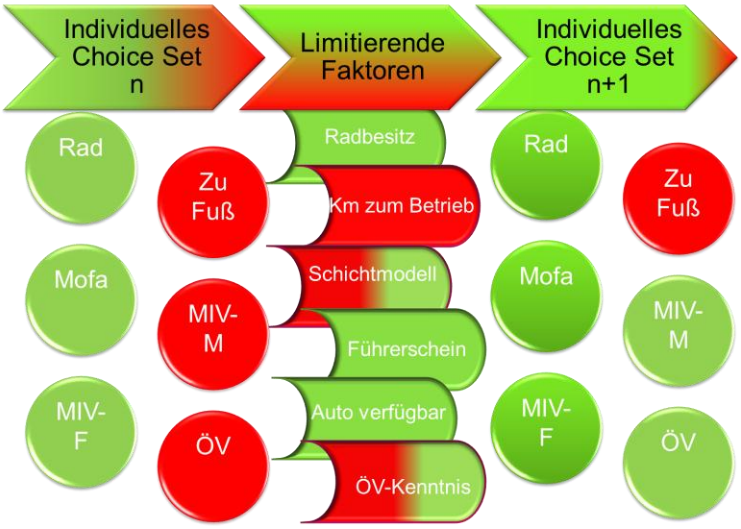

Abb. 4: Abbildung im Modell: Erweiterung wahrgenommener Verkehrsmittelalternativen durch Maßnahmen der Information über ÖPNV-Angebote und der Anpassung des Arbeitszeitmodells (eigene Darstellung)

Für eine regionsweite Wirkungsabschätzung von Mobilitätsmanagement wird für alle in der Standortbewertung als „gut geeigneten" Standorte die Verkehrsmittelwahl der synthetischen Belegschaft im Null- und Planfall ‚ohne' und ‚mit Mobilitätsmanagement' simuliert und so die Veränderungen bei der Nutzung der einzelnen Verkehrsmittel relationsspezifisch abgeschätzt.

Mit Hilfe der so erzeugten Differenzmatrizen Wohnen-Arbeiten können nachfolgend neben dem Modal Split auch weitere Kenngrößen wie CO2-Emissionen, ÖPNV-Erlöse berechnet werden.

Zudem könnten Entlastungseffekte im Straßennetz lokalisiert dargestellt werden, indem die Gesamt-Pkw-Nachfragematrix um die Differenzmatrix mit den eingesparten Pkw-Fahrten vermindert wird und auf das Verkehrsnetz umgelegt wird.

5 FAZIT, AUSBLICK

Während sich bisherige Ansätze zur Abschätzung der Umsetzungspotenziale und Voraussetzungen für betriebliches Mobiliätsmanagement primär auf die Untersuchung einzelner Betriebe konzentrierten, erlaubt das hier vorgestellte Verfahren eine flächenhafte Bewertung der Voraussetzungen für betriebsübergreifende Standorte auf Basis von Indikatoren zur Beurteilung der verkehrlichen wie auch der betriebsstrukturellen Situation am Standort. Im Ergebnis lassen sich geeignete Standorte einfach erkennen und kommunale Strategien zur Umsetzung von Mobilitätsmanagement gezielt angehen - sowohl im Bestand als auch bei der Neuansiedlung von Betrieben. Ebenfalls möglich sind Analysen der Schwächen von Standorten. Wird für einige der Indikatoren eine Überprüfung der Situation am Standort vorgenommen, lassen sich auch standortbezogene Analysen vornehmen, die detaillierte Planungen zur Ansprache der Betriebe und zur konkreten Umsetzung von Mobilitätsmanagement ermöglichen. Durch die Standortbewertung wird festgelegt, für welche Maßnahmenbündel („ÖV-Förderung", „MIV-Effizientssteigerung", „Radverkehrsförderung", „Parkraummanagement") der Standort geeignet ist und welche Entlastungseffekte daraus am Standort resultieren.Vorteil des hier beschriebenen modellgestützten Ansatzes ist, dass er auf verhältnismäßig leicht zu erschließenden Datengrundlagen basiert, was die Übertragbarkeit begünstigt und einen Verzicht auf sonst übliche Befragungen (BMVBW 2003) ermöglicht. Außerdem werden die Effekte des Mobilitätsmanagement dabei fundierter als bisher üblich abgeschätzt, da nicht eine pauschale Reduzierung angenommen wird, sondern die Effekte eines für jeden Standort passenden Maßnahmenbündels individuell geschätzt werden.

Auf Basis der Standortbewertung, der Modellierung der Wohnstandorte von Pendlern und der Auswahl von Maßnahmenbündeln können schließlich Planfälle mit- und ohne Mobilitätsmanagement vergleichend modelliert werden. Die zu erzielenden Entlastungseffekte für das Straßennetz können dann abgeschätzt,

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Minderungen bei der Umweltbelastung und weitere Größen abgeleitet werden. Analog zur in der Praxis üblichen Modellierung von Infrastruktur- und anderen angebotsseitigen Maßnahmen können so die potenziellen Wirkungen der Anwendung von auf Mobilitätsmanagement basierenden kommunalen Mobilitätsstrategien vorab abgeschätzt werden.

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🏆 *reviewed paper*

Prospects for Brownfields at the Edge of Nicosia Buffer Zone

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1 ABSTRACT

Nicosia is the last divided city in Europe, which is the result of Cyprus conflict. Most important result was the necessities of population transfer between the inhabitants of the island. According to the ethnicity, Turkish Cypriots moved to northern part and Greek Cypriots to the southern part of the Island. Although the allocated land use at the edge of Nicosia buffer zone (border) in North is practically the same, because of their close proximity to the border these properties gradually either changed or lost their users, and became vacant and/or abandoned.

Brownfield definition for this study is based on widely accepted European brownfield definition which explains brownfields as the sites that previously developed and now are vacant, derelict and/or abandoned, and also these sites usually consist of real or perceived contamination which requires intervention to bring them back to effective use. Therefore the areas along the border in Nicosia are accepted as Brownfields within the concern of this paper.

These sites, which are in low quality condition of physical environment, have been affecting the overall development of the city, local economy, and also have socio-cultural consequences where those places are becoming differentiated from the rest of the city by means of physical, socio-cultural and economical aspects, including user profiles as well. Accordingly, the aim of this article is to define brownfield lands at the edge of Nicosia buffer zone, and to analyse their existing condition by means of physical, socio-cultural and economical aspects for achieving further sustainable development of those areas. The methodology of this study for data collection is site surveying and the evaluation will be through the European brownfield policies. At the summary of the paper, the findings out of the evaluation will be summarized to define the potential land use of those areas which are considered as brownfield site.

Keywords: Land Use, Mobility, Sustainability, Brownfield Regeneration, Urban Development

2 INTRODUCTION

2.1 Brownfields of Nicosia

Sustainable Brownfield Regeneration (SBR) is one of the most accepted tools in sustainable development issue, which is also a comprehensive solution for problematic lands such as brownfields. The definitions' exploration of the term "Brownfield" clearly shows that there is no exact common definition for this term. Therefore, based on British, European, and American definitions, the term "Brownfield Sites" is defined overall by this research as previously developed land which is real (estate) properties and may occupy a permanent structure in both built-up and rural locations. These sites have been affected by former uses of the site or surrounding lands. Brownfield sites are generally abandoned, derelict, idled or underused, and may have real or perceived contamination problems, where require intervention to bring them back to beneficial use (CABERNET, 2006). One of the accepted solutions for turning these deprived areas to lively, vibrant, and functional space is laid in the combination of urban regeneration and sustainable development, which is widely called as Sustainable Brownfield Regeneration (Dixon at el. 2007). SBR programs are about providing connection between technical issues and socio-economic concerns in order to give a new life to those dead lands and properties. Besides, these regeneration programs will reduce the pressure on Greenfield and prevent the urban sprawl to achieve more compact way of urban form. Awareness of the realistic dimensions of the projects is an essential, which throughout defining the role of stakeholders and managing the partnership, and also recognition and handling the potential risks, more realistic and sufficient results are expected.

Aim of this study is to provide prospects for brownfields in Northern part of Cyprus in general, and areas close to the buffer zone in particular, where no any research has been done before in this perspective. Accordingly this study aims at defining sites with potential brownfield status in northern part of Nicosia, and

particularly at the edge of Nicosia buffer zone to make an initial analysis and evaluation on their existing condition by means of physical, socio-cultural and economical aspects for achieving further sustainable development of those areas. The methodology of this study for data collection is site surveying, and the evaluation will be through the European brownfield policies. The existence of the border or by other means, the UN buffer zone which horizontally divided the entire island into two parts, and particularly the division of the city of Nicosia, caused urban decays with many dimensions at peripheral of the buffer zone.

Broadly, the study moved along a quantitative to qualitative path. Quantitatively, the components of urban changes in selected pilot area, in reference to the theoretical discussions of brownfield, are identified. This set a setting against which ranges of qualitative inputs were set. These inputs were derived from these primary research objectives of brownfield development; defining and classifying the existing setting according to different explorations of brownfield sites, developing an awareness against the issue, achieving participation of stakeholders, develop strategies to achieve regeneration of those potential sites as accepting them as assets to be activated for achieving socio-economic and physical transformation of urban space. In order to assess the existing setting and understanding the public response to certain provisions of the study, in-depth interviews with employees, residents and finally other stakeholders such as the central and local authorities have been held accordingly. Although brownfields exists on both sides (South and North) on buffer zone, it is important to define the limitations in order to be able to develop a comprehensive study for 'specific part of an area'. Therefore, areas close to buffer zone have decided to be case to develop an approach against existing 'unsustainable development'.

Though in South, through the EU accession and afterwards, several policies and programs have been developed for achieving regeneration of declined urban areas by means of brownfield development, and there have been no attempts done before on the concern of this research. Therefore, the theoretical part involves with the overall idea of brownfield regeneration that provides a holistic approach for further steps of the study where the developed strategies will be considered for the Southern part as well. Particular study of Northern part, peripheral areas to buffer-zone is accepted as 'case study' where outputs of the study will provide an input, and accordingly a complementary work should be considered by the South Cyprus as well in order to achieve integrated urban regeneration as a whole.

Generally, case studies related to Brownfield sites are defined in a framework that is formed throughout three dimensions; these three dimensions are physical/environmental, socio-economic, and economic. Each dimension has its own indicators, which all together formulate a framework for beginning of brownfield regeneration program. Also the outcome of this framework produces another framework for beginning of a holistic strategic plan. According to recent literature on brownfield issues, in each dimension there are some indicators, which act as the checklist for brownfield site analysis and evaluations. To be aware of variety in reflections of dimensions and indicators is an essential. For example, in the case of Nicosia, regeneration of residential areas will not increasing the rate of tax, therefore the indicator of tax income will not be the consideration. As a result, this research will use dimensions and indicators according to the characteristic of the area.

This study examines and evaluates the characteristics of these areas in a holistic approach. This holistic analysis takes the whole area as a mixed-use environment, with variety of users, and tries to decode and decontextualize the problems regarding to brownfield issues. Study area consists of industrial, commercial, and residential properties. In most of the literature and actual practices, the most common brownfield sites are industrial, and then commercial ones are in second place, the residential properties have become vacant and abandoned due to the result of special events, such as political/ethnical/religious conflicts, earthquake, war, and etc. The special issue about this case study is existence of the residential properties within the area, and these unique cases became brownfield as the impacts of buffer zone, which are now functioning as a barrier between two communities.

on the other hand, process of Sustainable Brownfield Regeneration (SBR) program consists of several steps, which each step is essential and foundation of another one (Shojaee Far, 2011). In fact, the beginning or the first stage of the program has an important role in whole regeneration project, which produces a general assessment and defines the problems (Table 1). This research attempts to evaluate the case of Nicosia according to the first stage, to emphasise the theme of general problems related to brownfield issues of the study area. For the purpose of this study, an initial site survey has been carried out in regards to all

dimensions. Beside exploration in existing documents and researches related to the Nicosia for finding out its physical characteristics, the questionnaires, in-depth interviews with locals and governmental authorities, decodes many problems of the area. Moreover the observations and physical evaluations of the sites, in combination with qualitative and quantitative data drew a framework to assess the problems and give the better understanding of existing situation.

Initial Stage of Process of SBR Program	
Initial Process (General Assessment and Problem Definition)	Initial Site Survey: - Physical/Environmental Site Survey - Socio-Economic Survey (Interviews, questionnaires, etc.)
	Recognition of Stakeholders to arrange a multi-disciplinary team for further stages
	Identification of theme of general problems
	Conceptual Framework out of initial analysis for SBR Program to emphasize positive and negative points

Table 1: Initial Stage of Process of SBR Program (Shojaee Far, 2011)

2.2 Nicosia, Last Divided City in Europe

Nicosia is a city where its history goes back to the early Bronze Age (3000 B.C.). From 9th century A.D. to 20th century many dynasties and kingdoms used to rule the island, such as the Byzantines, Lusignans, Venetians, Ottomans, and British governors (Gunnis, 1973). Finally after British period (1878-1960) in 1960 the people of Cyprus formed and established the Republic of Cyprus, however by the agreements between United Kingdom, Turkey, and Greece, two base areas have been reserved for Britain which are still in use and active. These two reserved base areas are located in Famagusta and Limassol regions, as it can be seen in figure 1. The life of new republic was so short, which it last only less than 14 years. Political conflict between Turkey and Greece in influential of new republic, and also the ethnical conflict between the two communities of Turkish and Greek Cypriots conclude another political conflict in 1974. Therefore Turkey intervened into the island as the guarantor for safety of Turkish Cypriots (BBC Timeline, 2011). Result of the conflict was division of island into two parts, with an establishment of a border by United Nation (Figure 1). Turkish Cypriots moved to the northern part of the island and Greek Cypriots to the southern part. The impact of this disaster also showed up in the city of Nicosia as well, which leads to division of the city into two parts (Cyprus country profile, 2011).

Figure 1: Cyprus map from CIA World Factbook, after 1974 (Source: CIA Fact Book, URL: https://www.cia.gov/library/publications/the-world-factbook/maps/maptemplate_cy.html)

2.3 UN Buffer Zone of Cyprus and Urban Decays Which It Caused in Nicosia

The border, which divided the country, consists of a buffer zone that established by UN to function as a physical barrier between the two communities. Agreeing the importance of buffer zone itself, there is another important factor about the buffer zone, which has shown in Alpar (2008) studies. In her studies it has noted that after southern part of the island have been placed to the European Union (EU), the buffer zone and northern Nicosia became one of the edges of EU, and Nicosia buffer zone transformed to the EU border. Therefore the existence of vacant and abandoned properties at peripheral of EU makes more sensitive

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discussions about brownfield conditions. Furthermore what is perceived in buffer zone is like that the time is stopped since 1970's and all elements within the buffer zone such as houses, shops, cars, and etc. remain as how Cypriots' life style was in 1970's.

Right now the buffer zone itself has a function which is the country border, but if any time in future the conflict of Cyprus will be solve the buffer zone will not have any other function and it will turn to a huge amount of brownfield. According to this research the UN buffer zone is categorized into three parts according to where the buffer zone is located (Figure 2). The three parts of buffer zone are explained here:

(A) The part which divide the cities/settlements; these sections of buffer zone are located within the cities, and a portion of cities where many commercial, residential, and industrial functions were located, have become vacant and abandoned (e.g. Nicosia Buffer Zone, Maras District in Famagusta).

(B) The part which divide the greenfields, where now is no man land and is a huge undeveloped land where crossing horizontally all over the country.

(C) The part which is completely covered by previously functional land/buildings or facilities and now they are vacant and abandoned because of characteristic of border itself, these properties are not within the cities and they are located in suburbs or rural areas (e.g. Cyprus International Airport).

The main difference in these categories is in the locations of the buffer zone, for example although both category A and C are a built up area, the difference between them is that the category A located within the city and category C located at suburbs or totally out of the city.

As a matter of fact, the buffer zone, divided the city of Nicosia into two parts, and although before the division, the historic walled city of Nicosia was the centre of city, it turned to the edge of the city as well as the other central neighbourhoods. In the northern part of Nicosia the properties where Greeks used to live, became vacant and abandoned, and because of population transfer it started to be used by Turkish people [1]. The threat of another possible conflict, the huge vacant and abandoned area within the buffer zone, existence of army in the area, and existent of physical and mental border resulted in population crisis of original inhabitant. Besides for many years because of its strategic location, the government did not put any effective urban investment into the area. (Cyprus country profile, 2011)

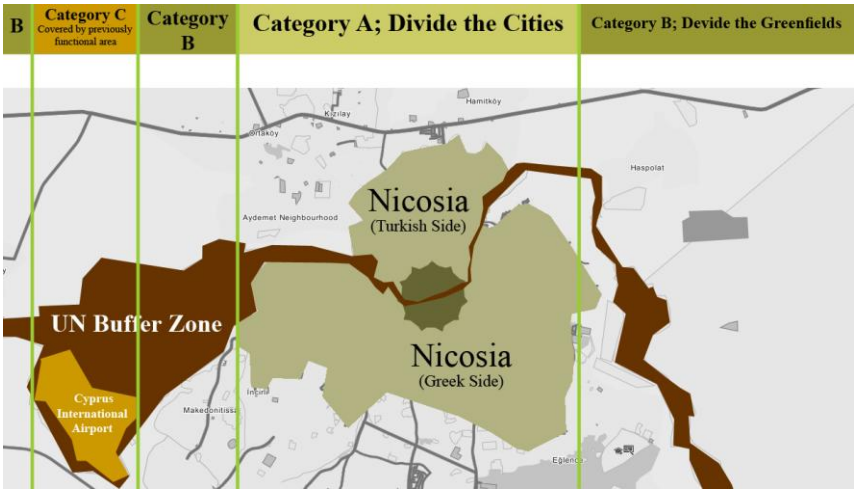

Figure 2: Categories of UN Buffer Zone According to its Location

All these situations caused urban decays in peripheral of Nicosia buffer zone. The neighbourhoods where used to be a vibrant urban space, turned down to a poor neighbourhood, which progressively caused the slum condition. It is important to know that the physical barrier was not the only reason for urban decays of peripheral of buffer zone and other older part of the city. Accordingly other several reasons were involved in that condition such as negative political and international situation, economical problems, big number of immigrants with low user's profile, and many other issues that have discussed in further sections of this study (BBC Timeline, 2011).

[1] Turkish Cypriots who were refugee from the southern part and Turkish immigrants from Turkey.

Existence of the barrier in middle of the city transferred most of economic activities toward the northern part of the city, and stayed away from the buffer zone. Many commercial and industrial buildings were shut downed in last 30 years, and left vacant and abandoned areas within the city at the peripheral of buffer zone, as well as many residential properties, for example "Sanayi Holding Binasi" which used to be an industrial building and "Caglayan" neighbourhood where used to be one of the luxury residential area. The division showed its impacts on urban structure and formed a negative socio-economic setting within the area.

In brief overview on periphery of southern side of buffer zone it can be said that although in Southern Cyprus, regards to their membership in European Union and EU Strategic Development Plan, regeneration of urban areas is one of the main concerns of their development plans, but the particular "integrated" approach to "urban regeneration" which can ensure the "integrative" effect is often missing. This missing element established fragmented and partial approaches, which have a great negative impact on the city, and produces the big obstacle for considering the city as a whole for developing strategies of a greater scope. (IUREU, 2010)

2.4 Brownfield Sites in Peripheral of Nicosia Buffer Zone

In peripheral of Nicosia buffer zone there are many previously developed lands, which are vacant, derelict, and abandoned. Although in land use policies of Northern Cyprus, there are no rules for brownfields, however according to this study, these properties are subjected to brownfield status. In these regards there are three regions of brownfields next to Nicosia buffer zone in northern part, which surrounded the historical Walled City. Although in the Walled City there are many sites with brownfield's characteristic, but because the Walled City is a historic place, then those sites are considered as historic urban quarters (HUQ) and they cannot have the status of brownfield. Therefore these regions have been marked with brownfield status according to the accepted definition of brownfield sites by this research. Within these regions there are many previously developed lands (PDL), which are vacant and/or abandoned, and also many lands are partially occupied. Many sites in the study area have one or combination of the elements of partially occupied lands, which are (1) not currently fully in use, (2) land or building currently in use and allocated by different land use in local plan, and (3) land or building currently in use with redevelopment potentials (HCA, 2011). Two of these regions have the residential land use and located at sides (east & west) of the walled city and the other one is a mixed-use area consists of commercial, industrial, and residential area, which is located on top (north) of the walled city (Figure 3).

These three areas have been suffering from an urban decline because of that huge vacant and abandoned area (Buffer Zone) which crossed the city and gradually by the time, they have lost their original users, and became vacant and abandoned. Although some restoration and conservation project were applied on a number of those properties, but still many of them remains empty with no good condition, and as a whole is seems to be far from achieving sustainability concerns in the area.

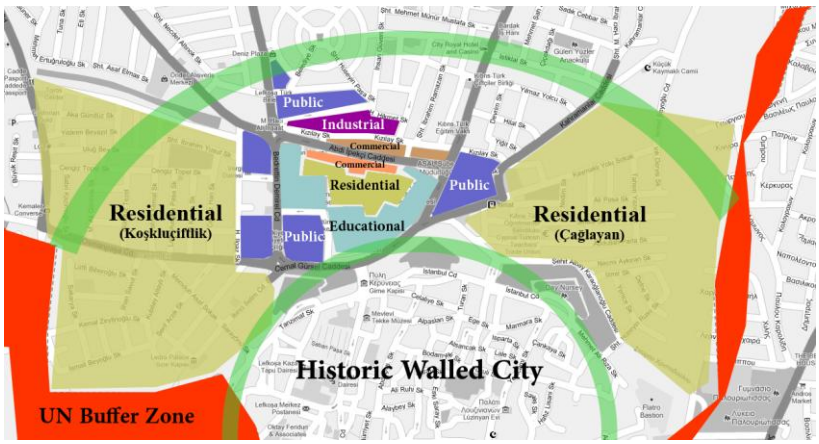

Figure 3: Study Areas, Peripheral of Nicosia Buffer Zone

With no doubt there are variety of barriers to achieve sustainable development in these areas, such as lack of professional and contemporary methods, absence of sufficient policies regarding to sustainable development, variety of visions between local government and professionals, poor attention to social sustainability, and of

course the existence of physical and psychological border. All these limitation shaped an unsustainable scheme for these areas.

3 MACRO SCALE REVIEW

Today, the urban structure of the city of Nicosia consist of three parts, (a) the historic walled city, (b) the inner part of the city, and (c) the newly developed areas in suburbs which has been attached progressively to the city. On the other hand, the shape of buffer zone, which is the dividing element in the city, formed the southern edge of the Nicosia in northern part (Figure 4).

According to this study the buffer zone has been categorized into three categories, therefore in this scenario, the buffer zone located in the category A. This section of buffer zone is located within the cities, where many commercial, residential, and industrial functions were located become vacant and abandoned. Progressively according to these situations, the peripheral areas of buffer zone which consists of mixed land use include residential, commercial, industrial, governmental, and public facilities have been faced the serious declines in urban environment.

Impacts of buffer zone have been affected its periphery and have shown up in many ways such as in functional, infrastructure, and transportation systems of the city. Not just brownfield sites within the area, also most of properties in the area as a whole need a comprehensive regeneration plan. In regard to finding a solution, Alpar (2008) argued that a holistic top down decision with combination of bottom up decision system, which is partnership of community, could resulted in more sustainable outcomes.

Although many efforts have been taken place for redevelopment of the area, such as Nicosia Master Plan (NMP) and United Nation Development Program (UNDP), the main focus of all these programs were on protection of historic and cultural heritage. These efforts achieved some good results such as NMP by winning the Aga Khan Award in 2007, which restored and regenerated some areas, however it fails in social dimension, due to lack of participation of property owners who are waiting for political settlement (Hadjri, 2008).

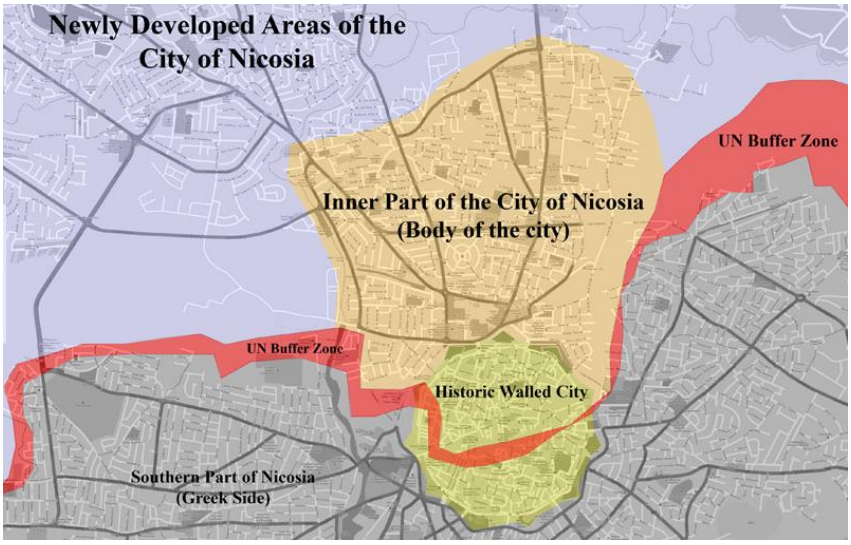

Figure 4: Urban Structure of City of Nicosia

3.1 Initial Stage; Findings Related to Periphery Area of Nicosia Buffer Zone

Based on the study of existing documents about physical characteristics of the case area, it can be said that the selected study area has variety of land use; previously industrial activities and accordingly vacant industrial buildings are located at the heart of the area, which surrounded with vacant commercial buildings and warehouses (Figure 5). Existence of some functional daily activities such as governmental offices (parliament, ministry buildings, and Turkish embassy), public high school and historic walled city brought some daily life to the area. However these activities are not enough to change the social structure of the area and did not help the improvement of urban settings. On the other hand, the residential areas (e.g. Caglayan

neighbourhood [2]), which are one of the oldest neighbourhoods in Nicosia, are suffering from abandoned properties and lack of sense of belonging form owners, users, and public authorities (Figure 6).

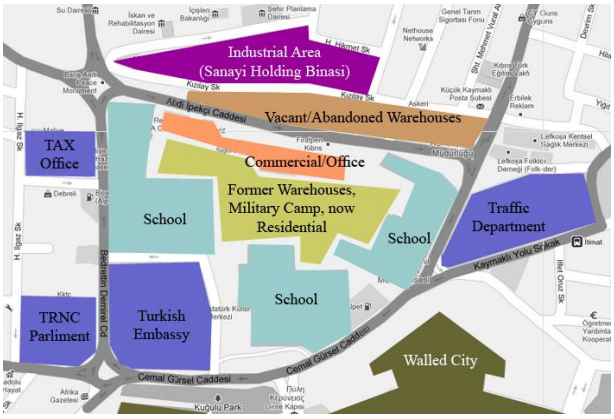

Figure 5: Study Areas, Mix-used Environment

Figure 6: Vacant and Abandoned Houses in Caglayan Neighbourhood

To realize the sole of challenge a site survey has been done with Turkish Cypriots community who lives or works in that area. The initial site survey formed throughout three dimensions, which are physical/environmental, socio-economic, and economic.

3.2 Physical/Environmental Dimension

During the study it was realized that there is a level of contamination in whole neighbourhood, and there is no statics and analysis about that. The industrial building (Sanayi Holding Binası) has been vacant for many years and municipality does not have any authority and rights [3] about that building (Figure 7). This building which was performing industrial activities, for sure has been contaminated the soils and water base, however there is no action about this and rather than applying brownfield regeneration program, which leads to un-contamination and regeneration, the government decided to demolish the building and built the new one.

In challenge between demolition and regeneration option a questionnaire shows that more than 50% of the people who live in the area were strongly agreed to regenerate that building and any buildings with same situation rather than demolition option. Towards resident's opinion, also people who work in municipality were strongly agreed with the regeneration. In this regard, deputy town clerk of Nicosia noted everything in that area are suffering from lack of a holistic strategic plan and for sure the partial planning and fragmented decisions will not help any of these problems.

The bigger disaster was about another neighbourhood just in front of that industrial zone, the neighbourhood has a long history, it was a graveyard and then it turned to industrial warehouses and British soldiers' camp, and then the function has changed to UN camp. In 1964 Turkish Cypriots [4] who forced to leave their properties, moved to this neighbourhood and some other refugees and immigrants moved there after 1974. This area was never un-contaminated (graveyard, military camp, copper warehouses), and people live in the

[2] Caglayan neighbourhood used to be a rich environment, and mainly with the high profile users, still some villas with yellow stone façade can be seen there, however the overall condition of those buildings and whole neighbourhood is in decline.

[3] Before municipality of Nicosia built its new building, municipality asked for that industrial building to regenerate and change it for use of the new municipality building, however they never succeed in their request and they built a new building somewhere else.

[4] The verbal story from an old man who actually moved there in 1964 and still living there in poor condition.

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warehouses, where now transformed to residential area, however the physical condition is more look like a slum neighbourhoods (Figure 8).

In centre of study area there are two sides, the main street and the back street side where most of properties are located. Thanks to Nicosia Master Plan, the main street side is improved and somehow it is gentle by means of physical environment; however the back street side is suffering from serious urban declines. In those back street areas (Figure 9) there is no utilized infrastructure (e.g. street lights, proper roads, pedestrian, and etc.), rain water runoffs in the road during the winter time, garbage and waste materials are everywhere. Unfortunately as a matter of fact, in governmental departments and municipality there is no policy and regulation regarding to brownfield issues, and more sadly nobody knew about it, from top to down level, include professionals and decision makers were unfamiliar with the term "Brownfield". Accordingly, since there is no policy, then nobody knows about the risks of brownfields and the benefits of regenerating them, moreover it is a policy disaster that there is no action about that. This is the foundation of problems regarding to SBR program in North Cyprus.

Figure 7: Abandoned Industrial Building

Figure 8: Warehouses, which were transformed to residential

Also physical existence of UN buffer zone and military area in nearby all civic functions in study area are affecting the physical environment of the area. The shadow of restricted areas prevents any further efficient development in nearby sites.

Figure 9: back street areas

3.3 Socio-Economic Dimension

The people who live and work in the industrial, commercials (e.g. vacant warehouses) and residential areas (e.g. Caglayan neighbourhood and residential nearby industrial zone) do not have any sense of belonging to the area and as what perceived there, it resembles refugee camps rather than urban environments. There are just some conservation projects about historical heritages, which act as a gentrification scenario, and there is no actual regeneration. Most importantly people lost their belief in government for any further changes, therefore according to quantitative surveys there is a high level of user's un-satisfaction.

In series of interviews at Nicosia municipality many thoughts and believes has been demonstrated the professional opinions about the area. In this regard, an architect from project department believes that many components should get together to succeed the regeneration program, and especially in the case of brownfield sites it needs specific knowledge and policies that are not exist in North Cyprus. He believes what they are doing is only the restoration program, and because it fails in social aspects, it will be only a gentrification. In the city-planning department there is a progress to produce a new master plan, but unfortunately as he mentioned there is no specific consideration about brownfield issues.

Although most of people are not satisfied with existing situations and they do not believe the local government will share the decisions with community, but then again more than half the people who answered the questionnaire have the willing to participate with any future regeneration programs. This willingness is an opportunity for further development plans.

Opinions about participation of community in regeneration programs have two sides; people within the community wish to participate and open a new page of healthy urban environment and in other side government and in particular the municipality believes that there is no community to partnership. Accordingly deputy town clerk noted that the community in Nicosia changes a lot and people are behaving privately and not like a community. It is because of many changes in texture of community during less than a century. Each week the municipality has a council meeting for public, to let them share their opinions, but as the long term results, these discussions will not affect the decision processes, and it is a top down decision system. Deputy town clerk sharply defends this situation by referring to lack of existence of permanent community, and then he raised this question that "when we don't have a permanent community how can expect the community shares the ideas and be a part of the projects?"

Although there is no regulations regarding to brownfield regeneration, and both sides of community and government lost their beliefs in partnership, municipality still believes that the problem can be solve by partnership with private sectors with economically feasible strategic plans. This Public-Private Partnership (PPP) idea can open new chapter in governmental decisions and leads it to the community partnership.

According to the in-depth interviews, it is perceived that there is not much partnership between these actors. In this regards municipality believes that everything will come to the political issues, and since politic is the part of holistic approach, there is an essential needs for a holistic strategic plan. Therefore, if a holistic strategic planning happens, then it can be expected the partnership of all stakeholders, and particularly the community, which leads the project to succeed. Also, uncertainty about political situation will produce uncertainty in public, private, and community decisions.

3.4 Economic Dimension

Unfortunately, there are no defined incentives or grants for propose of regeneration plans or SBR program, therefore mostly it is too costly for private sectors to handle these types of programs in their development plans. In this regards private investors are not interested in those areas and the investment will goes to greenfields rather than brownfields, therefore more pressure will be on natural environment. The main source of this situation is lack of feasible financial strategic plan for brownfield regeneration, which means there is no holistic management for economic and strategic development. Also, as the start point of economic analysis to produce initial analysis for SBR program, the opinion of community is an essential.

According to the questionnaire surveys, which has collected the data from community about their opinion related to economic issues, most of the people in community were agreed that the regeneration programs bring new job opportunities and new investment to the area and if the government provides some grants and incentives as a catalyst, then the private sector and community have the willing of partnership. Therefore if the area is regenerated they might not be complaining for any possible future new tax systems and more tax payments.

According to the findings of this research, the existing stakeholders are mainly from public sector. Stakeholders in regards to brownfield issue have been categorized into four categories. In physical environment this is the top down decision system, which start from ministry of interior, parliament, city planning department, and municipality, and these are the main actors in this category. For environmental issues there is an environmental office department, and ministry of tourism and environment, which are the main stakeholders. For community support and social issues, working and social security department, NGOs, and associations are the main stakeholders. Finally, for economic issues the government and department of economy are the main actors. As a matter of fact, most of these stakeholders act separately and unfortunately there is no efficient partnership between them.

4 EVALUATION OF THE INITIAL STAGE FINDINGS

In order to provide a better understanding of existing situation, and according to initial qualitative and quantitative data analysis, for future decisions and holistic plans, this research categorized the positive and

negative issues related to the study area. It examines the area's strengths and weaknesses, which identified the opportunities for further improvements and threats where needed to be controlled and managed.

4.1 Positive Issues

The study area is located in heart of the inner part of the city and there are many public buildings and facilities in that area, which are giving the impression of daily life activities. Also the existence of historic walled city and tourists who come to see the historical heritages is a great advantage to the area. On other hand, the overall structure of most of buildings is suitable for restoration and then regeneration. Moreover, as an environmental advantages the area has a good air quality.

Another positive point of the area is that the people who works in municipality are mainly Turkish Cypriots who experienced and seen the advantage of cooperation with other society (Greek Cypriots) throughout NMP, and they have a strong willing for improving the quality of life of people who lives in their community. Also existence of infrastructure within the area is an economic advantage for government, which they do not need to invest for new ones.

Throughout de-contextualization of existing situation within the site, the study shows some opportunities for further developments, which also should be considered as positive issues. These opportunities are the access to the UNDP resources, being at the peripheral of European Union, which provide the possible request for technical support, have chance to find a solution for contamination problem, and also because of historical and strategically location there are many optional new functions for regenerating the abandoned properties, and then development opportunities in vacant lands.

On the other hand, people who work and live in those areas are willingly participating in any possible future regeneration program and they wish for changes for better quality of life. Also another good signal of opportunities is that professionals who work in municipality are aware of most of the existing situations. Moreover since the government gave the incentives to revitalize and protect the historic heritage and have got the positive results, then there is chance for possible incentives for future regeneration programs, which increase the tax income for the government. Another positive point of study area is that municipality believes the solution is laid in private approaches, which sound like high profit for privet sectors throughout participation and investment.

4.2 Negative Issues

Throughout the analysis and evaluation of the study area it has shown that there are some risks and threats existed there, which need to be controlled and managed. The best solution for these problems is placed on a clear and professional risk assessment and management process. The level of awareness is an important factor regarding to the risks. One of the main threats to the studied site is absence of policies and regulation about brownfields and contaminated sites and no existence of statics and surveys about the level of contamination. On the other hand, existence of abandoned properties which has the ownership problem, poor urban setting which look like a slum neighbourhood, and possible contamination within soils and water bases produce the physical and environmental threats to the area.

Another negative issue is producing the high risk for the community and social aspects; these risks, which have long-term effects, can end up with another social disaster. High level of users' un-satisfaction, top-down governmental decision system, no more community believe in government and government does not share the decisions with the community are the main social negative issues. Correspondingly, because of political situations, municipality does not have enough power to make the main decisions of city and in other hands central government concerns more economical issues rather than social ones and also they do not believe in regeneration, which make them focused and invest on new developments. Since public sector does not act as catalyst for possible brownfield regeneration programs, then private sectors invest for new developments in greenfields. Furthermore the most important negative point is the absence of guideline for previously developed lands (PDL), which are vacant and/or abandoned now.

As general negative issues in study area there is lack of many things such as lack of skills and knowledge for un-contamination techniques, lack of utilized infrastructures, lack of green spaces and landscapes, lack of permanent community, lack of sense of belonging, lack of community partnership, public-private partnership, partnership of public stakeholders, lack of holistic strategic plan, lack of incentives and grants,

lack of feasible financial and economic plans, and lack of management for economic and strategic development. These missing elements draw a scheme of what does not exist.

However, there is existence of some other elements, which are the reason for other negative issues in study area such as UN buffer zone, military bases, uncertainty about political situations and settlements, and gentrifications rather than regeneration. Moreover low level of some other issues such as people's income, local's population, educational background, and low interest of investment from private and public sector make the negative points of the study area more dominant. For finding a solution for these negative issues, an intervention and in-depth studies are essential need.

5 SUMMARY AND CONCLUSION

This study initially analysed the periphery of buffer zone which is located at inner part of Nicosia by means of physical/environmental, socio-economic, and economic dimension. These analyses were based on existing situation of the city in regards to urban declines, vacant and abandoned properties, and in more complex way the brownfields issue.

Existence of physical barrier and the dead area, which has referred to UN buffer zone, set a huge pressure to the urban areas in general and in particular to peripheral of border within the island. These impacts affected the social structure, physical environment, and economics of those areas. These urban crises were shown up with the vacant and abandoned properties have been addressed as urban declines that referred to brownfield site. Unfortunately, because the issue of brownfield was a new concern within the island, there is no existing policy and regulation about it. All abandoned and vacant properties with possible contamination have been leftover in poor urban environment, which many immigrants and refugees moved there (Figure 10). The area that once used to be a vibrant urban environment has turned into a neighbourhood which looks like a run-down area or slum.

Although there are some positive points within the study area, the negative issues lead the area to serious risky situations. Contamination within the sites, which are never evaluated, can cause long-term health problems for the community, and affect the natural and environmental system in the area. On the other hand people are extremely unhappy about the existing situation and lost their belief to the government, and uncertainty about political situation adds more pressure to the situation. Also, the government does not share the partnership and this solo mentality in decision making system, which referred to the top down decision system, will produce the high risk of urban disasters for future of the city and in particular the brownfield issues.

In general overview, what are needed for the study area are improvement in state policies, transformation of abandoned and vacant properties to the functional form, transformation of military areas within the city to some other public functions which leads to contribution of those facilities and properties in city life, and enhancing the community partnership which are essential to improve the quality of life in Nicosia.

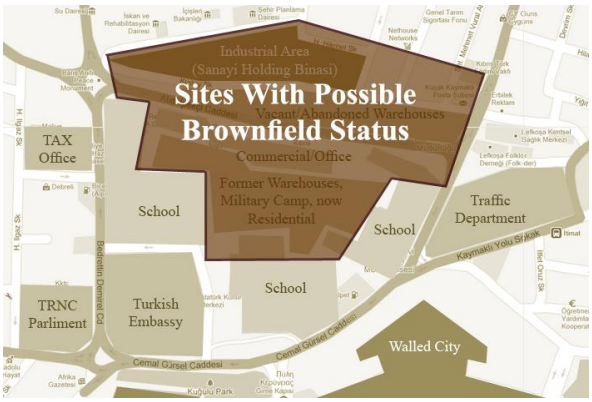

Figure 10: One of the sites with possible brownfield status at the centre of study area

Nowadays the main development issue in Cyprus has focused on Greenfields and this sprawl development will have long term negative impacts to the urban environment of the island. If this situation continues with the existing condition, approximately in next 30 years, solution for all these problems will be so expensive by means of money, time, and effort. According to these situations the main outcome of this study should be considered as a serious warning for the future of the island and particularly the city of Nicosia.

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Providing Web Maps for Everyone. Understanding Users and their Requirements

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1 ABSTRACT

In the last years, advancement of digital technologies has led to the development of innovative information and communication applications. Today, geographical digital tools are closely linked to computer-based communication processes, and contemporary (Geo-)ICT is extensively used in a wide range of different applications. However, for taking full advantage of these tools across society – including special needs groups – manifold open issues still have to be considered referring to topics such as e-inclusion. Interest is rising on enabling visually impaired to make use of web map applications, especially web-based city maps. Due to demographic change – associated with the rapid aging of population and the increasing number of people with age-related visual impairment – this is particularly in recent times. Unfortunately, the access and use of currently available web map applications is difficult or even impossible for visually impaired. Hence, several questions pertaining to the appropriate design and implementation of web maps for visually impaired are still open: (1) How to design and configure user interfaces of web map applications for visually impaired? (2) Which functionalities need to be implemented? (3) Which map content is demanded by visually impaired? (4) Which kind of graphical and non-graphical map design is most useful to enhance accessibility? The AccessibleMap project aims to investigate the above mentioned questions and to develop methods to make web-based city maps more (easily) accessible and usable for visually impaired. A prototype web map application is developed.

2 INTRODUCTION AND RESEARCH QUESTION

Rapid advance of information and communication technologies (ICT) has changed the way we communicate, exchange information, and catch up on contents. Virtual globes, web mapping services, GPS, and many other geographical digital tools are closely linked to computer-based communication processes. This opens up new opportunities for E-inclusion. The concept of E-inclusion focuses on widespread web accessibility for all users, enabling everyone to benefit from ICT. It tends to support participation of everyone in all aspects of today's information society. The concept of E-inclusion is in line with the goals defined by the Digital Agenda of Europe which generally aims at "(…) to chart a course to maximize the social and economic potential of ICT, most notably the internet (…)" (EC 2010: 3). In addition, the i2010 Initiative on E-inclusion targets at "(…) to realize an inclusive information society, that is, an information society for all" (EC 2007: 2).

Hence, the concept of E-inclusion focuses on digitally including disabled users who cannot (fully) access and use web-content. This refers to persons with vision deficiency such as people with reduced, i. e. limited vision, colour-blind, and blind users. In fact, these target users are very heterogeneous as – for instance – they embody elderly people which due to age-related visual impairment experience similar difficulties in retrieving web content. Thus, demographic change and the growing number of elderly people underline the outlined demand.

In this context special interests arise in terms of web-based maps. As by studying a map, users create a mental or cognitive map and can understand space in a better way (Tolman 1948). Alike maps in general, web-based maps are crucial means in terms of helping people to orientate themselves in physical space, and to guide from place to place. By enhancing mobility skills, (web-based) maps improve the quality of life and support a more active life and aging. A person who is mobile can better perform autonomously daily-life activities, and can hold up social networks (UN Habitat 2006; WHO 2007). Thus, (web-based) maps are important assistive (Geo-)ICT-based solutions. This refers especially to the urban space, where city maps can enhance individual sense of confidence, autonomy, competence, and feeling of safety. Generally, these maps can be used for the discovery of urban space, i. e. the location and spatial relation of streets, crossings, and landmarks etc.

However, even though different types of assistive technology and visual aids (e. g. screen reader, braille display, text to speech technology) as well as guidelines and standards of accessible web design have been developed, for this special needs group it is currently difficult or even impossible to make use of the available web-based maps. Research is still needed to provide accessible graphical and cartographic information (i. e. maps) on the web for visually impaired. Several questions on appropriate design and implementation of web-based maps for visually impaired exist: (1) How to design and configure user interfaces of web map applications for visually impaired? (2) Which functionalities need to be implemented? (3) Which map content is demanded by visually impaired? (4) Which kind of graphical and non-graphical map design is most useful to enhance visual accessibility? To answer these questions major importance refers to understanding the user group visually impaired and their requirements.

The project AccessibleMap, funded by the Austrian Federal Ministry of Transport, Innovation & Technology within the Benefit program (started in April 2011), addresses the above-mentioned questions. The AccessibleMap project is based on the research results of the AmauroMap project (funded by the Internet Foundation Austria in 2010; Wasserburger & Neuschmid 2010). The main objective of the AccessibleMap project is to develop and improve usage of web-based maps according to the requirements of visually impaired people. Therefore a prototype of a web map application is developed that is executable on PCs and mobile devices.

3 ANALYSIS AND SPECIFICATION OF USER REQUIREMENTS

Within the AccessibleMap project constructive co-operations between users and target group experts as well as developers are principally seen as a fundamental precondition for and a central aspect of the application development process.

The AccessibleMap project analysis and specification of user requirement is based on a literature review as well as on a user survey, focusing on the above outlined target user groups. Therefore an online questionnaire was designed using the internet survey tool SurveyMonkey (URL 18) according to the principles of empirical social research. The survey was developed in close co-operation between the different project partners (ICT-experts, GI-experts, target user group experts).

The questionnaire design is based on the results of the comprehensive literature review which covers literature from e. g. Web Cartography, Modern Cartography, Special Needs Cartography, and Cybercartography (Hennig & Zobl 2011). From reviewing the literature available on the topic, it became obvious that detailed information on design and implementation of web map applications for visually impaired is mostly missing. Thus the questionnaire was particularly designed to get response on open questions regarding user interface design and functionalities, map design, and map content.

The questionnaire consisted of 55 open and closed questions addressing the different types of visual impairment. The questions referred to:

(1) Demographic issues (sex, age, education, profession, place of residence etc.);

(2) Aspects regarding the visual impairment of the participants (type, extent and timing of the visual impairment etc.);

(3) General characterization of internet user behavior (extent of internet use, use of digital devices, use of assistive technology and visual aids etc.);

(4) General characterization of web map user behavior (extent of use, problems, purposes etc.);

(5) User needs on map content (user group specific information, supplementary links, etc.);

(6) User preferences on the graphical and non-graphical user interface design (access and use) including functionalities;

(7) User preferences on the (carto-)graphical and non-(carto-)graphical map design (cartographic means of design, use of additional information media like photos, audio signals, verbal description etc.).

The survey was carried out in autumn and winter 2011. The study was spread across Austria, Germany and Switzerland by Email, telephone and face-to-face propaganda. The data collected by the survey was pre-processed (identifying valid and invalid responses such as responses of non-visually impaired), statistically

analyzed (e. g. frequency distribution, measures of central tendency), interpreted, and integrated in existing knowledge, experiences and other research findings.

4 TARGET GROUP SPECIFIC USER REQUIREMENTS

The AccessibleMap user survey resulted in 199 returned and 158 valid questionnaires. The valid questionnaires are grouped under three subgroups of target users as follows:

- people with reduced and limited vision: 59 %,
- colour blind: 4 %, and
- blind: 37 %.

Because of the large number of issues covered by the questionnaire, only selected items are presented in the following.

4.1 General use of the internet and web map applications

The majority of the 158 (valid) respondents indicates to make strong use of the internet. 63 % of the interviewees use the internet several times per day. To make full use of the internet, assistive technology and visual aids are required by 85 % of the respondents (Table 1). In this context voice output, screen reader, braille display, and magnification software are the most popular tools.

Assistive technology & visual aid		**Blind** (n=59)	**Limited vision** (n=99)	**All (n=158)**
Braille display	An electro-mechanical device for displaying Braille characters by use of raising dots through holes in a flat surface. This enables blind people to read text output on the computer.	88 %	10 %	39 %
Braille embosser	A Braille printer that renders text as tactile Braille cells.	25 %	3 %	11 %
Magnification software	Software for enlarging text on the computer screen (e. g. screen magnifier, ZoomText).	3 %	57 %	41 %
Optical Character Recognition (OCR)	Software used to convert scanned text into information that the computer can recognize. This software – along with PC and scanner – gives visually impaired people access to almost all printed material.	53 %	9 %	25 %
Screen reader	A software application used to identify and interpret text presented on the computer screen into spoken words. Common screen readers are Window-Eyes from GW Micro, JAWS from Freedom Scientific, etc. NVDA is an open source screen reader that gets well-known nowadays.	80 %	24 %	45 %
Voice output	A text-to-speech (TTS) system converts normal language text into speech.	88 %	31 %	53 %

Table 1: Used assistive technology and visual aids (multiple replies possible).

Even though the interviewed persons show a high level of internet usage, only 56 % point out to use web maps. Respondents mentioned different reasons therefore:

(1) Web map applications are not (easily) operable, i. e. not (easily) usable.

(2) Web map applications do not provide verbal descriptions of their content.

(3)Web map applications cannot be interpreted by screen reader, Braille display or voice output.

(4) Users lack knowledge on the existence of web-based maps.

(5) Users make use of voice-operated navigation devices instead of web map applications.

Hence, the provision of voice output and textual, i. e. readable descriptions is a fundamental requirement to enable usage of computer applications including web map applications to these users. In terms of web map applications this refers to the user interface as well as the map content. While blind users generally rely on

assistive technologies and visual aids, also 36 % of the persons with low, i. e. limited vision ask for information in audio output format, and 35 % demand for written texts explaining the map content.

4.2 Requirements on user interfaces

During the last years several graphical and textual user interfaces providing specific features focusing on the needs of visually impaired have been designed and implemented (e. g. The European GUIB: graphical and textual interfaces for blind people). As stated by GOLLEDGE, RICE & JACOBSEN (2006: 183) "… multimodal interfaces (implemented as graphical, audio, textual, and haptic user interfaces) are becoming increasingly important in many areas, including geospatial information processing". Addressing different senses enables users to access and use information according to their personal preferences and capabilities (GOLLEDGE, RICE & JACOBSEN 2006). Experiences, expertise and findings on user interface design which complies with the demands of visually impaired are also useful for the implementation of user interfaces providing web maps for visually impaired.

Thus, for instance, literature emphasizes that accessible user interfaces should only use simple visual design avoiding patterned or complex backgrounds and provide buttons and menus (most) relevant to the users to reduce the complexity of user interfaces (Hung 2001; Jacobson 1998). Therefore, the most important functionalities for the users need to be specified and implemented. Here, the survey shows that the respondents make use of web maps for several purposes: Most of the interviewees point out to use web maps for address search (44 %) and navigation (37 %). Only 18 % use web maps to discover a (city) area, i. e. finding points and areas of interest (museums, public buildings, health care services and facilities, features on public means of transport such as bus routes, stops, public parks etc.). Accordingly web map applications must enable easy searches, navigation and discovery functionalities, besides providing basic map functionalities such as zoom and pan.

	Colour & Contrast	**Annotation**	**(General) Presentation**
Buildings	Light red (buildings without annotation being e. g. residential buildings) Dark red (buildings with annotation being e. g. buildings of public interest) Alternative presentation mode: buildings in light and dark grey	Dark red characters on a white halo to guarantee contrast If at all, only the first character of a word (substantives) is written with capital letter, others are written in lower case letters	Availability of annotations depends on the level of detail, i. e. zoom level
Streets	Generally: white Important streets (e. g. major streets): yellow	Black If at all, only the first character of a word (substantives) is written with capital letter, others are written in lower case letters	
POIs	Different colours (mainly the fundamental colours, high saturation) Providing generally high contrast to the surrounding	Black with light yellow-orange background Annotation (incl. further information on the POI) is presented (information window) in the map if the user single-clicks the icon	Information is presented in the map depending on users' interests and preferences (visible/ invisible) Simplified and generally-accepted symbols
Areas	Open, i. e. green space: green water bodies: blue other areas: light brown	Black characters on a white halo to guarantee contrast If at all, only the first character of a word (substantives) is written with capital letter, others are written in lower case letters	Availability of annotations depends on the level of detail, i. e. zoom level

Table 2: Selection of preferences of visual impaired people on cartographic design of web maps (N=99); light green: representation mode of Google Maps, and light red: representation mode of digital Vienna city map.

4.3 Requirements on graphical and non-graphical map design

To specify user requirements on map design, users were asked to assess the web map application that they commonly use. While the majority of respondents indicates to use Google Maps (67 % of the respondents who use web maps), the digital Vienna city map (http://www.wien.gv.at/stadtplan) is ranking as second most popular web map (17 % of the respondents who use web maps), due to the large number of respondents living in Vienna. Other web map applications mentioned are Bing Maps, Open Street Maps and other city-specific web-based maps (such as the city map of Berlin: http://stadtplan.meinestadt.de; or the city map of Bern: http://map.bern.ch/stadtplan). Table 2 presents a selection of map design preferences of visual impaired people, based on a comparison between Google Maps and the digital Vienna city map (Fig. 1).

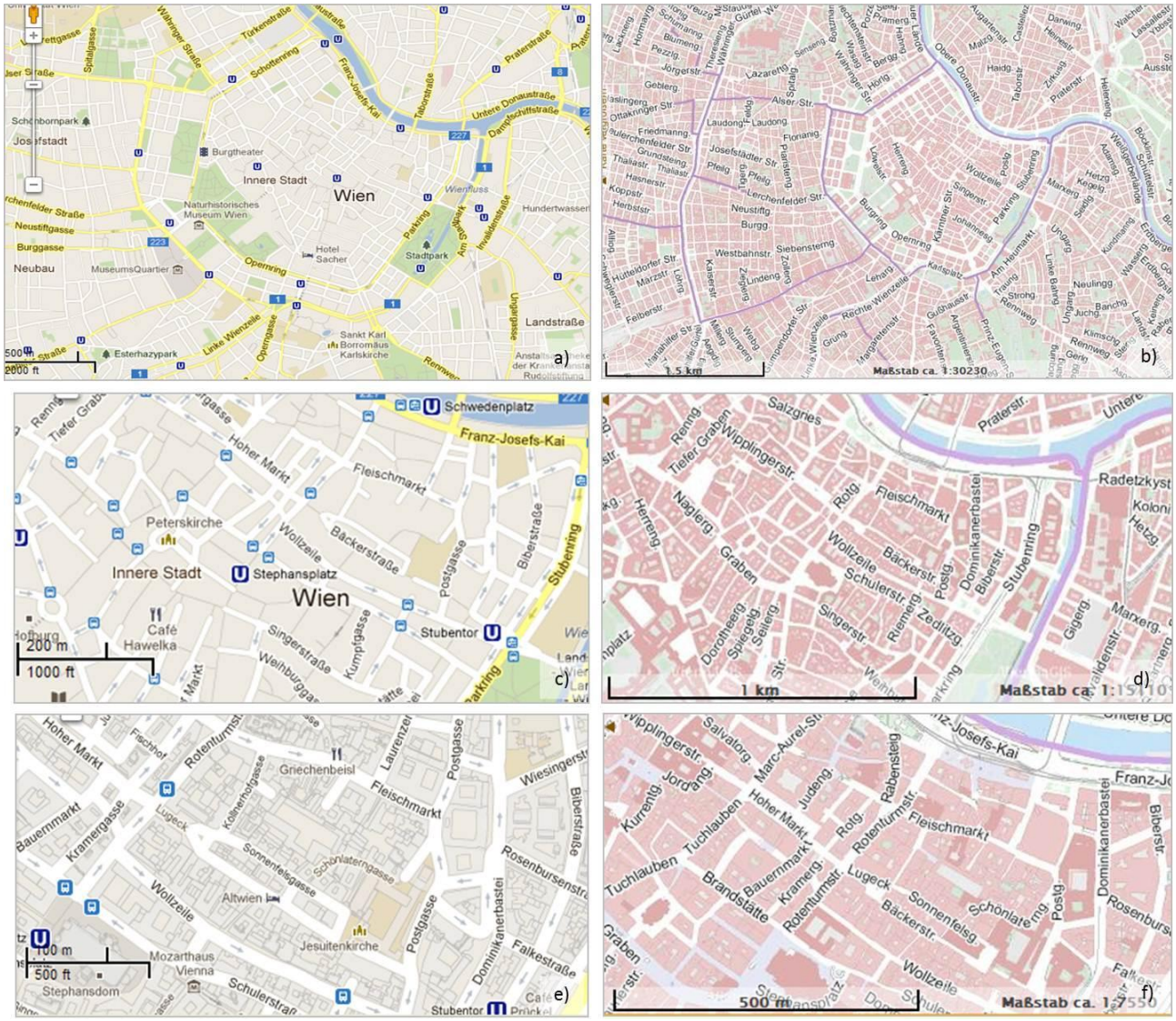

Fig. 1: Google Maps (a, c, e) and digital Vienna city map (b, d, f): selected differences on map design (focusing on the representation of buildings and streets).

In conclusion of the survey results, to improve map design in terms of the needs of visual impaired, attention must be paid mainly to colour contrast between the different objects (areas, buildings, streets etc.), colour design, and labeling (font size). However, due to the wide range of extent and forms of visual impairment literature suggests the provision of functionalities which allow user adjustment on contrast, symbols size, line width, colour combinations and lightness etc. (JEFFREY & FENDLEY 2011). These suggestions are confirmed by the user survey results as well.

As mentioned in chapter 4.2 voice output and textual description of the map content are considered as relevant elements for visually impaired. Accordingly, verbal descriptions of the pertinent map content are needed. Its provision relies on the conception and design of non-graphical map content. On this topic a

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number of recommendations exist (different possibilities of viewer's perspective, anchor-point hypothesis, hierarchy and order of information etc.). In the following only two aspects are explained in more detail.

Generally, when accessing verbal descriptions of maps, i. e. location of features, users prefer information being available at different levels of detail. This means – as also described by Hung (2001) and National Mapping Council of Australia (1985) – voice output and verbal description should be available:

(1) on a very general level, describing the overall situation of a city or a city area with information on e. g. districts ("Show the minimum detail!"),

(2) on a more detailed level providing information on e. g. particular streets (street names) and blocks of buildings („The content should be such that users can not only identify blocks of buildings and the streets surrounding them but also navigate their way from public buildings or facilities. In order to do this users will need to be aware of traffic lights, pedestrian crossings and other relevant facilities!") , and

(3) as in-depth information on particular houses, shops, facilities and services including entrances („It is important to show door access to buildings and businesses, using standard symbols, as well as stairways, escalators, elevator and ramp locations!").

To build a mental or cognitive map including the location or direction of single landmarks (buildings, streets etc.) as well as the relations between these elements, users prefer the usage of hour system (e. g. Sánchez & Torre 2010). For instance, the verbal description of the directions of a street or crossroad could be designed as follows (Fig. 2): „Street A diverges at 1 o'clock (respectively 20 degree) from street B. Street A diverges at 11 o'clock (respectively 340 degree) from street B, thus the crossroad looks like as Y crossroad, i. e. triple-trace crossroad."

Fig. 2: Description of location based on hour system (Source: Sánchez & Torre 2010).

Information category	Exemplary information
Tactile	surface of road and footway including changes (sewer cover, surface irregularities), texture paving blocks, curb, steep gradients
Auditory	traffic lights with audio signals, acoustic of the surroundings (water features, traffic noise, underpasses, house walls, large squares)
Olfactory	smell of gardens, stores, coffee houses, and restaurants
General information	name of streets and squares, course of the road and direction (one way street), pedestrian crossings (with layout and detailed description if they are complex, underpasses, cross walks), width of the road, number of lanes, bridges, environment around the roads, current road works, shared cycle- and footways, pedestrian area, entry and exit, walking times in minutes and meters,
Public means of transport	bus stop, tram stop, metro station, taxi ranks, railway stations
Useful buildings and landmarks (Points of Interest POIs, Lines of Interest LOIs, Areas of Interest AOIs)	public buildings (office, government agency, theatre, museum), places of interest, healthcare facility (hospital, doctors' surgeries), supermarkets, shops and stores, restaurants, hotels, parks, open and green spaces
Orientation system for blind people	fences, house walls, bushes, texture of the pavement
Route planning	detailed textual description including time and direction

Table 3: Information to display in city maps required by visually impaired (N=59; multiple replies possible).

4.4 Requirements on map content

As stated by Horstmann et al. (2006) no specifications exist on objects which – user group independent – should be presented in city maps. Generally, map publisher tend to produce product-specific standards.

Horstmann et al. (2006) provide a list of objects typically presented in city maps. It encompasses elements such as parks and gardens, water bodies (lakes, rivers, sea), different types of streets, squares and places, points of interest (museums, shops, hotels etc.), public buildings (churches, schools, city hall etc.), features referring to public means of transportation (bus routes and stops etc.), bridges and tunnels. All objects are characterized by numerous attributes such as name and number of lanes, one-way or two-way. Apart from information which should generally be available in city maps, the literature review revealed that – compared with sighted people – visually impaired ask for additional information (e. g. Ienaga et al. 2006; Jacobson 1994; Reichert, Kurze & Strothotte 1994). An overview on information to display in city maps required by visually impaired – embodying results from the literature review and the user survey – is presented in Table 3. Furthermore, Bradley & Dunlop (2005: 399) highlight that "… directions consisting of a reduced amount of textual-structural and textual area/ street information, and incorporated sensory, motion, and social contact information are more optimal for helping visually impaired people navigate." This was proved by the user survey as well.

5 SYSTEM DESIGN

The AccessibleMap (prototype) application, which is developed to be used either with PC or by mobile devices (e. g. smartphone, tablet PC, etc.), is based on open source software. The service-oriented software architecture is made up of a PostgreSQL/ PostGIS database, Geoserver, Open Layers and PHP Application Server. The use of assistive technology and visual aids – as exemplary listed in Table 1 – is supported by the application. Fig. 3 gives an overview of the basic components of the AccessibleMap application.

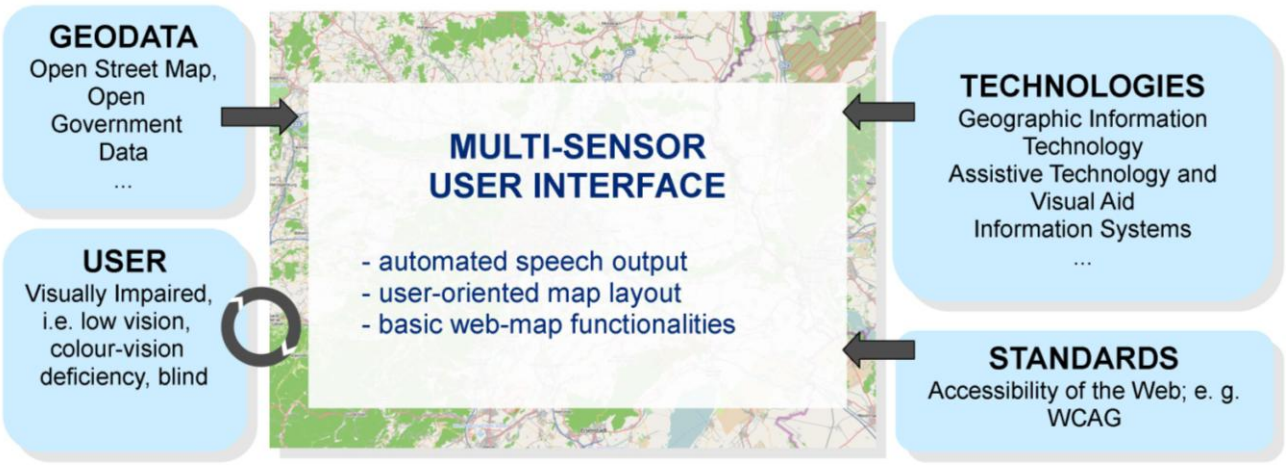

Fig. 3: Components of the AccessibleMap application.

To develop the AccessibleMap application a number of common standards as well as web-accessibility standards and guidelines can be used (Table 4). They help to guide the design and implementation of the web-based map application in association with the identified user requirements. However, despite an immense number of standards and guidelines, no specific standards and guidelines regarding the development of web-based maps for visually impaired or blind people exist.

Type of standards & guidelines	Web content & GUI	Cartographical user interface & map design	Auditory & visual signals	Map content
General, non-technical	Design guidelines, WCAG 2.0 (URL 1), ATAG 2.0 (URL 2), UAAG (URL 3), ISO/IEC Guide 71:2001 (URL 4)	ISO/IEC TR 19766 (URL 7), ISO/IEC 11581-1 (URL 9)	ISO/TR 22411 (URL 8)	
Technical	XML (URL 5), ISO/IEC TR 29138-1:2009 (URL 6)	SLD (URL 14), CSS (URL 15)		WMS (URL 10), WFS (URL 11), GML (URL 12), SVG (URL 13)

Table 4: General and technical standards and guidelines regarding accessibility of web and map content.

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Thus, according to existing standards and guidelines the AccessibleMap user interface is developed as a multi-sensory interface. It contains a map component with an optimized cartographic design (map layout). Functionalities are implemented which allow (1) to configure, i. e. select the cartographic design depending on user abilities and preferences, (2) to access verbal descriptions (text and speech output), and (3) to perform basic map operations such as search, zoom, and pan.

Different spatial data sources are used to generate the map content: Open Street Map data (OSM; URL 16) which is created by the user community (i. e. volunteered geographic information), and open government data provided by public administration. Various reasons account therefore: This data is published under the Creative Commons license (URL 17) which targets at promoting open and shared data access and use via web services – for everybody. Due to the great variety of data and their attributes, these data sources provide a wide range of information, which meets data demanded by the respondents (Table 3). Thus, most general information (street names etc.), tactile information (surface of roads), useful landmarks, etc. is available for the users. Olfactory (e. g. smell of a bakery) and auditory information (e. g. traffic noise), particularly demanded by blind users, is currently still more complicated to provide to the users. Due to the fact that e. g. opening hours vary and traffic impact is changing, it is difficult to deliver such information being reliable and up-to-date.

To perform end-user tests and to provide to the user accurate and reliable data for a testing area in Vienna, the data – originating from the above-mentioned data sources – must be quality checked and processed according to its accuracy, completeness, up-to-dateness, and language (e. g. translation into German language). Afterwards, the data is transferred to particularly designed data models. This is a precondition to transform the data into information, i. e. to spoken or written text, and to facilitate the visually impaired users to hear or read the map content making use of assistive technologies and visual aids (Table 1). Thereby the verbal description is automatically generated. The automated approach is required in order to generate verbal descriptions of web-based maps which generally cover wide areas and are based on a wide range of different spatial data. It helps to reduce costs as there is no need for extensive manual, time consuming updates. Furthermore, the approach makes the application flexible so that it can be easily applied in different cities and regions.

For the map layout Styled Layer Description (SLD) technology is used. SLD allows creating a map rendering style according to the user requirements which includes e. g. the configuration of colour design and labeling as well as colour contrast between the different objects (Table 2). The data, i. e. the maps, are provided via Web Map Services (WMS) to the user.

6 OUTLOOK

The presented results, on how to support the access and use of web-based maps for visually impaired, can be seen as a contribution towards E-inclusion and web-accessibility. The comprehensive user requirement analysis (literature review and user survey) gives important input for design and implementation of the AccessibleMap (prototype) application. It includes (1) the optimization of the cartographic design, i. e. the map layout in terms of colour, contrast, object size and type, etc. and (2) the automatic generation of a verbal description of the map content respecting the requirement of the users asking for a multi-sensory user interface.

Anyway, especially the verbal description of maps requires a lot of efforts on semantics. To improve the audio and textual output as well as to create meaningful semantic information, spatial data needs to be preprocessed to present information on existing relationships between particular objects (e. g. with regard to distances and directions). More in depth work on semantics will be a main focus of the next tasks of the project and will be based on the results of the user requirements analysis. Ultimately, testing of the prototype application scheduled for autumn 2012 will enhance the integration of the target user group and gain user feedback.

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Raum.Sicherheit.Bewusstsein – Sicherheitswirkung und Sicherheitsverständnis räumlich handelnder Akteure

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1 EINLEITUNG

Sicherheit in Städten wird zunehmend als eine Aufgabe verstanden, die nicht mehr nur von einzelnen Sicherheitsakteuren wie Polizei und Ordnungsamt gehandhabt werden kann (vgl. z.B. Deutscher Städte- und Gemeindebund, 2003: S. 7). Eine wesentliche Rolle hierfür spielt das wachsende Bewusstsein darüber, dass verschiedenste städtische Akteure mit ihren Handlungen sowohl die (objektive) Sicherheitslage als auch das (subjektive) Sicherheitsgefühl in Städten laufend beeinflussen – ob diese Wirkungen intendiert sind oder nicht. Dabei besteht kein absoluter und meist auch kein abgestimmter Sicherheitsbegriff. Vielmehr treffen in Akteurshandlungen unterschiedliche Sicherheitsverständnisse und -ziele aufeinander, die mehr oder auch weniger gut miteinander harmonieren. Dieses Zusammenwirken verschiedenster Akteurshandlungen setzt weit reichende Rahmenbedingungen der objektiven und subjektiven Sicherheit in Städten.

Als Handlungsebene kommt dem städtischen Raum mitsamt seiner Gestalt und seinen Nutzungen eine hohe Bedeutung zu: Sicherheitseinschätzungen kommen selten ohne Raumbezug aus (Stichworte „Angsträume“, „No-Go-Areas“) und viele sicherheitsrelevante Handlungen zielen direkt auf ihn ab oder schlagen sich zumindest indirekt in ihm nieder. Mit ihren raumbezogenen Theorien zu „Defensible Space“ und „Broken Windows“ prägten Newman (1972) und Wilson/Kelling (1982) sowohl Begriffe mit erheblicher Nachwirkung, als auch ein Verständnis von Raum nicht nur als statischer Rahmen, sondern auch als planvoll veränderbares Element.

Zu den Akteuren, die sich laufend und unmittelbar mit dem Stadtraum auseinandersetzen und seine Entwicklung besonders tiefgreifend und langfristig prägen, zählen Stadtplanungsämter und Wohnungsunternehmen. Es handelt sich dabei nicht um klassische Sicherheitsakteure – aber dennoch um solche, deren Handlungen direkt und indirekt sicherheitswirksam sind: Sie sind maßgeblich daran beteiligt, der physischen Umwelt ihre Struktur und Form zu geben; ihre Entscheidungen bestimmen über Nutzer, Nutzungen und Nutzungsmöglichkeiten des Raumes mit.

Ob eine Stadt sicher ist und als sicher empfunden wird, entscheidet sich in diesem Sinne mit daran, mit welchem Bewusstsein diese Akteure ihren sicherheitsrelevanten Handlungen nachgehen: Berücksichtigen sie Sicherheitsaspekte in ihrer Arbeit explizit oder ergibt sich eine wie auch immer geartete Sicherheitswirkung ungeplant und quasi von selbst? Im Zentrum der folgenden Betrachtung steht daher die Frage, mit welchem Verständnis diese raumprägenden Akteure mit dem Thema „Sicherheit“ in ihrer Arbeit umgehen. Hierbei wird ein besonderer Schwerpunkt auf die baulichen und planerischen Aspekte der Tätigkeiten gelegt.

Die in diesem Beitrag zusammengefassten Erkenntnisse erlauben eine erste Verortung der beiden Akteure im Spannungsverhältnis von Raum, Sicherheit und Bewusstsein. Sie basieren auf Zwischenergebnissen des laufenden interdisziplinären Verbundforschungsprojekts „DynASS – Dynamische Arrangements städtischer Sicherheitskultur“, das durch das deutsche Bundesministerium für Bildung und Forschung im Zuge der Bekanntmachung „Gesellschaftliche Dimensionen der Sicherheitsforschung“ im Rahmen des Programms der deutschen Bundesregierung „Forschung für die zivile Sicherheit“ gefördert wird.

2 STADTPLANUNGSÄMTER UND WOHNUNGSUNTERNEHMEN ALS RAUMPRÄGENDE AKTEURE

Kommnale Stadtplanungsämter und Wohnungsunternehmen entfalten jeweils weit reichende Wirkungen auf den öffentlichen und öffentlich zugänglichen Stadtraum, entstammen aber unterschiedlichen Sphären mit eigenen Zielansprüchen und Handlungslogiken.

Stadtplanung wird als das „Bemühen um eine den menschlichen Bedürfnissen entsprechende Ordnung des räumlichen Zusammenlebens“ (Albers, 1996: S. 4) verstanden. Dies umfasst auch die sozialen, ökonomischen, kulturellen und ökologischen Dimensionen der Stadt, aber: „der Fokus der Stadtplanung liegt auf der baulich-räumlichen Dimension, auf die unmittelbar Einfluss genommen wird“ (Pahl-Weber, 2010: S.

491). Die Gestaltung des Stadtraums bildet damit den Kerninhalt der Stadtplanung. Die Aufgabe der Stadtplanung wird dabei im Rahmen der kommunalen Selbstverwaltung von der Gemeinde übernommen und in der Regel in eigenen Ämtern oder Fachbereichen verortet. Sie ist damit Teil der Stadtverwaltung und den jeweiligen Handlungsrahmen und Zielen der Kommunalpolitik unterworfen. Ähnliches gilt auch für verwandte Fachplanungen wie die Freiraum- oder die Verkehrsplanung, die mit ihrer Arbeit ebenfalls die Gestalt des öffentlichen Stadtraums beeinflussen, aber stärker sektoral ausgerichtet sind.

Wohnungsunternehmen sind in der Klassifikation des Statistischen Bundesamtes dem Wirtschaftszweig „Grundstücks- und Wohnungswesen“ zugeordnet. Dieser umfasst jene Akteure, die sich dem Kauf und Verkauf von eigenen Immobilien (z.B. Bauträger), der Vermietung und Verpachtung von eigenen Immobilien (z.B. Wohnungsunternehmen) und der Vermittlung und Verwaltung von Immobilien für Dritte (z.B. Makler) widmen (vgl. Statistisches Bundesamt, 2008: S. 457ff). Insbesondere die ersten beiden Bereiche dieses Wirtschaftszweiges beeinflussen durch ihre Tätigkeiten die physische Umwelt und nehmen starken Einfluss auf das Erscheinungsbild und die Nutzungsmöglichkeiten des öffentlichen Raums.

Mietwohnungen machen in Deutschland einen Anteil von 58 Prozent (das entspricht knapp 24 Millionen Wohnungen) der insgesamt auf dem Wohnungsmarkt verfügbaren Wohnungen aus. 39 Prozent dieser Mietwohnungen (ca. 9,2 Millionen Wohnungen) befinden sich im Eigentum professioneller Wohnungsunternehmen (vgl. Deutscher Bundestag, 2009: S. 21, 28). Die Wohnungsunternehmen prägen den städtischen Raum deutlich stärker als Selbstnutzer und private Kleinanbieter, denn mit ihren Entscheidungen beeinflussen sie jeweils eine deutlich größere Zahl an Objekten, die durch ihre räumliche Konzentration oder allgemein ihre kritische Masse häufig stadtbildprägend wirken. Die Bestände von Wohnungsunternehmen umfassen zudem meist öffentlich zugängliche Außenbereiche, die auch von externen Bewohnern genutzt werden.

Unter den professionellen Wohnungsunternehmen lassen sich u.a. kommunale Wohnungsunternehmen, Genossenschaften, professionelle private und kirchliche Wohnungsanbieter unterscheiden – eine Homogenität der Wohnungswirtschaft kann in dieser Hinsicht nicht unterstellt werden, Zielstellungen und Selbstverständnis können sich erheblich unterscheiden. Den Unternehmen gemein ist jedoch ein grundsätzlich renditeorientierter Ansatz, der ihre Handlungen prägt. Dies gilt, spätestens seit dem Wegfall der Gemeinnützigkeit 1990, auch für die kommunalen Wohnungsanbieter. Für Bau und Unterhalt des Wohnungsbestandes sind in der Regel eigene Abteilungen innerhalb der Unternehmen zuständig.

Die beiden Akteure Stadtplanungsamt und Wohnungsunternehmen treffen dort aufeinander, wo es um Fragen der baulich-räumlichen Entwicklung von Stadtbereichen geht. Dabei obliegt es der Stadtplanung, den planerischen Rahmen für die räumliche Entwicklung zu gestalten, dem auch die mit ihren Beständen ortsgebundenen Wohnungsunternehmen in ihren baulichen Aktivitäten unterliegen. Entsprechende Tätigkeiten der beiden Akteure sind jedoch häufig eng verknüpft – Wohnungsunternehmen bringen sich in Planungsprozesse ein bzw. werden konsultiert und gestalten damit den künftigen Rahmen ihrer Handlungen mit. Vor dem Hintergrund des Wandels von einer Angebots- zu einer Nachfrageplanung können planerische Prozesse auch von privatwirtschaftlichen Akteuren wie Wohnungsunternehmen ausgelöst werden. Während die beiden Akteure jeweils zeitlich längerfristige Perspektiven betrachten und sich in ihrer globalen Zielstellung bezogen auf die Stadtentwicklung – nämlich der gesteigerten Attraktivität – ähneln, haben Wohnungsunternehmen in erster Linie ihre eigenen Bestände im Blick, die Stadtplanung hingegen eher das „Große Ganze“. Bezogen auf das Thema Sicherheit verdeutlicht eine 2011 bei Stadtplanungsämtern durgeführte Umfrage des Deutschen Instituts für Urbanistik (Difu) die Bedeutung von Wohnungsunternehmen als Kooperationspartner: Mehr als die Hälfte (52 Prozent) der antwortenden Stadtplanungsämter gibt an, im Themenfeld „Sicherheit“ mit Akteuren der Wohnungswirtschaft zu kooperieren (vgl. Floeting/Seidel-Schulze in diesem Band).

3 ROLLE IN DER SICHERHEITSPRODUKTION

Stadtplanungsämter und Wohnungsunternehmen wirken durch die Gestaltung des baulichen Umfeldes in der Regel präventiv auf die lokale Sicherheitslage, indem sie beispielsweise Tatgelegenheiten schaffen oder vermeiden sowie durch die Gestaltung von Raumsituationen das Sicherheitsempfinden beeinflussen. Zudem prägen diese Akteure die räumlichen Rahmenbedingungen für das Handeln anderer Sicherheitsakteure. Sie erfüllen damit eine aktive wie auch eine vorbereitende Funktion für die Sicherheitsproduktion.

Sicherheit spielt allerdings nur in wenigen Fällen eine eigenständige Rolle im Tätigkeitsfeld von Stadtplanungsämtern und Wohnungsunternehmen. Insbesondere für die kommunalen Planungsakteure ist die Gestaltung des (öffentlichen) Raumes vielmehr eine ganzheitliche Aufgabe, die menschliches Leben und Zusammenleben in all seinen verschiedenen Aspekten ermöglicht und prägt. Zu diesen Aspekten gehört nur unter anderem die Sicherheit. Ähnlich streben Wohnungsunternehmen meist die Schaffung von in ihrer Gesamtheit attraktiven Wohnanlagen an, um eine hohe Nachfrage zu erzielen und Bewohner langfristig zu binden. Dass sich (potenzielle) Bewohner sicher fühlen ist ein integraler Aspekt dieser Bestrebungen – denn kaum etwas wirkt so geschäftsschädigend wie ein als unsicher in Verruf geratenes Wohngebiet. Das Thema der (wahrgenommenen) Alltagssicherheit im Wohnumfeld wird jedoch selten dezidiert behandelt und noch seltener nach außen gestellt, ganz im Gegensatz zur Sicherheit im Sinne der „Wohnsicherheit“: Sie findet in Leitsprüchen häufig Verwendung, bezieht sich jedoch vorrangig auf das Vertragsverhältnis zwischen Mieter und Vermieter oder die physische Sicherheit der Wohnungen etwa vor Einbrüchen.

Für diese wenig explizite Behandlung von Sicherheit in der Gestaltung des Stadtraums durch Stadtplanungsämter und Wohnungsunternehmen lassen sich mindestens drei Erklärungsansätze identifizieren: Zum ersten wird Sicherheitsproduktion als eine Aufgabe unter vielen anderen wahrgenommen, zum zweiten wird Sicherheit als Thema mit Überschneidungsbereichen und Synergien zu gänzlich anderen Themen begriffen und in einer dritten Verständnislinie dient das explizite Thema Sicherheit als Vehikel weiterer Ziele und Interessen.

3.1 Bewusste Breite – Sicherheit als eine Aufgabe unter vielen

Stadtplaner und Wohnungsunternehmen besitzen durchaus ein Bewusstsein für das Thema der Sicherheit im öffentlichen Raum. Dass ihm selten eine eigenständige Rolle zukommt, ist daher weniger einem „blinden Fleck“ geschuldet als vielmehr einer Bewertung „sehenden Auges“ zuzuordnen. Insbesondere bei der mit der Abwägung von Nutzungsinteressen betrauten Stadtplanung zeigt sich, dass Sicherheit als ein Thema gilt, welches gleichwertig zu anderen Themen behandelt werden muss. Eine Priorisierung wird für die eigene Arbeit abgelehnt: „Also das ist ein Aspekt unter anderen. Man muss es jetzt auch nicht nach oben hieven.“ (Vertreter Planungsamtsleiter)

Interdisziplinär zu arbeiten und thematisch vernetzt zu denken sehen Stadtplaner als eine ihrer Kernkompetenzen an. Dabei weitet sich der Blick und das Bewusstsein für Abhängigkeiten mit der Maßstabsebene: Die Tätigkeitsschwerpunkte haben sich in der jüngeren Vergangenheit weg von der künstlerischen oder technischen Tätigkeit hin zu einer moderierenden Rolle gewandelt, die unterschiedliche Interessen in Ausgleich zu bringen versucht. Grundsatzfragen des gesellschaftlichen Zusammenlebens, des demografischen Wandels und des Klimaschutzes werden als die großen Themen begriffen in die sich Einzelthemen wie Sicherheit integrieren lassen (müssen). Im Zentrum des Schaffens steht ein „großes Ganzes“ anstelle eines Einzelthemas.

Sicherheit ist für Stadtplaner wie Wohnungsunternehmen eng mit Begriffen wie „Lebensqualität“, „Wohlbefinden“, „Nachbarschaft“ und „sozialer Zusammenhalt“ verknüpft. Sie verweisen auf einen Anspruch, der deutlich über die Schaffung sicherer Orte hinausgeht. Dementsprechend sehen sich die beiden Akteure auf einer allgemeinen Ebene sehr wohl in einer eigenen Funktion als Sicherheitsproduzenten, auch wenn der Begriff „Sicherheit“ nicht immer fällt oder durch andere (z. B. „attraktive Stadt“) ersetzt wird.

Ein bewusstes und planvolles Sicherheitshandeln – nur unter anderem Namen – kann daraus jedoch nicht abgeleitet werden. Das Problem gerade für kommunale Planer besteht darin, das grundsätzliche Bewusstsein auf konkrete Arbeitssituationen herunterzubrechen: „Ich glaube, dass das in der Gesamtbetrachtung – gerade auch planerisch ausgebildeter Menschen – immer schon eine Rolle gespielt hat. Auch diese Frage ‚Sicherheit in der Stadt‘ – allerdings nicht pointiert wurde. Und indem man es nicht pointiert hat, auch an vielen Stellen also ein bisschen geschlabbert wurde, und in diesem Schlabbern dann das eigentliche Problem lag.“ (Vertreter Planungsamtsleiter)

Im Alltagsgeschäft fehlt häufig die Reflexion über das eigene Sicherheitshandeln. Aus dem sehr allgemeinen Verständnis über seine Funktion in der Sicherheitsproduktion wird im konkreten Handeln für einige Akteure dieses Typs häufig ein unbewusstes Sicherheitshandeln. Ein expliziter Zielfokus „Sicherheit“ besteht in dieser Hinsicht nicht.

3.2 Gern gesehene Synergien

Viele Wirkungen, die durch anderweitig motivierte Maßnahmen erreicht werden, haben aus Sicht von Stadtplanungsämtern und Wohnungsunternehmen, zumindest in der Nachbetrachtung, auch eine positive Wirkung auf die lokale Sicherheitslage. Bereits in dieser Reihung wird jedoch deutlich, dass Sicherheit in diesen Fällen selten der Handlungsauslöser ist. Sicherheit wird zu einem willkommenen Nebeneffekt, wenn andere Themen behandelt werden müssen: Fragen des Klimaschutzes, der Verkehrsplanung und Mobilitätsgestaltung, des Strukturwandels, des Substanzerhalts oder der Ästhetik. In vielen Gestaltungsfragen „… steht natürlich der Sicherheitsaspekt überhaupt nicht im Mittelpunkt, aber der schwingt natürlich indirekt da immer mit." (Vertreter Wohnungsunternehmen)

Für eine gezielte Sicherheitsproduktion sind solche vermutete Synergien und das grundsätzliche „Mitschwingen von Sicherheitsaspekten" in gänzlich anderen Planungsaspekten problematisch. Wirklich greifbar und bearbeitbar wird Sicherheit in diesen indirekten Bezügen nicht. Daher erfolgen bewusste Sicherheitshandlungen in der Praxis meist als Reaktionen auf konkrete Problemlagen – und das Bewusstsein endet auch mit der Findung eines Lösungsansatzes für diese Problemlagen wieder. Das Gegengewicht hierzu wäre eine planvolle Befassung mit Sicherheitsthemen in größerem Zusammenhang, die darauf abzielt, Synergien zu verstärken: Wie kann von vorneherein bei anstehenden Maßnahmen ihre Sicherheitswirkung bewusst (mit)gedacht werden?

Ein solches Verständnis findet sich bei den betrachteten Akteuren jedoch nur selten. Die planerischen und gestalterischen Projekte, die explizit als Sicherheitsthemen bewegt werden, haben daher konkreten Bezug: „Angsträume" und „Un-Orte" sind beispielsweise häufig genannte Problemlagen objektiver oder subjektiver Sicherheit im Raum, die im expliziten Bezug zu einem planerischen Handeln verstanden werden.

3.3 Sicherheit als nützliches Vehikel

Wird das Thema Sicherheit im öffentlichen Raum durch Stadtplanungsämter oder Wohnungsunternehmen explizit in den Mittelpunkt gestellt, so handelt es sich häufig um Vorhaben, die zwar mit dem Begriff „Sicherheit" betitelt, aber aus einer anderen Motivation heraus verfolgt werden. Im Kern geht es dann nicht unbedingt vorrangig um die Sicherheit der Stadtbewohner, sondern auch darum, andere Werte und Ziele umzusetzen. „Sicherheit" wird hier zu einem Vehikel beispielsweise für ein Verständnis „guter Gestaltung" von Stadtplanern und Architekten. Diese strategische Verwendung des Sicherheitsthemas zeigt sich auch dann, wenn es um die Akquise von Fördermitteln geht und kann insofern als Reaktion auf die Reduktion verfügbarer Mittel für „weichere" Themen gewertet werden.

3.4 Handlungsspielräume mit Grenzen

Insbesondere die kommualen Planungsämter sind in ihren Handlungen nicht auf den einzelnen Bürger als Subjekt ausgerichtet, sondern betreffen die Allgemeinheit als Ganzes. Dabei sind ihnen ihre begrenzten Einflussmöglichkeiten auf städtische Sicherheit bewusst.

Bei der Planung und Gestaltung öffentlicher Räume unterliegen alle Akteure der gleichen, einschränkenden Rahmenbedingung: der finanziell angespannten Situation der Kommunen. Die Kommune ist die „Inhaberin" des öffentlichen Raumes und dessen ansprechende Gestaltung ist angesichts knapper Kassen eine Herausforderung. Es herrscht unter den betrachteten Akteuren grundsätzliche Einigkeit, dass sich der öffentliche Raum aufgrund der finanziellen Situation der Kommunen in einem schlechten Zustand befindet, was sich negativ auf das Sicherheitsempfinden auswirkt:

„Also, weil, je verwahrloster die öffentlichen Räume sind, desto verlorener fühlt sich der Einzelne. (…) Es wird zu wenig Geld in die Hand genommen, um Räume herzustellen und zu wenig Geld, um sie zu pflegen." (Vertreter Architekten)

Zur zentralen Rolle der Kommune bei der Gestaltung des öffentlichen Raumes gibt es wenig Alternativen. Wohnungsunternehmen sind in besonderem Maße abhängig von der Qualität und dem Zustand des Umfelds ihrer Bestände – und sehen sich zunehmend in der Lage, die eingeschränkte Handlungsfähigkeit der Kommunen kompensieren zu müssen. Kommunale Wohnungsunternehmen – wie andere Wohnungsunternehmen verantwortlich für Räume, die häufig gleichfalls als „öffentlich" begriffen werden – sind der angespannten Haushaltslage ihrer Eigentümer häufig direkt ausgesetzt: Rediteerwartungen schränken auch ihren Spielraum ein.

Aber auch jenseits eines Möglichkeitsraumes, der finanziell definiert wird, zeigen sich strukturelle Grenzen im Handeln der Akteure. Dies zeigt sich zunächst in den verschiedenen Maßstabebenen des Planens und Bauens, auf denen sich die betrachteten Akteure verändern:

„Die klassische Vorstellung ist: ‚Wir entwickeln eine Stadt und überlegen gesamt-strukturell. Und dann wird es konkret örtlich. Und dann wird es irgendwann realisiert' – die Realisierung ist dann ja nicht mehr eine Aufgabe, die in der Regel von der Stadtplanung begleitet wird, in jeder Dezidiertheit. Also das Bauvorhaben noch weniger, als – ich sage mal – die Ausgestaltung des öffentlichen Raumes." (Vertreter Planungsamtsleiter)

Trotz gleicher Wirkweise auf die Sicherheitslage sind auf verschiedenen Maßstabsebenen unterschiedliche Einzelakteure tätig, z.B. von der Stadtenwicklungsplanung über die Stadtplanung, das Bauordnungsamt bis zum Bauherren und Architekten. Der Herstellungsprozess von Raum ist damit nicht frei von Brüchen.

Auf räumlicher Ebene schränken darüber hinaus Verfügungsrechte die Handlungsfähigkeit dieser Akteure weiter ein. Die Ausgestaltung von öffentlich nutzbaren Räumen ist originäres Handlungsfeld der Kommunen, aber ihre Zugriffsmöglichkeiten auf private Flächen sind begrenzt. Bei Flächen in Privateigentum kann die Kommune lediglich einen Rahmen setzen, Anreize schaffen, als Verstärker wirken um die Bedürfnisse der Allgemeinheit zu transportieren oder versuchen, auf dem Verhandlungswege Einfluss zu nehmen ¬– aber kaum direkt handeln. Besondere Bedeutung kommt in diesem Zusammenhang kommunalen Wohnungsunternehmen zu, mittels derer Impulse und Maßstäbe für die Entwicklung von Stadtteilen gesetzt werden können. Mit einer Verbindlichkeit für Dritte sind diese Maßnahmen freilich nicht verbunden: Akteure der Wohnungswirtschaft können ebenso nur begrenzt auf die Gestaltung angrenzender Flächen einwirken, die nicht zu ihren Beständen zählen. Jenseits von Impulsen, die in (neuen) Entwicklungsdynamiken resultieren können, beschränken sich die Einflussmöglichkeiten in diesen Fälle auf Argumentationen und Aushandlungsprozesse. Diese kommunikativen und kooperativen Elemente sind besonders für die Planung, aber auch für Wohnungsunternehmen essentiell, um ihre begrenzten Handlungsreichweiten zu erweitern.

Auf thematischer Ebene erreichen Planung und bauliche Gestaltung ebenfalls ihre Grenzen. Selbst eine Planung mit einem – oder grade aufgrund ihres – so umfassenden eigenen Wirkanspruchs wie die kommunale Stadtplanung kann nicht alles bewirken und will es auch nicht können:

„Da ist baulich gar nichts geändert worden. Da sind nur durch rechtliche Normierungen Änderungen erfolgt. Also – ich sage mal – wiederum ein Thema, was die Stadtplanung jetzt weder aktiv angegangen, noch in irgendeiner Form forciert hat, hat da zu Veränderungen geführt. Das meine ich auch damit: Da ist man dann eben auch durch stadtplanerisches Handeln einfach nicht mehr fähig, etwas zu bewältigen. Es sei denn – aber dem hänge ich nicht an – man empfindet eine Omnipotenz bei Stadtplanung und Stadtplanerinnen und Stadtplanern – habe ich nicht, und das nicht nur aus Faulheitsgründen." (Vertreter Planungsamtsleiter)

Gerade in Bezug auf Sicherheitsthemen wird von den betrachteten Akteuren die Vielschichtigkeit unterschiedlicher Einflussgrößen anerkannt – und dass viele von diesen jenseits ihrer originären Handlungsmöglichkeiten liegen. So ist zwar die Auffassung weit verbreitet, dass qualitativ hochwertige Gestaltung zu einer positiven Bindung beiträgt und einen pfleglichen Umgang mit Objekten befördert – also Einfluss auf das menschliche Verhalten hat. Ebenso klar wird jedoch herausgestellt, dass gute Gestaltung allein besonders dann nicht reicht, wenn die Probleme grundlegender sozialer Natur sind: Gestalterische Maßnahmen ohne eine Addressierung des sozialen Verhaltens werden häufig als unwirksam und gesellschaftliche Probleme auf der lokalen Ebene als nicht lösbar, sondern nur in ihren Symptomen behandelbar angesehen. Sicherheit entsteht im Verständnis dieser Akteure erst im Zusammenwirken der Faktoren. Ein Primat baulicher gegenüber sozialer Prozesse wird von Stadtplanern und der Wohnungswirtschaft in der Regel nicht gefordert, sondern die gleichberechtigte Verknüpfung beider Stränge. Als erfolgreiches Beispiel für diese Verbindung gilt das Städtebauförderprogramm „Soziale Stadt", bei dem „bauliche Investitionen der Stadterneuerung in Gebäude, Wohnumfeld und Infrastruktur (…) mit Maßnahmen zur Förderung von Bildung, Beschäftigung und Integration gebündelt" werden (BMVBS, 2011: S. 105).

4 GEMEINSAME SICHERHEITSPRODUKTION - ABHÄNGIGKEITEN

Die unterschiedlichen Raumverantwortungen zwischen kommunaler Planung und Wohungsunternehmen erfordern für ein koordiniertes Vorgehen eine gezielte Zusammenarbeit.

Für kommunale Planungsakteure sind Wohnungsunternehmen und Privateigentümer wichtige Partner. Sie erweitern die Grenzen des eigenen Handelns, denn angesichts des – im Vergleich zum Bestand – geringen Umfangs an Neubauprojekten findet Sicherheitsproduktion in der bereits gebauten Stadt statt. Hier sind es häufig die Wohnungsunternehmen, die im Umfang und in der räumlichen Konzentration ihrer Bestände Veränderungspotentiale bieten. Solche bestehen ebenso bei privaten (Klein-)Eigentümern, sie verfügen jedoch meist über Bestände von wesentlich geringerem Umfang und sind für die kommunalen Akteure in Bezug auf Ansprache und Koordination oft aufwändiger.

Im Wechselspiel ist für Wohnungsunternehmen wiederum die kommunale Planung ein wichtiges Gegenüber:

„Dann gibt es in den großen Wohnsiedlungen, wenn sie stark begrünt sind, zunehmend das Problem Sicherheit – also Beleuchtung und Zuwachsen ist so ein Thema und dann ist wahrscheinlich ein interessantes Thema, dass es oft solche undefinierten verwahrlosten Räume gibt. Also wo fängt mein Haus an oder wo fängt meine Nachbarschaft an und wie geht dann der Weg weiter bis zur S-Bahn oder zur U-Bahn, das sind manchmal noch so kritische, als unangenehm oder als unsicher empfundene Räume, wo dann die Partnerschaft mit der öffentlichen Hand ganz wichtig ist. Da geht es halt um die Wohnumfeldgestaltung.“ (Vertreter Wohnungsunternehmen)

Wohnungsunternehmen und Kommune sind sich ihrer jeweiligen begrenzten Handlungsreichweite bewusst und dementsprechend sind die Kooperationsbeziehungen zwischen diesen Akteuren häufig etabliert. Die Zusammenarbeit zwischen den planenden und bauenden Akteuren von Kommune und Wohnungsunternehmen erfolgt aus unterschiedlichen Beweggründen und wird gleichermaßen von beiden Seiten initiiert: Die planenden Akteure sind darauf angewiesen, dass die umsetzenden Akteure die Ziele ihrer Tätigkeit weiterverfolgen, ebenso wie die Umsetzenden bemüht sind, ihre Ziele bereits in der Planung zu verankern. Inhaltlich geht es um räumliche Schnittstellen und Übergänge, aber auch um grundsätzliche Nutzungskonzepte und die Zugänglichkeit von Räumen.

5 VOM WISSEN, WAS WO ZU TUN IST

Kommunale Planer und die planenden und umsetzenden Akteure aus der Wohnungswirtschaft sind in der Wahl ihrer Schwerpunkte vergleichsweise frei und setzen diese nach wahrgenommener, gesamtheitlicher Problemlage – zu der in ihrem breiten Verständnis auch die Sicherheitslage zählt. Bei der Bewertung der Sicherheitslage stützen sie sich stark auf informelle Zugänge: auf eigene Beobachtungen und direkte Erfahrungsberichte.

Eigene Beobachtungen sind für Stadtplaner und Wohnungsunternehmen durch keine anderen Informationen substituierbar. Sie haben jeweils zahlreiche Anforderungen an den Raum zu koordinieren. Dies erfordert einen direkten Kontakt mit der Situation vor Ort. Entsprechend ist gerade für eine wirksame Prävention die Ortskenntnis der Mitarbeiter eine zentrale Voraussetzung, denn nur durch diese können Probleme entdeckt und bearbeitet werden, noch bevor sie einen kritischen Punkt erreichen:

„Das ist die Auseinandersetzung, gerade auch der Kollegen, die in den Ortsteilen arbeiten; natürlich dort auch viel, viel Kenntnis haben, Ortskenntnis haben, und sagen: ‚Also das ist ein Thema, also da müssen wir mal ran.‘“ (Vertreter Planungsamtsleiter)

Die Kenntnis der lokalen Situation ist dabei nicht nur für die Problemfindung zentral, sondern auch essentiell für die Entwicklung geeigneter, passgenauer Lösungen.

Neben der eigenen Beobachtung zählen Stadtplaner und Wohnungsunternehmen auch die vermittelte Beobachtung zu den wichtigen Informationsquellen, die ihre Sicherheitswahrnehmung und Einschätzung des Handlungsbedarfs prägen. Dabei betonen sie die Bedeutung einer möglichst unverfälschten Informationsweitergabe, die nicht über viele Stationen läuft, sondern direkt kommuniziert wird. Ein solcher „authentischer Dialog“ wird zu einem wichtigen Informationsinstrument. Er gelingt leichter im Rahmen lange laufender Projekte wie Städtebaufördergebieten (für die kommunale Planung) oder mit erfahrenen Gebietsbetreuern (für die Wohnungswirtschaft). In solchen langfristigen Prozessen werden die Akteure zu selbstverständlichen Ansprechpartnern für die Bedürfnisse der Bewohner. Auf diesem Wege fließt auch das

subjektive Sicherheitsempfinden aus der Bevölkerung in die Sicherheitswahrnehmung der hier beschriebenen Akteure ein.

Wohnungsunternehmen und kommunale Planung sehen sich auch hier jeweils nur als einer von vielen Akteuren vor Ort: In Sicherheitsfragen werden Ordnungsämter und Polizei, aber auch Jugend- und Sozialämter als mindestens gleichberechtigt in ihren Zugängen zu einem „authentischen Dialog" eingeschätzt. Auch die Kommunalpolitik besitzt in ihren Augen solche direkten Kanäle. Aus diesem Grund reagieren die baulich-gestalterischen Akteure aufmerksam auf Hinweise von diesen Partnern und nutzen diese „Zurufe" oder „Umwegzurufe" (Vertreter Planungsamtsleiter) aktiv bei der Ausgestaltung ihrer eigenen Bilder.

Die subjektiven Komponenten dieser Hinweise erfordern in den Augen der betrachteten Akteure allerdings eine gewisse Gegenprüfung. Zentrale Stellen für objektivierte Daten – als Gegengewicht zur stark subjektiven Informationsbasis – sind für sie das Ordnungsamt und die Polizei als die professionell mit Sicherheit befassten Akteure. Diese beiden Partner dienen in diesem Fall für sie als Beratende, die helfen, die auf informellem Wege gewonnenen Ansätze zu validieren – quasi die Spreu vom Weizen zu trennen.

Medienberichte sind für die Planenden und Umsetzenden eine weitere Informationsquelle. Sie werden nicht nur als Kanal wahrgenommen, der die Meinung der Bevölkerung prägt, sondern der auch andersherum die Stimmung vor Ort aufgreift und somit zu einem Pegelstandsmesser der lokalen Situation wird. Dabei sind neben Vorfällen im öffentlichen Raum auch solche im privaten Bereich von Interesse, da sie als Hinweise auf die Entwicklung der soziale Lage des betroffenen Quartiers gewertet werden. Die Inhalte der Berichte selbst bewerten die Akteure – nicht zuletzt aufgrund einschlägiger Eigenerfahrungen – mit einer kritischen Distanz. Sie stellen für sie nur eine ergänzende Quelle dar. Ungeachtet dessen können Medienberichte über den Umweg über Einzelpersonen in Entscheidungspositionen (z.B. in der Kommunalpoltik oder Geschäftsführung) dennoch großen Einfluss auf ihre Schwerpunkte und Tätigkeiten der operationalen Ebene entwickeln.

6 HANDLUNGEN UND EINFLUSS AUF DIE SICHERHEITSLAGE

Stadtplanung und Wohnungsunternehmen führen im planerisch-baulichen Feld eine Vielzahl unterschiedlicher Maßnahmen durch, die potentiell sicherheitsrelevante Wirkungen für den öffentlich zugänglichen Raum haben: Gesamtstädtische Strategieplanungen, quartiersbezogene Entwicklungskonzepte, Bebauungsplanung, Gestaltungskonzepte und Umgestaltungsmaßnahmen, städtebauliche Planungen und Umsetzungen sowie objektorientierte Gestaltungsmaßnahmen.

Diese Tätigkeiten sind auf verschiedenen räumlichen Maßstabsebene angesiedelt, wobei die Akteure selbst eine Grenze ihres sicherheitsrelevanten Handelns ziehen, wenn sie darüber reflektieren: Die Maßstabsebene des Flächennutzungsplans wird von Stadtplanern nicht mehr als sicherheitsrelevante Maßnahme begriffen, denn über grundsätzliche Aussagen – etwa zur „gemischten Stadt" – hinaus gilt er als zu unscharf in seiner räumlichen Abgrenzung und seiner inhaltlichen Tiefe. Sicherheitsrelevante Arbeit beginnt daher mit einer konkreteren örtlichen Ebene.

Auf dieser Ebene sind die Akteure je nach räumlichem Handlungsschwerpunkt unterschiedlich tätig. Verbindend ist aber ein gemeinsames Grundverständnis: Nur qualitätsvolle Planung und Gestaltung fördert Sicherheit – sei es in Form eines grundsätzlich „guten Entwurfs":

„Ich glaube schon, dass viele Dinge, die mit gutem Entwurf zu tun haben, automatisch auch Sicherheit generieren. Nicht immer und nicht zwangsläufig, aber vieles doch. (…) Das geht von gemischt genutzten Quartieren – was ja im Grunde die nationale Stadtentwicklung auch möchte, dass man also diese unterschiedlichen Ebenen wieder zusammenbringt, das ist ein Faktum – es ist die Anbindung von Wohnquartieren an den ÖPNV, die Erreichbarkeit von Einrichtungen des täglichen Bedarfs…" (Vertreter Architekten)

Sei es als qualitätsvolle Planung bei der Herstellung attraktiver Räume:

„Also bei meinem Aufgabenbereich, den, den ich verantworte, oder für den ich auch ausgebildet bin, Sorge zu tragen, solche Gelegenheiten [Angsträume] erst gar nicht entstehen zu lassen. Also den öffentlichen Raum so auszugestalten, dass er ein Gefühl von Sicherheit erzielt, dass er attraktiv ist in vielfältiger Weise, was eben gleichfalls auch schon ein, eine gewisse Garantie für Sicherheit dann darstellt, weil Attraktivität auch

bedeutet, aus unserer Sicht: Dieser Ort wird dann auch wahrgenommen. Und er wird auch angenommen. Und wenn ich ihn annehme, dann ist eben auch Vielfalt dort. Und wenn Vielfalt da ist, sind auch viele Menschen da. Und viele Menschen sind auch schon wieder ein höheres Maß an Garantie, sich sicher zu fühlen.“ (Vertreter Planungsamtsleiter)

Oder sei es als qualitätsvolle Realisierung in Form einer hochwertigen Gestaltung der Objekte:

„…und die interessante Erfahrung: Je hochwertiger das gestaltet wird, umso höher ist die Hemmschwelle da zu randalieren oder es zu beschmieren. Also das sind – glaube ich – wichtige, schon elementare Sachen gewesen.“ (Vertreter Wohnungsunternehmen)

Auch hier werden mit dem Thema Sicherheit noch weitere Werte – namentlich diejenigen „guter Planung“ und „guter Gestaltung“ – transportiert. „Gute Planung“ oder „gute Gestaltung“ sind dabei Globalansprüche – ein besonderer Fokus auf Sicherheit besteht nicht. Vielmehr wird Sicherheit– neben allen anderen wichtigen Themen – auch durch gute Planung und Gestaltung hergestellt und verweist wiederum auf die Rolle von Sicherheit als lediglich einem Thema unter vielen. Die genauere Betrachtung zeigt, dass sich „gute Planung“ und „gute Gestaltung“ für diese Akteure unter dem besonderen Blickwinkel von Sicherheit wiederholt auf drei Einzelelemente konzentrieren: Die Belebung öffentlicher Räume – über Maßnahmen zur Nutzungsmischung, zur Schaffung einer Vielfalt von Angeboten und einer Attraktivität des Raumes; die erfassbare Gestaltung von Orten – über visuelle Einsehbarkeit, Blickbeziehungen, Beleuchtung und die klare Definition von Funktions- und Verantwortungsbereichen; sowie die qualitätsvolle Ausgestaltung im Objektbereich – mittels gezielter Materialauswahl, technischer Sicherungen und durchdachten Detaillösungen.

Da den Akteuren die Grenzen eines rein baulich-gestalterischen Umgangs mit Sicherheitsproblemen in der Regel bewusst sind, thematisieren sie häufig die Notwendigkeit ergänzender sozialer Maßnahmen: Zum Teil setzen die betrachteten Akteure begleitende soziale Maßnahmen und Prozesse selbst um – die Planungsämter etwa im Rahmen von Beteiligungsverfahren, Wohnungsunternehmen etwa im Rahmen eines eigenen Sozialmanagements und beide z.B. durch ihre aktive Mitarbeit im Rahmen von Programmen zur Stadtteilentwicklung wie der „Sozialen Stadt“. Den Handlungsmöglichkeiten beider Akteure im sozialen Bereich sind jedoch Grenzen gesetzt (v.a. Mittel, Kompetenzen), sodass für eine umfassende Bearbeitung der Problemlage häufig weitere Akteure erforderlich sind.

Für die somit notwendigen Abstimmungen plädieren die hier beschriebenen Akteure für informelle Prozesse. So stellen Wohnungsunternehmen häufig Akteuren aus dem sozialen Bereich Geschäftsräume zum Selbstkostenpreis zur Verfügung. Damit erweitern sie die Handlungsfähigkeit dieser Akteure (geringe Kosten, Präsenz unmittelbar vor Ort) und erleichtern gleichzeitig eine laufende niedrigschwellige Abstimmung. Formalisierungen führen in den Augen der hier behandelten Akteure dagegen zu komplizierteren und langwierigen Verfahren. Als „Betroffene“ wird insbesondere durch Stadtplaner ein weiteres abstraktes Prüfverfahren – diesmal zu Sicherheit in der räumlichen Planung – nicht gerade begrüßt:

„Aber die Kommunen wehren sich auch mit Händen und Füßen dagegen, dass sie eine weitere Prüfnorm irgendwie auferlegt bekommen. Also man muss schon gucken, ist das verträglich mit Kröten und mit Igeln und keine Ahnung. Und dann müsste man noch gucken, ist es verträglich mit Sicherheit. (…) Habe ich auch das Gefühl, da stehen Planer nicht so drauf.“ (Vertreter Kriminalpräventive Gremien)

Dementsprechend sind in Deutschland gegenwärtig auch keine Bestrebungen feststellbar, Sicherheitsfragen in der kommunalen räumlichen Planung über formellem Wege verpflichtend zu verankern. Aktuelle Initiativen bieten stattdessen Weiterbildungsveranstaltungen, Handreichungen oder Unterstützung bei freiwilligen Kooperationen an und setzen explizit auf diese informellen Aspekte.

7 FAZIT

Das originäre Tätigkeitsfeld von Stadtplanern und Wohnungsunternehmen ist vielfältig und von Wechselwirkungen gekennzeichnet. Sicherheit ist ein Thema von erheblicher Breite und weitreichenden Folgeeffekten. Sicherheit in die räumliche Planung und bauliche Gestaltung zu integrieren heißt daher, ein komplexes Thema mit einem komplexen Feld zu verknüpfen – ohne Zweifel eine wenig triviale Verschränkung.

Im Umgang mit dieser anspruchsvollen Ausgangssituation finden sich in der Praxis zwei Varianten: Zum einen diejenige, die der Komplexität des Themas das eigene universale Handlungsverständnis („Sicherheit machen wir immer mit“ bzw. „Synergien“) entgegenstellt, zum anderen diejenige, die bei den entstehenden konkreten Problemen („Angsträume“) auch konkret eingreift. Beide werden dem Gegenstand nicht gerecht, denn Sicherheitsgesichtspunkte sind nur in den wenigsten Fällen angemessen weitreichend in diese planerisch-baulichen Handlungen integriert: Die erste Variante neigt dazu, das Thema Sicherheit zu vernachlässigen und kein eigenes Bewusstsein für sicherheitsrelevante Wirkungen der eigenen Handlungen zu entwickeln. Die zweite Variante behandelt häufig nur Einzelaspekte als Folgen und Symptome ebendieser Vernachlässigung.

Statt dessen muss Ziel für planende und bauende Akteure sein, von Beginn an die Sicherheitswirkungen eigener Tätigkeiten mitzubedenken und eine Sicherheits-Reflexion zu etablieren. Das heißt auch, dass es für die Praxis des Planens und Bauens weniger darum geht, etwas „Neues“ zu tun, als darum, ein Bewusstsein für die Reichweite und (unintendierten) Konsequenzen der eigenen Handlungen zu schaffen.

Die Handlungsoptionen der betrachteten Akteure müssen nicht erweitert werden. Ändern muss sich jedoch das Verständnis dahingehend, dass Sicherheit nicht (nur) als Spezialthema von Kriminologie und Polizei begriffen wird, sondern als fachübergreifendes Handlungsfeld eines lokalen Raums für dessen Handhabung die Zusammenarbeit mit anderen Akteuren notwendig ist. Gerade der intensive und gleichberechtigte Austausch mit anderen Akteuren wie Polizei oder Ordnungsamt, aber auch sozialen und zivilgesellschaftlichen Gruppen kann eine verstetigte Reflexion von Stadtplanern und Wohnungsunternehmen über die Sicherheitswirkung ihrer eigenen Handlungen fördern.

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Raumpioniership in sozial benachteiligten Großstadtquartieren: Akteurstypen aus Berlin-Moabit und Hamburg-Wilhelmsburg

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1 ABSTRACT

Kennzeichnend für die Stadtentwicklung in Deutschland ist heute, dass Schrumpfungs- und Wachstumsprozesse gleichzeitig stattfinden – allerdings räumlich disparat und regional differenziert. Vor allem in sozial benachteiligten und/oder peripherisierten Stadtteilen werden bisherige Entwicklungsleitbilder und Raumvorstellungen in Frage gestellt. In zunehmendem Maße zeigt sich, dass Politik unter einem wachsenden Handlungsdruck steht. Gleichzeitig ist sie mit ihren wohlfahrtsstaatlichen Ansätzen als alleiniger Akteur überfordert, Problemlagen zu entschärfen und nachhaltige Entwicklungsprozesse anzuregen. An diesem Punkt kommen Raumpioniere und Raumpioniership ins Spiel. Solche Akteure bzw. Akteursnetzwerke werden oft als diejenigen identifiziert, die Neues umsetzen, sozialräumliche Transformationsprozesse aktiv voranbringen und dies mit eigenen Lebensentwürfen verbinden.

Das Leibniz-Institut für Regionalentwicklung und Strukturplanung (IRS) widmete sich diesen Problemstellungen mit einem Forschungsprojekt, das empirisch in Großstadtquartieren im Umbruch in Berlin-Moabit und Hamburg-Wilhelmsburg angesiedelt war. Ausgangspunkt bildete ein Verständnis von Raumpioniership in der Ambivalenz zwischen Kreativität und ‚schöpferischer Zerstörung', welches nicht nur zivilgesellschaftliche Akteure, sondern auch Akteure mit beruflichem Engagement vor Ort einschloss. Untersucht wurde, wer diese Engagierten sind, welche raumbezogenen Entwicklungsvorstellungen sie verfolgen und wie diese in lokalen Gruppen bzw. Netzwerken verhandelt werden. Außerdem war Gegenstand der Analyse, in welche öffentlichen Diskurse deren Visionen bzw. Ideen eingebettet sind und wie diese in lokale Macht- und Wissensordnungen eingeschrieben werden.

Ausgangspunkt bildete die Annahme, dass es die ‚in den Köpfen' verankerten (abwertenden) Deutungsmuster – bezogen auf Stadträume und (bestimmte) dort verortete Bürger bzw. Akteursgruppen – sind, die als wichtige Ansatzpunkte für Quartiersentwicklungen betrachtet werden müssen. Solche Deutungsmuster, die in dem hier zugrunde gelegten Forschungsverständnis auch als soziale Konstruktionen bezeichnet werden, entstehen in kommunikativen Aushandlungsprozessen und können auch nur in Kommunikationen transformiert oder modifiziert werden. Dieser Ansatz, d. h. die Herstellung eines raumbezogenen Zusammenhangs zwischen Wissen, Handeln und Kommunikation, gilt in Verbindung mit Fragen der Raumentwicklung als neu und wird im IRS weiter ausgearbeitet. Dazu erfolgt eine Verbindung des neueren Sozialkonstruktivismus mit dem wissenssoziologischen Diskurskonzept sowie mit ausgewählten anschlussfähigen raumtheoretischen Bausteinen – wie etwa relationalen Raumkonzepten – die einen sozial konstruierten bzw. einen Handlungsraum in den Mittelpunkt stellen.

Ausgehend von den genannten Problemstellungen und theoretischen Zugängen stehen empirisch in den untersuchten Fallregionen identifizierte Raumpioniertypen im Mittelpunkt des Beitrags. Diese sind in einem mehrdimensional bestimmten Akteursfeld verortet, welches sowohl potenzielle, eigentliche und etablierte Raumpioniere umfasst als auch pionierhafte bzw. engagierte Akteure. An ausgewählten Typen wird zudem darauf eingegangen, welche Möglichkeiten und Handlungsspielräume Raumpioniere und deren Netzwerke in Berlin-Moabit und Hamburg-Wilhelmsburg haben bzw. entwickeln, um soziale Spannungen einzudämmen, Lebensqualität zu sichern bzw. Quartiere zu „Wohlfühl-Orten" zu machen.

2 EINFÜHRUNG

Charakteristisch für die Stadtentwicklung in Deutschland seit Anfang der 2000er Jahre ist, dass Schrumpfungs- und Wachstumsprozesse gleichzeitig stattfinden – allerdings räumlich disparat und regional differenziert (vgl. Müller/Schmidt/Selle 2003). Vor allem in sozial benachteiligten und/oder peripherisierten Stadtteilen werden daher bisherige Entwicklungsleitbilder und -strategien in Frage gestellt. Da (Stadt-)Politik in diesen Räumen unter einem wachsenden Handlungsdruck steht und gleichzeitig mit traditionellen wohlfahrtsstaatlichen Mitteln an Grenzen stößt, gilt die Aufmerksamkeit in Wissenschaft und Praxis neuen Ansätzen und Akteuren, die Lösungen für lokale Problemlagen suchen und so nachhaltige Entwicklungsprozesse anregen. An diesem Punkt kommen Raumpioniere bzw. Raumpioniership ins Spiel. In

der Stadtforschung werden diese oft als zivilgesellschaftliche Akteure identifiziert, die in ökonomisch (zeitweise) entwerteten Räumen Entfaltungs- bzw. Freiräume für eigene Lebensentwürfe sehen und dort Neues umsetzen (vgl. z. B. Lange/Matthiesen 2005, Matthiesen 2005).

Dieses Begriffsverständnis wurde im Rahmen eines Forschungsprojekts[1] am Leibniz-Institut für Regionalentwicklung und Strukturplanung (IRS) als Oberbegriff – der empirisch zu fundieren war – für alle lokal engagierten Akteure verwendet, die im Quartier bzw. Stadtteil mit neuartigen Ansätzen etwas bewegen oder verändern wollen. Damit bezog er sich auch auf Unternehmer und Selbständige sowie Vertreter aus Politik, Verwaltung bzw. von Organisationen, die sozial-räumliche Transformationsprozesse vor Ort voranbringen. Ziel der Untersuchungen war es, Antwort auf die Fragen zu geben, wer diese engagierten Akteure sind, vor welchem sozio-kulturellen Hintergrund sie handeln und welche Raumbindungen sie haben, welche raumbezogenen Entwicklungsvorstellungen sie verfolgen und wie diese in lokalen Gruppen bzw. Netzwerken verhandelt werden. Außerdem war Gegenstand der Analysen, in welche öffentlichen Diskurse deren Visionen bzw. Ideen eingebettet sind und wie diese in lokale Macht- und Wissensordnungen eingeschrieben werden.

Ergebnisse dieses Projekts bieten Anknüpfpunkte an Fragen der internationalen Stadtplanerkonferenz 2012 in Schwechat/Österrreich „Re-Mixing the City/ Wiederdurchmischung der Stadt“. Der nachfolgende Beitrag beleuchtet daher, bezogen auf sozial benachteiligte Großstadtquartiere in Berlin-Moabit und Hamburg-Wilhelmsburg, das raumbezogene Wissen und Handeln lokal engagierter Akteure, einschließlich deren Kommunikationsstrategien. Ausgehend von projektbezogenen Forschungskontexten, theoretischen Zugängen und dem methodischen Vorgehen erfolgt zunächst eine Darstellung der damit im Zusammenhang stehenden sozial-räumlichen bzw. stadtentwicklungspolitischen Rahmenbedingungen. Danach stehen empirisch identifizierte Raumpioniertypen, verortet in einem mehrdimensionalen Akteursfeld, im Mittelpunkt. Abschließend wird darauf eingegangen, welche Möglichkeiten und Handlungsspielräume Raumpioniere haben bzw. entwickeln, um soziale Spannungen einzudämmen, Lebensqualität zu sichern bzw. Quartiere zu „Wohlfühl-Orten“ zu machen.

3 FORSCHUNGKONTEXTE, THEORETISCHE ZUGÄNGE UND METHODISCHES VORGEHEN[2]

Für die Untersuchung von Prozessen kommunikativer Raumkonstruktionen in Stadtteilen mit sozialen Problemlagen lag die Annahme zu Grunde, dass es die ‚in den Köpfen’ verankerten (abwertenden) Deutungsmuster – bezogen auf Stadträume und (bestimmte) dort verortete Bürger bzw. Akteursgruppen – sind, die als wichtige Ansatzpunkte für Quartiersentwicklungen betrachtet werden müssen. Solche Deutungsmuster, die in diesem Forschungsverständnis auch als soziale Konstruktionen bezeichnet werden, entstehen in kommunikativen Aushandlungsprozessen und können auch nur in Kommunikationen transformiert oder modifiziert werden. Forschungsleitend war zudem, dass Akteure, die sozial-räumliche Visionen entwickeln bzw. Neues denken und Bestehendes verändern, darüber kommunizieren bzw. andere zur Kommunikation darüber anregen und so auch deren Raumvorstellungen beeinflussen. Kommunikation wird dabei als soziales Handeln verstanden, das sich „Zeichen“ unterschiedlicher Art (wie Sprache) bedient. Außerdem findet diese sowohl in ‚face-to-face’ Kontexten als auch in öffentlichen Diskursen statt und ist mit Machtfragen verbunden. Dieser Ansatz, d. h. die Herstellung eines raumbezogenen Zusammenhangs zwischen Wissen, Handeln und Kommunikation, gilt in Verbindung mit Fragen der Raumentwicklung als neu und wird im IRS weiter ausgearbeitet. Dazu erfolgt eine Verbindung des neueren Sozialkonstruktivismus (vgl. Berger/Luckmann 1987, Luckmann 2002, Knoblauch 1995) mit wissenssoziologischen Diskurskonzepten (vgl. Keller 2008) sowie mit ausgewählten anschlussfähigen raumtheoretischen Bausteinen – wie etwa relationalen Raumkonzepten (vgl. Läpple 1991, Sturm 2000, Löw 2001). Ziel ist die Entwicklung einer Theorie der kommunikativen Raumkonstruktion.

Das Pionierhafte wird in diesem Forschungsansatz also nicht primär an den Aktivitäten für neue oder alternative (Wieder-)Inwertsetzungen von gebauten Räumen oder Freiräumen – bezogen auf den Stadtteil

[1] Das Forschungsprojekt „Raumpioniere im Stadtquartier – zur kommunikativen (Re-) Konstruktion von Räumen im Strukturwandel“, zu dessen Team die Autorin gehörte, wurde zwischen 2009 und 2011 am IRS in Erkner (bei Berlin) in der Forschungsabteilung „Kommunikations- und Wissensdynamiken im Raum“ bearbeitet (vgl. dazu auch Christmann/Büttner 2012, Christmann/Jähnke 2011, Christmann/Mahnken 2012, Neumann/Schmidt 2012).

[2] Nachfolgend werden wesentliche Prämissen des o.g. IRS-Forschungsprojekts dargestellt.

oder das Quartier – festgemacht, wie dies beispielsweise in Ansätzen zur Zwischennutzung geschieht (vgl. zu Urban Pioneers z. B. SenStadt 2007). Vielmehr steht das Neue im sozialen Handeln der lokal engagierten Akteure, einschließlich der Wirkungen auf bzw. Wechselwirkungen mit anderen „Raumdimensionen" im Mittelpunkt. Anders ausgedrückt, Raumpioniere agieren in einem „Matrixraum", d. h. ihr Handeln bezieht sich sowohl auf den Raum als materiell-physisches Substrat als auch auf die gesellschaftlichen Interaktions- und Handlungsstrukturen bzw. die gesellschaftliche Praxis, die institutionellen und normativen Regulationssysteme sowie das räumliche Zeichen-, Symbol- und Repräsentantensystem (Läpple 1991: 196f.).

Da in diesem Forschungsverständnis ein Raumpionier weder allein noch im Verborgenen agieren kann, wenn er mit neuartigen Ansätzen etwas bewegen oder verändern will, waren als Forschungsperspektive nicht nur Einzelakteure, sondern auch Gruppen bzw. Netzwerke sowie öffentliche Diskurse von konzeptioneller und analytischer Bedeutung. Aus der Forschungsperspektive der Einzelakteure bestand das Untersuchungsziel in der empirischen Differenzierung eines Akteursfeldes sowie in der Identifizierung von Raumpioniertypen (zur empirisch begründeten Typenbildung vgl. Kluge 1999, Kelle/Kluge 2010 sowie Rosenthal 2005). Auf ausgewählte Befunde dieser Analysen wird nachfolgend vor dem Hintergrund spezifischer stadtteilbezogener Rahmenbedingungen eingegangen.

4 RAUMPIONIERE UND IHRE TYPIK IN BERLIN-MOABIT UND HAMBURG-WILHELMSBURG

4.1 Sozial-räumliche bzw. stadtentwicklungspolitische Rahmenbedingungen des Akteursengagements

Hamburg-Wilhelmsburg und Berlin-Moabit sind Stadtteile mit sozialen Problemlagen und partiellen Aufwertungstendenzen. Sie kennzeichnen sowohl stete Negativ-Images und soziale Heterogenität[3] als auch Bürgerengagement bzw. Raumpionieraktivitäten vor dem Hintergrund einer zumeist starken Ortsbindung der Bewohner. Hinzu kommt, dass die Zentrumsnähe dieser Räume innerhalb der Gesamtstadt für Akteure aus Politik bzw. Wirtschaft Anfang der 2000er Jahre Anlass war, in diesen bisher wenig beachteten Stadtteilen ungenutzte Entwicklungspotenziale zu identifizieren – wenn auch regionsspezifisch mit unterschiedlichen Intentionen und in verschiedenem Maße.

In diesem Kontext waren für Wilhelmsburg im Untersuchungszeitraum konkurrierende Images identifizierbar. Dem in der Öffentlichkeit negativ besetzten Bild (verbunden mit Begriffen wie Flut, Industrie, Verkehr und Gewalt; vgl. Weißbuch 2002) wird im Rahmen der offiziellen Stadtentwicklungspolitik seit Anfang des 21. Jahrhunderts mit dem „Sprung über die Elbe" eine neue Vision entgegengestellt und öffentlich kommuniziert. Diese zielt im Kontext des Leitbildes „Metropole Hamburg – Wachsende Stadt" auf die vielfältigen Qualitäten Wilhelmsburgs als Wohn- und Arbeitsort in Verbindung mit den verfügbaren Entwicklungsflächen und -potenzialen ab (vgl. Hamburg 2002). Zudem wurden im Ergebnis bürgerschaftlichen Engagements für die Sicherung der Lebensqualität auf dieser Insel – die durch Industrie- und Hafenansiedlungen oder städtische Infrastrukturanlagen wiederholt als bedroht angesehen wurde – im Ergebnis einer Zukunftskonferenz und unter Beteiligung eines breiten Akteurskreises wesentliche Grundlagen für stadtentwicklungspolitische Ansätze auf der Elbinsel erarbeitet (vgl. Weißbuch 2002). Davon ausgehend erfolgt Stadtentwicklung in Wilhelmsburg seit 2006 vor allem unter dem Dach einer Internationalen Bauausstellung[4] (IBA 2013) in Verbindung mit einer Internationalen Gartenschau (igs 2013). Unter dem Motto „Entwürfe für die Zukunft der Metropole" stehen drei Leitthemen im Mittelpunkt der IBA (vgl. www.iba-hamburg.org): Kosmopolis (Suche nach neuen Wegen des Zusammenlebens),

[3] In Moabit waren 2008 ca. 45 % der Bewohner nichtdeutscher Herkunft (Aktionsraum plus Wedding/Moabit 2010) und knapp 30 % waren abhängig von Transferleistungen des Staates, d.h. erhielten Hartz IV oder vergleichbare Leistungen (www.berlin.de). In Wilhelmsburg lag dieser Anteil im gleichen Zeitraum ebenso bei rund 30 %, der höchsten Quote in ganz Hamburg (www.statistik-nord.de). Der Anteil der Bewohner mit Migrationshintergrund wurde in diesem Stadtteil 2009 mit mehr als 50 % beziffert (ebd.).

[4] Als Instrument der Planungs- und Baukulturpolitik folgen Internationale Bauausstellungen (IBAs), die in Deutschland eine über hundertjährige Geschichte haben, i.d.R. drei Prämissen: Antworten auf städtische bzw. regionale Problemlagen werden auf Architektur und Stadtplanung zentriert. Modellhafte Lösungen, die zur Diskussion gestellt werden, orientieren sich an internationalen Maßstäben, setzen aber auch für die planende Verwaltung neue Maßstäbe. Intellektuelle, künstlerische und finanzielle Kräfte werden auf einen überschaubaren Zeitraum konzentriert, in dem auch Experimente und Mut zum Risiko ermöglicht werden (Durth 2008: 8).

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Metrozonen (interessante städtebauliche Lösungen für die „inneren Stadtränder“), Stadt im Klimawandel (Stadtwachstum im Einklang mit der Umwelt). Für die Realisierung baulicher, kultureller und sozialer Projekte erfolgt die Bündelung beachtlicher öffentlicher und privater Mittel. Als eine „durch das Standortmarketing induzierte IBA“ ist diese Bauausstellung aber auch mit dem Vorwurf konfrontiert, einer Festivalisierung von Stadtentwicklungspolitik Vorschub zu leisten und so die Beliebigkeit des Instruments zu befördern, auch wenn der realisierte Projektmix mittlerweile spektakuläre Einzelprojekte mit (erfolgreichen) Stadterneuerungsstrategien verbindet (Petrin 2008: 28).[5] Große Aufmerksamkeit gilt im Rahmen dieser IBA/igs auch der Öffentlichkeit und der Bürgerbeteiligung (z. B. Einrichtung eines IBA/igs-Beteiligungsgremiums). Sowohl die mit der IBA induzierten Aufwertungsprozesse als auch die verfolgten bzw. realisierten Beteiligungsstrategien werden von den engagierten Akteuren vor Ort teils sehr kritisch beurteilt. Ihr Handeln ist vor diesem Hintergrund breit aufgestellt.

Die Einbettung Berlin-Moabits in gesamtstädtische Entwicklungsstrategien stellt sich im Vergleich zu Wilhelmsburg anders dar. Das mit dem Konzept „Aktionsraum plus Wedding/Moabit“ entwickelte Leitbild bescheinigt diesem Stadtteil zwar das Potenzial, sich zu einem urbanen Lebensbereich mit attraktiven Wohn , Arbeits , Einkaufs , Freizeit und Erholungsmöglichkeiten entwickeln zu können, setzt aber letztlich nur an der Überwindung gegenwärtiger Defizite und Probleme an (vgl. Aktionsraum plus Wedding/Moabit 2010). Die Standortgunst dieses Stadtteils ist vor dem Hintergrund zahlreich verfügbarer, zentrumsnaher Entwicklungsflächen stadtentwicklungspolitisch und investorenbezogen bisher vor allem für ausgewählte Nutzungen interessant. Diese stehen zumeist mit dem neuen Berliner Hauptbahnhof in Verbindung – wie Hostels und Hotels, aber auch höherwertiges Wohnen. In wenigen Wohnquartieren sind bisher Aufwertungstendenzen erkennbar. Einen vergleichbaren visionären Entwicklungsansatz, wie dies mit der IBA/igs für Hamburg-Wilhelmsburg der Fall ist, gibt es für Moabit nicht. Dies wird auch in der Medienresonanz deutlich, die weiterhin ein zumeist negatives Bild des Stadtteils zeichnet (verbunden mit Begriffen wie Gewalt, Kriminalität, Gefängnis und Gericht). Vor diesem Hintergrund findet Stadtentwicklung in diesem Stadtteil vor allem auf der Basis informeller Planungsinstrumente (wie städtebauliche Wettbewerbe und Masterpläne) und formeller Planungen (wie vorhabenbezogene Bebauungspläne) sowie über Programme der Städtebauförderung (wie „Soziale Stadt“, „Stadtumbau West“ sowie „Aktive Stadt und Ortsteilzentren/Innenentwicklung“) – in unterschiedlichen Zeiträumen und Förderkulissen mit den entsprechenden Beteiligungsverfahren – statt. Bürgerengagement in Moabit wurzelt bereits in der alternativen Stadtentwicklungsszene bzw. in Beteiligungsgremien von Stadterneuerungsansätzen Ende der 1980er Jahre. Es konzentrierte sich im Untersuchungszeitraum sowohl auf die Bewahrung und Sicherung der Lebensqualität in diesem Stadtteil, beispielsweise in Konflikten mit Investorenansiedlungen bzw. interessen, als auch auf die Entwicklung und Umsetzung neuer Ansätze für eine sozial-räumlich verträgliche Aufwertung.

Insgesamt bildet die Gesamtheit dieser Rahmenbedingungen den Kontext des Engagements von Raumpionieren in den beiden Referenzräumen, welches nachfolgend spezifiziert wird.

5 ZUR BESCHREIBUNG EINES AKTEURSFELDES „PIONIERHAFTES ENGAGEMENT“[6]

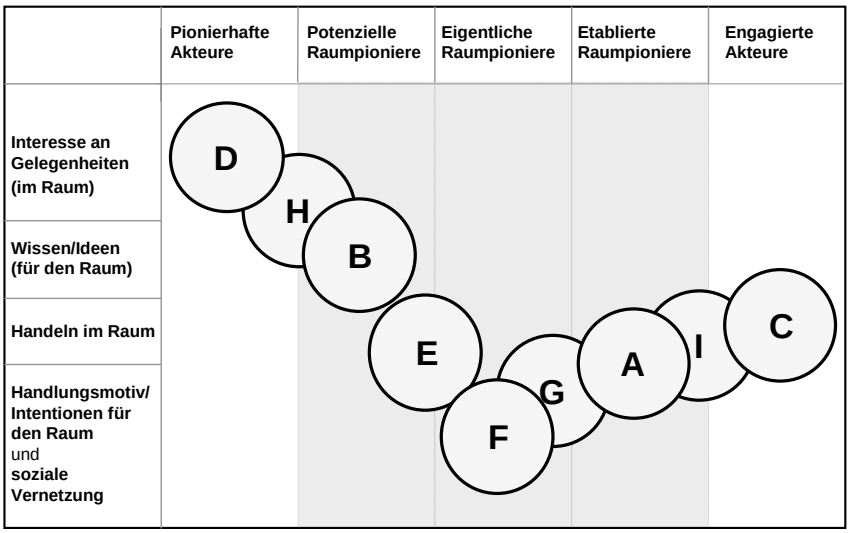
Die Differenzierung des identifizierten Akteursfeldes beruht auf einer Heuristik, die anknüpfend an forschungsleitende Annahmen und erste empirische Auswertungen entwickelt wurde. Danach charakterisieren fünf unterschiedliche Ausprägungen das „pionierhafte“ Engagement neuer Akteure in einem Stadtteil bzw. in einem Quartier (vgl. Abb. 1).

Pionierhafte Akteure haben vor allem Interesse an den Gelegenheitsstrukturen vor Ort (wie Gebäude oder Freiflächen), d. h. sie suchen beispielsweise günstigen Wohn bzw. Gewerberaum oder beides. Ihr raumbezogenes Wissen über den Stadtteil ist gering. Ihr Handeln ist nicht mit der Intention verbunden, sozial-räumliche Ideen für Veränderungen im Quartier zu entwickeln bzw. umzusetzen. Außerdem sind sie auch nicht mit engagierten Akteuren oder Akteursgruppen vor Ort sozial vernetzt.

[5] Mit dem ins Leben gerufenen Netzwerk „IBA meets IBA“, das unter anderem ein Memorandum mit zehn Empfehlungen – als freiwillige Selbstverpflichtung – erarbeitet hat, wird diesem Vorwurf begegnet (faz 2009).

[6] Datengrundlage bildeten die mit Akteuren in den beiden Referenzräumen im Rahmen des o. g. Projekts durchgeführten problemzentrierten Interviews, die für qualitative Auswertungen transkribiert und anonymisiert wurden.

Potenzielle Raumpioniere entwickeln dagegen als Akteure innovative bzw. visionäre Vorstellungen von Aktivitäten in ihrem Quartier für das sie sich bewusst entschieden haben. Sie greifen dabei bereits auf spezielles Raumwissen zurück, haben aber keine sozial-räumlichen Visionen, die sie explizit bzw. intendiert mit dem Stadtteil verknüpfen. Neue Ideen, die sie entwickeln oder aufgreifen und lokal verankern, sind untrennbar mit den eigenen und teils neuen Lebensentwürfen verbunden. Sie münden zumeist in einem projektbezogenen Engagement, wie beispielsweise in Form „experimenteller oder alternativer Kunst im öffentlichen Raum". Ihr Handeln wird öffentlich wahrgenommen und ist (sozial-)raumwirksam, allerdings nicht intendiert. Daher grenzen sie sich davon ggf. sogar ab. Zu anderen Engagierten im Stadtteil haben sie kaum soziale Beziehungen. In ihrer überregional ausgerichteten Community sind sie dagegen sehr gut vernetzt.



Quelle: Christmann 2011, modifiziert.

Abb. 1: Heuristik – Akteursfeld „pionierhaftes" Engagement[7]

Eigentliche Raumpioniere verfügen über umfangreiches Raumwissen und richten ihr pro-aktives Handeln – vor dem Hintergrund ihrer ebenso teils neuen, aber bereits stärker lokal verankerten Lebensentwürfe (im Hinblick auf Wohnen, Arbeiten oder beides) – gezielt auf sozial-räumliche Veränderungen. Sie haben nicht nur darauf bezogene Visionen und Ideen, sondern daraus auch Projekte entwickelt. Diese setzen sie erfolgreich um und verankern sie ggf. weiter institutionell – wie beispielsweise im Rahmen von Social Entrepreneurship[8] oder Corporate Social Responsibility.[9] Mit anderen engagierten Akteuren im Stadtteil sind diese strategisch vernetzt und in unterschiedlichem Maße öffentlich „sichtbar".

Bei **etablierten Raumpionieren** steht vor dem Hintergrund ihres umfangreichen Raumwissens dagegen nicht mehr die Entwicklung und Verankerung neuer bzw. innovativer sozial-räumlich orientierter Ideen, verbunden mit entsprechenden Aktivitäten, im Mittelpunkt ihres Handelns, sondern die Institutionalisierung bzw. Bewahrung des einstmals Innovativen. Dazu greifen sie auf ihre mittlerweile etablierten strategischen Netzwerke bzw. sozialen Beziehungen zurück und sind „bekannt" im Quartier bzw. Stadtteil. Sie verfolgen durchaus noch sozial-räumliche Visionen, konzentrieren sich auf der Handlungsebene aber auf die Etablierung oder Weiterentwicklung bereits eingeführter neuer bzw. innovativer Projekte. Ihr (langjähriges) Engagement für das Quartier bzw. den Stadtteil (beruflich, bürgerschaftlich oder beides) ist fester Bestandteil ihrer Lebensentwürfe geworden.

[7] Die mit Buchstaben versehenen Kreise verkörpern stellvertretend Einzelfälle, deren genaue Einordnung/Zuordnung Gegenstand der Untersuchungen zur Charakterisierung des Akteursfeldes und der Identifizierung von Typen war.

[8] Unter Social Entrepreneurship wird hier das gemeinsame unternehmerische Handeln von Akteuren verstanden, die sich mit ihren Ansätzen der Lösung sozial-räumlicher Probleme zuwenden und dabei den sozialen Mehrwert in den Vordergrund stellen (vgl. dazu Jähnke et al. 2011).

[9] Corporate Social Responsibitity (CSR) kennzeichnet Unternehmen im Wirtschaftsbereich, die mit ihren Aktivitäten über die bloße Erfüllung von sozialgesetzlichen Vorschriften deutlich hinausgehen. Im Vordergrund steht zwar das wirtschaftliche Handeln, das aber in hohem Maße sozial verantwortungsbewusst und nachhaltig angelegt wird (vgl. Beckmann 2007).

Engagierte Akteure schließlich sind ebenso lokal sozial verankert und vernetzt, sie greifen aber vor allem auf bewährte Engagementansätze zur Gestaltung der Quartierentwicklung, zur Verbesserung von Lebensqualität vor Ort u. ä. zurück und handeln eher reaktiv.

Das empirisch identifizierte Akteursfeld wird daher aufgespannt zwischen den Akteursmerkmalen „Interesse an Gelegenheiten“ (im Raum), „Wissen/Ideen“ (für den Raum)“, „Handeln im Raum“ sowie „Handlungsmotiv/Intention für den Raum“, was die „soziale Vernetzung“ der Akteure einschließt (vgl. Abb. 1). Zudem zeigten weitere empirische Auswertungen, dass raumwirksames Akteursengagement auch als „Prozess“ im Zeitverlauf interpretiert werden kann. Dies bedeutet, dass sich Engagierte von pionierhaften Akteuren im Stadtteil zu potenziellen, eigentlichen und etablierten Raumpionieren entwickeln können, worauf ggf. (nur noch) Aktivitäten als engagierte Akteure folgen („Raumpionierzyklus“). Außerdem wurde deutlich, dass von einer Offenheit dieses Prozesses ausgegangen werden muss, d. h. es ist auch ein Quereinstieg in bzw. ein Ausstieg aus jeder dieser „Phasen“ möglich. Dies wäre beispielsweise der Fall, wenn ein Akteur ohne bisherigen Stadtteilbezug Raumpionier-Projekte voranbringt bzw. wenn er seine Aktivität vor Ort nach dem Abschluss solcher Projekte wieder ‚einstellt’.

Und schließlich konnte festgestellt werden, dass sich o. g. Ausprägungen bei ausgewählten Akteuren überlagern können bzw. dass Einzelfälle den „Phasen“ nicht eindeutig zuordenbar sind. Dies machte eine weitergehende Differenzierung notwendig, auf die nachfolgend am Beispiel ausgewählter Raumpioniertypen[10] eingegangen wird.

6 ZUR TYPIK VON RAUMPIONIEREN: MACHER, GESTALTER, ENTWICKLER UND ANDERE

Für die Identifizierung von Raumpioniertypen wurden vor allem die Akteure herangezogen, die sich im Bereich zwischen potenziellen, eigentlichen und etablierten Raumpionieren einordnen ließen und somit den Kern des Akteursfeldes bilden (vgl. Abb. 1), da nur sie, wenn auch auf unterschiedliche Art und Weise, ihr Wissen und ihr Handeln – einschließich ihrer kommunikativen Strategien – auf eine sozial-räumliche Wirksamkeit im Quartier bzw. Stadtteil ausrichten.

Ausgehend von den für Stadtentwicklung bedeutsamen Fragen – welche Aktivitäten das Handeln von Raumpionieren kennzeichnen, was diese Akteure langfristig an städtische Räume bindet und welche Gründe sich dafür identifizieren lassen – bieten folgende Raumpioniertypen, die in beiden Referenzräumen zu finden waren, interessante Ansatzpunkte.

Die **„Macher von Kunst im Raum“** mit experimentellen Ansätzen (potenzielle Raumpioniere) leben seit Jahren in der jeweiligen Stadt und seit längerem im Stadtteil. Sie schätzen insbesondere die Entfaltungsmöglichkeiten, die sie für ihre Ideen lokal vorfinden. Charakteristisch ist ihre positive Identifikation mit dem Raum und zwar genau so wie er ist. Auch in der räumlichen Nähe von Wohnung und Arbeitsplatz (Atelier, Galerie o. ä.) drückt sich die enge Verbindung des lokalen Engagements mit den persönlichen Lebensentwürfen aus. Das Handeln dieser Akteure ist stark durch einen künstlerischen Habitus bestimmt, der vor allem mit Individualität und Freiheit verbunden wird. Ihre soziale Resonanz, d. h. ihre sozialen Kontakte und Beziehungen sowie ihr sozialer Einfluss im Quartier bzw. Stadtteil ist gering, dafür sind sie in der jeweiligen Kunst bzw. Kultur-Community lokal, national und zumeist auch international gut vernetzt. Sie nutzten den Stadtteil vor allem als „Bühne“ für ihre Kunstprojekte. Diese sind neu/innovativ für den Raum, aber nicht oder nur mittelbar auf dessen soziale Problematiken und die Menschen des jeweiligen Stadtteils bezogen. Da diese Akteure Freiräume und Selbstbestimmung schätzen, stehen sie politisch-planerischen Steuerungsinterventionen kritisch gegenüber. Mit ihren Projekten sind sie in der Öffentlichkeit „sichtbar“ und präsent. Sie tragen somit zur Außen-Imageverbesserung des Stadtteils bei, auch wenn dies unter Umständen gar nicht von ihnen gewollt ist.

Die „Gestalter von lokalen Lebensräumen“ mit experimentellen Ansätzen und unternehmerischen Strategien (eigentliche Raumpioniere) kennzeichnet eine Orientierung auf pro-aktives und sozial-räumlich intendiertes Handeln. Ihren Anspruch zu gestalten verbinden diese Akteure in hohem Maße mit „Selbstverantwortung“, die sie auch von anderen einfordern. Sie kennzeichnet ein ausgeprägter unternehmerischer Habitus.

[10] Trotz gewisser Überschneidungen bei der Gruppierung bzw. Zuordnung der Einzelfälle in das zunächst heuristisch bestimmte Akteursfeld waren für jede der identifizierten Gruppierungen gemeinsame Charakteristika sowie Unterschiede bestimmbar, was die Bildung empirisch begründeter Typen rechtfertigte.

Außerdem wohnen und/oder engagieren sie sich schon lange im Stadtteil, verbinden mit diesem ein großes Identifikationspotenzial und haben ein positives Raumbild. Ihre Aktivitäten fokussieren diese Akteure auf die sozial-räumliche Vision „eines Dorfes in der Stadt", denn sie suchen eine soziale Gemeinschaft, die sowohl von gegenseitiger Unterstützung und Hilfe als auch durch Offenheit und Toleranz charakterisiert wird. Vor dem Hintergrund ihres zu großen Teilen ehrenamtlichen Engagements, bei dem sie in der Regel den „Hut auf haben" (wie als Vereinsvorsitzender), verbinden sie immer wieder eigene Lebensentwürfe mit Aktivitäten bzw. Projekten im Stadtteil. Typisch für diese Akteure sind Offenheit für Neues, die Freude am Experimentieren und der Mut zum Ausprobieren. Ihr besonderes Interesse gilt Aktivitäten bzw. Projekten, die soziale Anliegen mit unternehmerischen Ansätzen verknüpfen (im Sinne von Social Entrepreneurship oder Corporate Social Responsibility). Sie stellen sich selbst als „visionäre Macher" dar, sie handeln pragmatisch und lösungsorientiert. Im Stadtteil sind sie daher strategisch auf mehreren Ebenen vernetzt und haben soziale Resonanz.

Die **„Entwickler von Kultur- und Bildungsorten"** mit kommunikativen und partizipativen Strategien (zwischen eigentlichen und etablierten Raumpionieren angesiedelt) charakterisiert, dass sie sozial-unternehmerisch intendiert im Kontext sozial-räumlicher Transformationen handeln und institutionell verankert sind. In dieser Rolle tragen sie Verantwortung (als Vereinsvorsitzender, Geschäftsführer o. ä.) und sind mit der jeweiligen Einrichtung im Stadtteil etabliert. Das Ziel ihres Engagements, ihre Vision, ist die „gesellschaftliche Teilhabe aller" durch den Zugang zu Bildung und/oder Kultur sowie durch Möglichkeiten der Information und Kommunikation – d. h. auch von Migranten, sozial Benachteiligten oder Menschen in prekären Einkommensverhältnissen. Dafür schaffen sie einerseits „Orte" bzw. setzen sich in ihrer institutionellen Rolle und mit persönlichem Engagement für die Sicherung bzw. den Erhalt dieser ein. Andererseits ist für sie Partizipation im Stadtteil von zentraler Bedeutung. Die Entwicklung von sozialem Kapital (wie Vertrauen) halten diese Akteure für besonders wichtig, um Zugang zu den heterogenen Zielgruppen ihres Engagements zu finden. Viele der entwickelten Aktivitäten/Projekte sind für den Stadtteil neu bzw. innovativ, sie arbeiten aber auch mit bereits eingeführten Ansätzen. Akteure dieses Typs wohnen in der Regel schon lange vor Ort, was sie für soziale Problematiken sensibilisiert hat und können zumeist auf eine bürgerschaftliche „Engagementkarriere" im Stadtteil zurückblicken. Sie entwickeln ein positives, auf die lokalen sozial-räumlichen Potenziale fokussiertes Raumbild. In ihrer (heutigen) institutionellen Rolle ‚verfügen' sie über entsprechende organisatorische, personelle und finanzielle Ressourcen (d. h. Mittel der öffentlichen Hand, wie Zuwendungen und zeitlich befristete Fördermittel, sowie eigene Einnahmen und Spenden). Zudem werden die verfolgten Ansätze durch ein breites bürgerschaftliches Engagement vor Ort begleitet. Vor diesem Hintergrund sind diese Akteure strategisch lokal vernetzt und haben soziale und öffentliche (d. h. ihr Engagement wird öffentlich wahrgenommen und reflektiert) Resonanz sowie zum Teil auch eine politische Resonanz (im Sinne einer ‚Beachtung' durch Vertreter der städtischen Politik und Verwaltung).

Neben den o. g. Raumpioniertypen erweisen sich weitere Typen durch regionale Spezifika als interessant, die sowohl Zusammenhänge mit der Entwicklungsgeschichte der Stadtteile bzw. der Historie des Bürgerengagements als auch mit den verfolgten stadtentwicklungspolitischen Strategien nahelegen. So sind beispielsweise **„Hüter der lokalen sozialen Gemeinschaft"** mit partizipativen Strategien (als etablierte Raumpioniere)[11] vor allem in dem Referenzraum zu finden, für den im Untersuchungszeitraum keine stadtentwicklungspolitische Gesamtvision – verbunden mit entsprechenden Gesamtentwicklungskonzepten – vorlag, und aufseiten der Bürger keine permanent wahrgenommene ‚Bedrohung' der Lebens- und Freiräume existierte (Berlin-Moabit). Dies könnten Gründe dafür sein, dass sich dieser Typus weniger politisch-strategisch für oder gegen sozial-räumliche Transformationsprozesse positioniert und engagiert sowie hauptsächlich auf der Informationsebene verbleibt.

[11] Für die „Hüter der lokalen sozialen Gemeinschaft" stellt diese Verbundenheit einen zentralen Wert ihres Lebensentwurfes dar. Kennzeichnend für sie sind ein altruistischer Habitus und der Anspruch, ihren Stadtteil bzw. ihr Quartier als Sozialraum im Ergebnis vergangener sozial-räumlicher Transformationen zu schützen. Ihr Handlungsschwerpunkt liegt bei der Umsetzung partizipativer Strategien für die Sicherung neuer Formen des Bürgerengagements. Ihr Engagement ist zumeist reaktiv, welches sie aber auch mit kreativen Aktionen und Aktivitäten verbinden.

Andererseits waren „Veränderer von Stadträumen“ mit baulichen, kulturellen und sozialen Projekten sowie kommunikativen Strategien (eigentliche Raumpioniere)[12] nur in Hamburg-Wilhelmsburg zu finden, d. h. in dem Referenzraum, wo sozial-räumliche Transformationen mit einer gezielten stadtentwicklungspolitischen (Aufwertungs-)Strategie verbunden werden. Um die gebaute Umwelt bzw. städtische Freiräume tatsächlich zu gestalten bzw. zu verändern, bedürfen Akteure solcher finanzieller, institutioneller bzw. personeller „Kapazitäten“. Auch der politisch-strategisch „Aktive (Bürger) für lokale Lebensräume“ mit konzertierten Aktionen für eine sozialverträgliche Entwicklung (zwischen eigentlichen und etablierten Raumpionieren verortet) ist (nur) in diesem Referenzraum lokalisiert. Er verkörpert Raumpioniere (bzw. Ansätze von Raumpioniership), die mit einem breiten „Bürgerengagement“ auf eine lange und erfolgreiche „Entwicklungsgeschichte“ zurückblicken können und – geübt in der Auseinandersetzung mit Stadtentwicklungskonzepten – nicht nur sozial vernetzt und mit ihren Aktivitäten öffentlich ‚sichtbar’ sind, sondern auch auf der politischen Ebene agieren.

7 FAZIT UND AUSBLICK – MÖGLICHKEITEN UND HANDLUNGSSPIELRÄUME VON RAUMPIONIERSHIP IN DER QUARTIERSENTWICKLUNG

Im Rahmen dieses Beitrags wurde – vor dem Hintergrund eines Forschungsansatzes, der einen raumbezogenen Zusammenhang zwischen Wissen, Kommunikation und Handeln herstellt – ein empirisch differenziertes Akteursfeld beschrieben und auf ausgewählte Raumpioniertypen eingegangen. Dieses Akteursfeld umfasst sowohl potenzielle, eigentliche und etablierte Raumpioniere als auch pionierhafte bzw. engagierte Akteure. Es konnte verdeutlicht werden, dass deren „Absichten für den Raum“, das damit verbundene Handeln sowie die zugrundeliegenden Wissensbestände durchaus verschieden sind. Betrachtet man das identifizierte Akteursfeld im Zeitverlauf, haben Akteure unterschiedliche Entwicklungsoptionen als Raumpioniere, die im Hinblick auf die Entwicklung benachteiligter Stadträume Beachtung finden sollten.

Mit der Nutzung von Gelegenheitsstrukturen vor Ort setzen pionierhafte Akteure brachliegende Potenziale im Stadtteil wieder „in Wert“. Ihr Lebensstil und ihre Wertvorstellungen haben – in der Regel nicht intendiert – Einfluss auf die lokalen sozio-kulturellen Bedingungen. Optionen dieser Akteure für raumrelevantes Handeln bestehen in zwei Richtungen: Wenn sich ihre Bindungen an den Stadtteil verstärken, sie diese mit sozial-räumlichen Visionen verknüpfen, Projektideen dazu entfalten und dafür Umsetzungschancen sehen, können sie sich zu Raumpionieren entwickeln. Ebenso besteht die Option, dass diese Akteure den Stadtteil nach einer bestimmten Zeit ohne weiteres Engagement vor Ort wieder verlassen.

Raumpioniere im engeren Sinne, d. h. potenzielle, eigentliche oder etablierte Raumpioniere, haben eine große Identifikation mit dem Stadtteil oder Quartier, weil sie hier nicht nur Gelegenheitsstrukturen vorfinden, sondern auch Entfaltungs- und Freiräume für ihre eigenen Lebensentwürfe und/oder ihre berufliche Entwicklung sehen. Diese „Raumqualitäten“ verbunden mit sozio-kulturellen, baulich-räumlichen bzw. sozial-räumlichen Visionen bzw. Projekten sind ausschlaggebend für ihr lokales bürgerschaftliches und/oder professionelles Engagement. Da sie dies nur gemeinsam mit anderen Akteuren bewältigen können, entwickeln sie je nach Typus spezifische soziale Netzwerke und entsprechende kommunikative Strategien (Raumpioniership). Entwicklungsoptionen haben diese Akteure vor allem im Bereich zwischen eigentlichen bzw. etablierten Raumpionieren. Gegebenenfalls bestehen diese aber auch in Richtung engagierter Akteure, wenn (nur noch) bereits bewährte Engagementformen im Mittelpunkt des Handelns stehen oder in Richtung „Ausstieg“, wenn die Akteure das Quartier bzw. den Stadtteil verlassen, weil sie ihre Lebensentwürfe nicht mehr mit lokalen sozial-räumlichen Transformationsprozessen in Übereinstimmung sehen.

Eine weitere Akteursdifferenzierung durch die Bildung von Typen war nicht nur für die beiden Referenzräume aufschlussreich, sondern bietet auch im Hinblick auf Lösungen für lokale sozial-räumliche Probleme und die Anregung nachhaltiger Quartiers- bzw. Stadtteilentwicklungen Anknüpfungspunkte.

Aus einer „Bottom up“-Perspektive sind insbesondere die **„Gestalter von lokalen Lebensräumen“,** die **„Entwickler von Kultur- und Bildungsorten“** und der **„Aktive (Bürger) für lokale Lebensräume“** von

[12] Die „Veränderer von Stadträumen“ kennzeichnet, dass sie die visionäre „Veränderung von Orten“ in den Mittelpunkt ihres Handelns zur sozial-räumlichen Transformation stellen. Mit ihrer „auf Zeit“ angelegten und mit einer entsprechenden Ressourcenausstattung und institutionellen Verankerung verbundenen öffentlichkeitswirksamen Handlungs- und Projektorientierung nutzen sie den Stadtteilvor allem als „Bühne“. Lokalem sozialem Kapital messen sie dabei weniger Bedeutung zu als andere eigentliche Raumpioniere.

Bedeutung, da sie ihre sozial-räumlichen Visionen mit gezielten Aktivitäten bzw. einem kontinuierlichen Projektengagement im Stadtteil verbinden. Erstere können mit ihren experimentellen Ansätzen vor allem eine Vorreiterrolle bei der Initiierung von „Neuem" im Zuge sozial-räumlicher Transformationen einnehmen. Dies schließt sowohl die Mobilisierung von Ressourcen, die Motivation und das „Mitnehmen" weiterer Akteure im Stadtteil in ein „positives Umfeld" als auch die Abgrenzungen von Akteuren mit anderen Wertstrukturen ein. „Entwickler von Kultur- und Bildungsorten" sind dafür prädestiniert, in diesen Entwicklungsprozessen – über das eigene Projektengagement hinaus – auch als „lokaler Wissensspeicher", Kommunikator und Vermittler zu fungieren.

Aus einer „Top down"-Perspektive stellen sich die **„Veränderer von Stadträumen"** als besonderer Typus dar. Dieser hat durch eine entsprechende Ressourcenausstattung (wie die einer IBA) Entwicklungskapazitäten, die über Einzelprojekte und spezifische Themenausrichtungen hinausgehen, zur Verfügung und kann so nicht nur einzelne „Orte" im Kontext eines Projekts entwickeln, sondern auch nachhaltige Impulse für die bauliche, kulturelle und soziale Entwicklung eines ganzen Stadtteils im Zuge sozial-räumlicher Transformation setzen.

Für beide Perspektiven gilt, dass das mit Raumpioniership verbundene soziale Kapital – wie Gruppensolidarität, Vertrauen, (sozialer) Einfluss und Informationsaustausch (vgl. Jansen 2000) – als eine wichtige Ressource für Quartiersentwicklungen angesehen werden muss. Stadtentwicklungspolitische Ansätze, die darauf abzielen, soziale Benachteiligungen auszugleichen, Spannungen einzudämmen und Lebensqualität zu sichern, dürfen diesen lokalen Fundus nicht vernachlässigen, negieren oder unterschätzen. Dies impliziert, dass die Vorstellung davon, wie Lebensqualität gesichert werden soll bzw. was ein „Wohlfühlort" ist, sozial-raumspezifisch von den Engagierten und Betroffenen vor Ort sowie den Vertretern von Politk/Verwaltung bzw. Planung ‚ausgehandelt' werden muss. Weil Raumpioniere in einem Stadtteil davon unterschiedliche Auffassungen haben können, ist dies kein leichtes Unterfangen, wie beispielsweise in Wilhelmsburg heute deutlich wird: Trotz sozialer Vernetzung, kommunikativer Strategien und großen Engagements sahen „Entwickler von Kultur- und Bildungsorten" Ende 2011 im Bereich Kultur keine Möglichkeit mehr, mit der IBA weiter zum gegenseitigen Vorteil zusammenzuarbeiten (WIR 2011).

Für die Entwicklung neuer Ansätze in sozial benachteiligten und/oder peripherisierten Stadtteilen ist daher nicht nur eine detaillierte Kenntnis der Akteure bzw. Akteurskonstellationen (die solche Prozesse tragen können) und deren Kommunikations- bzw. Handlungsmuster (wie im Rahmen von Raumpioniership) wichtig, sondern auch ein genauerer Blick auf die dabei auftretenden Konflikte. In einem Folgeprojekt der Forschungsabteilung „Kommunikations- und Wissensdynamiken im Raum" mit zwei weiteren Referenzräumen werden im IRS bis 2014 „Städtische Raumpioniere im Spannungsfeld von ‚bottom-up' und ‚top-down' untersucht. Ziel ist es, durch die qualitative Analyse konflikthafter Governance-Prozesse, an denen Raumpioniere als zivilgesellschaftliche Akteure beteiligt sind, weitere Erkenntnisse zur kommunikativen Raumkonstruktion im Rahmen von Quartiersentwicklungen zu gewinnen.

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🏆 *reviewed paper*

Re-Mixing and Re-Using: the Urban Integration of the Specialized Filamentary Morphologies in Metropolitan Lisbon

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1 ABSTRACT

Twenty years after the consolidation of the administrative Lisbon's Metropolitan Area, its outcomes in terms of a trans-scalar approach to the region are still under development. In this sense, the planning of metropolitan Lisbon is confronted with a multitude of municipal, regional and national plans, acting at different scales, resulting in fractures and leftover spaces on its confrontation points, becoming potential interest areas for speculation and spontaneous urban developments. The consequences of this lack of territorial communication have an increasing presence in the landscape, resulting in the emergence of functionally specialized areas, in strategic points in terms of infrastructural connectivity but unrelated to the neighbor urban fabrics or city structure. At this redefining moment, the urban changes also take the form of obsolete urban areas and empty structures and in this sense, the re-colonization and the re-mixing of uses and urban elements is a key-element in the discussion of the metropolitan areas.

The increasing mobility, the consolidation of the infrastructural network and the resulting changes in the way of inhabiting the city have contributed to a growing urban polarization in metropolitan Lisbon. This network, consisting initially of a combination of harbor, railway and national roads has gradually been replaced by an articulated system of highways, that connect and structure the territory local and nationally. This change has created conditions for the emergence of functionally specialized urban formations, supported by the blurring of traveling distances and the high degree of connectivity. Hence, the network acts as catalyst for the polarization, characterized by the occupation of peripheral areas in strategic locations, creating filamentary morphologies along the highways – metropolitan filaments – with functions mostly related to the tertiary and quaternary sectors (logistics, retail, offices or R&D).

These changes reveal the diverse nature of the new specialized morphologies, spontaneously generated and unrelated to the formally recognized designs, through self-organizing processes invariably developed in parallel to the existing planning tools. Distant from the usual functional and formal logics present in the planning activity, it results of the interaction between the market laws and the layout of the mobility infrastructure (designed independently of the surroundings, aiming to establish the most efficient connection between its points). As the backbone for the new urban formations, the design of this mobility network, its access and connections influence the process of urban development, different from the traditional juxtaposition growth, with morphologies directly related to the infrastructure. According to their nature and location, these urban formations have its genesis related to production and distribution activities, in association with the railway and harbor development. Later, as a reply to new economic and social demands, some of these areas have become obsolete, as others have showed resilience in adapting and incorporating new activities in relation to the highway network. Nowadays, with a fast changing society and the different ways of living in the city, how can the metropolitan filaments re-adapt and re-mix the urban functions?

The morphological changes in Lisbon's territory reveal local features associated with specific geographic, historic, social and economic conditions, which require a multi-layer analysis to the recent urban formations and to their relationship with the supporting infrastructure. The research methodology is based on the identification and classification of specialized urban formations, based on field work analysis of metropolitan Lisbon; and morphogenetic analysis of the metropolitan filaments and their correlation with the overall metropolitan shape and the infrastructural network, based on the layering of cartography of different time periods: a) Until 1970: the harbor and the railway as the support of the industrialization and formation of the metropolis; b) From 1970 to 1990: the setting up of a high-speed road network and the terciarization of the territory; c) From 1990 to 2010: the consolidation of the highway network, the raise of the quaternary sector and the functional specialization of the metropolitan filaments.

2 METROPOLITAN FILAMENTS

The contemporary world is a set of constant and immediate changes that take place at a speed that makes its analysis and conceptualization difficult. These transformations are driven by aspects related to demographics, economics, mobility and connectivity [1], challenging the urban life and its classical paradigms by placing new questions to the cities. Lisbon is not oblivious to this international phenomenon that leads to interpretations of the current structure of the metropolitan territory as an expression of the contemporary culture. The modifications in the way of living and inhabiting the city have caused a fragmentation and a growing urban polarization [2], in which mobility shaped the morphology, with special importance since the introduction of car use in urban daily life, coupled with the increasing number of inhabitants and the need to respond to rapid changes of scale and uses. As result, have emerged new ways of living and socializing, new market logics and new urbanization, driven by the increasing movements in an urban extension that already does not follow the logics of continuity but of the connectivity promoted by the infrastructure network and the availability of building areas, new processes for distribution of goods and information, new forms of work and the changes of social structures (Portas, et al., 2011).

The mobility network of metropolitan Lisbon consisted initially on a combination of railroad, harbor and national roads and was gradually complemented by an articulated system of highways and freeways. This situation has created the conditions for the emergence of functionally specialized urban morphologies, supported by the blurring of traveling distances and the high degree of connectivity. Hence, the network acts as the main catalyst for the emergence of these urban formations characterized by the occupation of peripheral areas in strategic locations in relation to the network, creating filamentary morphologies along the highways, with a high degree of functional specialization [3] (metropolitan filaments). This increase of mobility within the metropolitan region has allowed for the displacement of programs that require large building areas to the outskirts, creating new monoprogramatic poles (Ascher, 2008), dependent on the center for population, supplies and equipment. These specialized areas are defined at the administrative level as clusters (business Area, Science Park, Business Park, etc.) and are deployed in still unoccupied spaces, whether rural or obsolete industrial areas, operating transformations supported by an urban marketing which promotes the proximity and access to the center, or the effective capacity of connection to national/transnational roads and railways or to the airport. With different origins, these urban morphologies tend to be subsidiary of the center, contributing to a growing spatial and social segregation.

The metropolitan filaments formalize a private response to market demands and are usually spontaneously generated and unrelated to the formally recognized designs, through self-organizing processes developed in parallel to the existing planning tools. Distant from the usual functional and formal logics which are present in the planning activity, they result of the interaction between the market laws and the layout of the infrastructure elements, leading to their disorganized image, revealing a lack of integration between its parts – the roads, the new built elements and the physical environment (natural and built). The thickness of the road [4] is, then, dependent on the willingness of the market, distanced from the urban planning and not resulting as an integrated project of these three elements, but as a lack of the understanding of the implantation logics of the recent urbanization and an inability to recognize the spatial structure that supports the landscape.

The territorial changes in metropolitan Lisbon over the past decades allow for an identification of the areas that showed the capacity for regeneration and adaptation, as well as others that have been abandoned

[1] The ability that a point has to be integrated into a network of roads and canals, using multimodality situations that allow mobility, both in terms of transport, telecommunications, water supply, gas or electricity. On the one hand it brings individuals and spaces together, but at the same time allows for the dispersal of urban occupation.In GRAHAM, S.; MARVIN, S. Splintering urbanism: networked infrastructures, technological mobilities and the urban condition. London, 2001.

[2] Set of urban formations that appear impelled by the metropolitan mobility infrastructures, supported by the accessibility or visual display and by activity enclaves based on synergies and location economies. In FONT, A.; LLOP, C.; VILANOVA, J. La Construcció del Territori Metropolità. Morfogènesi de la regió urbana de Barcelona. Barcelona, 1999.

[3] With programs related to secondary and tertiary sectors (manufacturing and distribution) and the tertiary and quaternary sectors (trade, services and research & development).

[4] Formed by the relationship between the road, the growth and physical context. In SECCHI, B. Lo spessore della strada. Casabella, 553/554, pp. 38-41. Milan, 1989.

revealing an inability of reply to different demands. The metropolitan filaments were defined over time in order to meet the needs of the urban structure, taking advantage of the physical and infrastructural conditions without an overall vision. The result is present in metropolitan Lisbon where the segregation of functionally specialized areas led to isolated and abandoned areas where their main industrial function ceased. There is a great range of causes that have driven to this phenomenon in the Lisbon's metropolitan territory, but the paper focuses on three main axes related to the analysis of the undertaken changes at the level of the urban systems, economic activity and urban life.

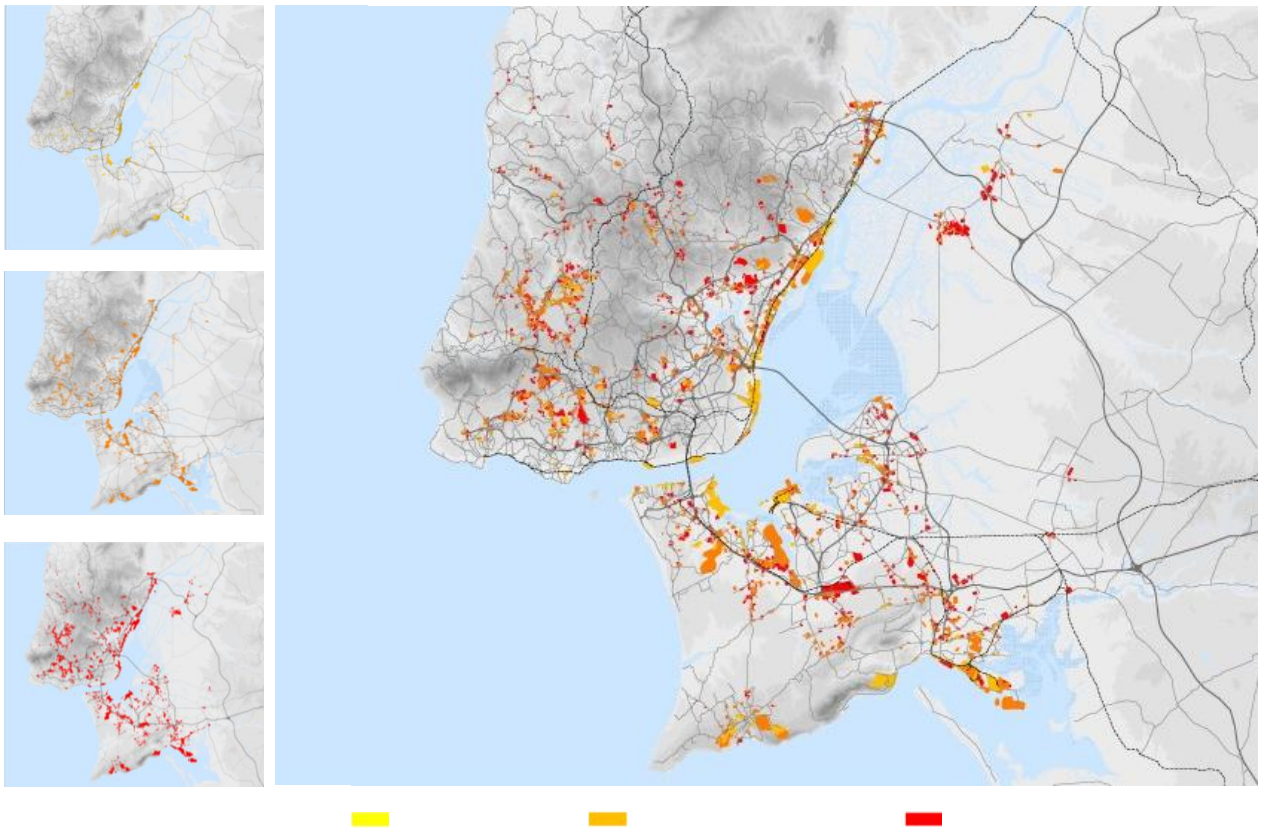

Fig. 1: Space occupied by economic activities connected to the secondary, tertiary and quaternary sector) in Lisbon's metropolitan territory, until 2010. Own elaboration, 2012.

In a fast-changing world, when vast industrial areas are being abandoned and high technological clusters are emerging, the main question driving this analysis lays on how the metropolitan territory can regenerate, adapting and replacing its obsolete areas and creating a different layer of occupation and use. In order to understand the process that led to the contemporary specialization of metropolitan Lisbon, its recent changes and their territorial impact regarding the formation and consolidation of the metropolitan filaments, is presented divided into three time periods: until 1970, from 1970 to 1990 and from 1990 to 2010.

3 THE TRANSFORMATIONS IN LISBON'S METROPOLITAN TERRITORY

3.1 Until 1970: the harbor and the railway as the support for the industrialization and the formation of the metropolis

The configuration of Lisbon as a metropolis was formalized from the 60's onwards, vertebrated by the mobility infrastructure, which contributed to a distended occupation of the territory that extended its physical limits and contributed to a suburban growth concentrated in industrial and residential areas, related to the railways, existing since the nineteenth century and the new highways [5].

[5] In 1944 was opened the section of A5 between Lisbon and the National Stadium, in 1961 was opened the section A1 between Lisbon and Vila Franca de Xira, and in 1966 was inaugurated the 25 de Abril bridge and the section of A2 between Pragal and Fogueteiro.

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Despite its neutral position in the World War II, Portugal had an active role in the supply of goods to the involved parties. During this period, the growing importance of the industry was formalized in the implantation of various factories in the region of Lisbon, driven by the increase of exportations and the investment in the production for domestic consumption. Although Portugal was fighting the colonial war, during the 60's there was a growth supported by the expansion of the secondary sector associated with the transformation of raw materials from the colonies, as well as the war industry (Conceição ; Heitor, 2002).Thus, in a region with an incipient presence of the tertiary sector, the industry was the main economic engine, establishing itself as a set of urban development centers, creating jobs, attracting people, other industries and associated services, with a logic of dynamic urban growth.

One of the main characteristics in the genesis of today's identifiable metropolitan filaments is the presence of this industrial structure as the engine for the location of urban settlements, which allowed for the establishment of subsequent activities. Although many of these factories are currently inactive, abandoned or converted, their location logics are present in the territory, in the dialogue with the urban fabrics and with the surrounding infrastructure. Their strategic location with regard to the physical support (topography, water courses, solar orientation, wind, etc.) and the availability of land for construction and connection to the infrastructure (in order to transport raw materials and goods) laid the foundations for the creation of industrial axes. This close relationship between harbor, railroad and the industrial location is present in metropolitan Lisbon: until the consolidation of the high-speed road network, the industrial freight was materialized by the rail and harbor infrastructure, which articulation is evident in the strategic location for a regional and international distribution of goods, by land or sea/river. The Tagus estuary offered exceptional conditions in physical terms as in relation to Lisbon, which catalyzed a development and investment in harbor infrastructure, both in general cargo – as in Alcântara or Xabregas – or as private terminals connected to large industrial units – as is the case of the Sacor refinery in Cabo Ruivo, Lisnave in Margueira, arsenal in Alfeite, Siderurgia Nacional in Seixal or CUF in Lavradio. On the other hand, the Sado estuary was the other main offloading point for the goods produced in the factories of the Setubal peninsula. The development of the harbor had a similar organization to Lisbon, with the transport of general cargo through the terminal of Fontainhas, or via private terminals associated to industries such as Movauto (automobile) or Inapa (cellulose). The metropolitan rail network consisted of five lines, with three serving directly the city of Lisbon, in use since the late nineteenth century – the Cascais line, the Sintra line and the North Line – which allowed for commuting and the expansion of the residential area of Lisbon. The lines of the North, West and South were part of the national mobility network for the transport of passengers and goods, and played an important role in the location and development of activities that would formalize the metropolitan filaments.

These industrial sites had a strong territorial impact as they occupied vast areas, generally located outside the city limits, in a close dialogue with the infrastructure. These industrial areas generated a great attraction of inhabitants and urban growth induced by the job opportunity, as well as the facilities created by the factories for their employees (housing, schools and recreation areas). Later, when these industries became inactive, they were already integrated in dense urban fabrics that developed in their surroundings and present an interesting opportunity for re-mixing the programs and re-using their obsolete space.

3.2 1970-1990: the establishment of a high-speed road network and the tertiarization of the territory

During the 70's, Portugal has undergone profound changes, with particular emphasis in Lisbon, as the capital of the country and stage of various population migrations. The end of the regime and the establishment of democracy the in 1975 were surrounded by a climate of growing political, social and economic instability, associated with fast population growth, the global oil crisis and a raising inflation that led to various social upheavals and strikes (George ; Morgado, 2007). The industrial sector suffered with these changes, as well as with the loss of raw materials from Africa with the end of the colonial war in 1974, resulting in a fall of manufacturing employment. On the other hand, a flow of more than half a million Portuguese rushed to Lisbon escaping the war in the former colonies (Salgueiro, 2001). This set of conditions shaped the phenomenon of the explosion of Lisbon's outskirts, explained by the need for housing a large number of families, stressing the territorial dispersion along the axes defined by the railways and highways, resulting in a high-density urbanization and rapid urban growth. Joining the European Economic Community in 1986 was the turning point for the process of stabilization and democratic consolidation of the country. The opening to the international market and the access to the European funds helped to bridge the structural

delays and boost the economy. This was the moment of transition to the following urban cycle, through the construction of the road infrastructure planned in the Master plan of the region in 1964, sanitation, equipment and the regeneration of degraded neighborhoods.

The metropolitan growth up to 1990 witnessed an expansion of the metropolis on the north bank and the industrial conquest of the south bank of the Tagus, through the establishment of industrial units with high technological component requiring large areas of deployment, accompanied by an accelerated residential development. During the 70's and 80's significant territorial transformations occurred, in which the functionally specialized occupation of strategic areas, allowing for the definition of axes which began the formalization of today's metropolitan filaments. The importance of the harbor and railway in the transport of goods and its consequences in the territorial hierarchy were gradually replaced by the high-speed road network. From the 80's on the territory was structured by a metropolitan system of highways which overlapped and absorbed the prior national road system, consigned to the accessibility at local level – the existing national roads became second-degree distribution elements, that vertebrated an urban growth induced by the higher-order network, with a growing importance in the articulation with the exits of the highways, railway stations and harbors. The process of expansion of the network was based on three main existing axes that have undergone extensions and enlargements. This restructuration, coupled with a growing motorization, introduced different urban experiences that diluted the limits and the central importance of Lisbon. The result was a distended occupation of the territory, as the metropolitan structure was transformed from an organization based on the accessibility to a single center, to an infrastructure network that promotes mobility between various points of great connectivity, creating the foundation for a polynuclear structure.

The pace of the industrial growth had slowed down after 1973, with increased expression in the 80's. This situation is explained by the international economic downturn in the demand for the exportation products, along with the economic restructuring connected to the introduction of new technologies in the 60's leading industries (siderurgy, heavy metalworking, shipbuilding and ship repair). Along with political changes and following the international trends driven by the market opening, the region suffered profound economic changes related to technological and transport improvements. The main result is present in the shift from an economy centered on the manufacturing sector to a service economy. The industrial production model of concentration in large areas with high territorial presence was gradually altered to a post-Fordist model, characterized by the segmentation of the production cycle and its consequent relocation to distant places, inducing the growth of processing and distribution activities. On the other hand, while the industrial activity slowed down, the service sector showed an increasing dynamism, associated with support services to economic activities, storage, distribution and retail. There was, then, a relocation and distribution of services that underscored a trend towards the functional grouping of activities, with the development of industrial and storage areas outside the city in connection with the main roads, in a centrifugal movement away from the harbor (Salgueiro, 2001). Therefore, it had been initiated a new process of hierarchy of the territory – a topological organization of the metropolis – defined by the degree of connectivity of each location in relation to the mobility network. This resulted in a set of opportunity spaces based on the ability and the speed of connection between the points of the network, at a metropolitan and national level, in which the urban growth was connected almost exclusively to the impact of the infrastructure (Morgado, 2005).

The main territorial consequences of these changes are present in the abandonment and gradual reconversion of large industrial areas and the shift to concentrated areas of small and medium-sized logistic units (assembly, processing and distribution of products). In contrast to the previous period characterized by high impact territorial interventions, these decades were marked by the atomization of smaller scale activities through spontaneous processes guided by location logics related to the ability of movement within the region/country. The agglomeration of these activities and its resulting urban morphologies led to the definition of functionally specialized axes in the territory that would be consolidated during the next period. The analysis of these morphologies allows for the identification of two types of relationship with the former industrial layer formed up to 70's: on the one hand, the emergence of urban clusters in previously unoccupied locations, taking advantage of its newly created connections to the infrastructure network and, on the other hand, the intensification and consolidation of the urban morphology from the existing industrial structure.

3.3 1990-2010: the consolidation of the highway network and the functional specialization of the metropolitan filaments

This last period has its origins with the accession of Portugal to the EU, in 1986, which consequences are felt during the 90's with the solidification of democracy and political normalization, allowing for the consolidation of the metropolis and its consequent modifications. The most visible territorial impact occurred in the boost of infrastructure combined with a functional complexity, which allowed for alternative centers to Lisbon. The occupation process that had started in the 80's continued, with urban morphologies directly related to the metropolitan mobility network, creating a topology that has steadily grown in importance in the structuring of the territory. The capital injection combined with the modifications in international relations and the globalization, has originated the changes that have occurred in the industrial and distribution sector. The tertiary and quaternary [6] sectors grew, gradually replacing the secondary sector, determining the obsolescence of the industrial and harbor areas and originating new opportunity areas integrated in the metropolitan system.

During the 90's, by imposition of the European Community were defined the legal conditions for the realization of land management plans, such as the municipal master plans, urbanization plans and detailed plans, which corresponded to a decisive stage for the understanding of the region as a whole, formalized with the establishment of the Lisbon Metropolitan Area in 1991. However, the planning activity couldn't always keep pace with the speed of the social, economic and territorial transformations that took place during this period. The carrying out of these municipal plans to the fullest extent of the metropolitan area showed a great political, technical and financial effort, but has seen its effectiveness compromised by the lack of coordination between the municipal and regional level, giving rise to a set of fragmented views of the region with territorial fractures that reveal a lack of integrative policies and of spatial planning strategies (Bruno Soares, 2003). Taking advantage of this lack of dialogue between the plans, arose the spontaneous urban developments, of private initiative and driven by the market laws, which seek peripheral locations with efficient road connections, forming anonymous agglomerations that can be found spread throughout Lisbon's metropolitan territory.

Great advances were achieved at the infrastructure level, at the mobility network, with the set up of a system of highways along with improvements in existing railway lines, which created a more homogeneous distribution of accessibility and enhanced the emergence of new polarizations. The impact of this metropolitan network, with national and international connections – through the construction of road and rail connections with Spain, harbor and airport improvements – was felt in the definition of various forms of centrality in the territory, which originated a change of location logics, with a more comprehensive mapping process, overcoming the administrative boundaries and establishing international connections for the distribution and commercial purposes. On the other hand, the technological developments, the access and the widespread use of new telecommunication technologies have reduced the importance of the physical presence in activities related to intellectual services. This situation enabled a freedom that was formalized in the relocation of corporate headquarters and high technological industries to business and technology clusters, physically distant from the center where they were traditionally located. Many alternatives to the congested center of Lisbon arose, in locations that offered a set of buildings designed for the specific use associated with the quaternary sector.

The development of functionally specialized urban morphologies created spaces targeted for efficiency, leading to the abandonment of the programmatic and scale mixture that is characteristic of the canonical in the city. Hence, the territorial hierarchy originated by the connectivity boosted the growth and specialization of the metropolitan filaments. This is transversal phenomenon to various metropolises, based on the synergies created between the constituent parts through functional complementarily between research, development and production as well as production, distribution and trade (Vecslir, 2007). It is possible to group them in programmatic typologies: the technological and production specialization, leisure, retail and distribution specialization and the specialization associated with the production, processing and distribution.

[6] The quaternary sector (or superior tertiary sector) of the economy is an expansion of the three traditional sectors, which classifies the activities related to intellectual services, specifically, with the generation and diffusion of knowledge: culture, education, information technology, research and development.

Fig. 2-4: Programmatic specialization areas: Porto Salvo (technological and production); Alfragide (leisure, retail and distribution) and Feijó (production, processing and distribution). Own elaboration, 2012.

The technological and production specialization consists in a set of business incubators, technology parks, business centers and logistics centers that associate corporate headquarters, financial activities, research and development and technology-based industries. The most paradigmatic example of this specialization is in the area between Lisbon, Cascais and Sintra (conditioned by the highways A5 and IC19), which concentrates a large number of business parks induced by the success of Tagus Park – an urbanization plan with an area of 360 hectares, from 1995, resulting of a public investment that combines a municipal and national strategy in to order to invest in the modernization and technological innovation as a means of increasing the international competitiveness of the economy, linking teaching to research. These clusters are supported by the connectivity of the road and rail network for the transport of their co-workers and clients, as well as the consolidated urban settlements and proximity to Lisbon.

The concentration of leisure, retail and distribution spaces consists in an agglomeration of retail, shopping centers, supermarkets and leisure, sports and hotel activities that arises in peripheral locations close to the center. Often these areas are associated with service activities, and use the same logics that reveal a dialogue between the degree of coverage of a specific location in terms of population (the radius of influence in terms of distance) and site conditions (availability and price of land, municipal plans, customers, etc). In this sense, the areas of Alfragide, or the shopping areas of Alcochete and Almada are examples of commercial areas combined with logistic units and services. Their strategy reveals a metropolitan approach by taking advantage of still unoccupied areas that were formerly rural or located in industrial parks, but recently integrated into the mobility network, which allows for the attraction of clients at large distances.

The concentration of production, processing and distribution, through a combination of industrial buildings with commercial, exhibition, storage and logistics activities, is the result of the adaptation to the industrial progress and modernization of the productive sector. The consequences of this change have been felt after the 80's with vast abandoned and obsolete industrial areas, and the shift towards a concentration of small and medium enterprises in industrial parks or logistics centers, also supported by the network connectivity, with special focus on the transport of goods. Based on its favorable conditions, the axis between Xabregas and Vila Franca de Xira, has suffered a gradual replacement of the industrial concentration for a combination with storage, display and trade. A similar process led to the intensification of areas that have emerged in the previous period, associated with industrial activities and storage along the A2 highway between Almada and Palmela, combining exhibition, storage, trade and distribution (mainly automobile or building materials).

4 RE-MIXING AND RE-USING: FROM AN INDUSTRIAL SITE TO PARQUE DAS NAÇÕES

As a result of the technological changes and keeping pace with the general process of obsolescence of heavy manufactory, several examples of abandon of former industrial sites may be found in metropolitan Lisbon. These spaces became of great interest in terms of centrality and touristic potential along the river front and become impulsionators of urban regeneration – the former industrial sites of Lisnave (Margueira), Siderurgia Nacional (Seixal) or CUF (Lavradio). Although several of these sites have been object of studies and proposals, the processes are dependent on the administrative approvals as well on the funding and investment priorities. The most paradigmatic contemporary process of re-mixing and re-using the territory is the process that originated the Parque das Nações, a major urban regeneration scheme developed for the site that hosted the international exhibition Expo '98.

Previously an industrial area with great dynamism, the site was part of the axis that extended along the river from Xabregas to Vila Franca de Xira. This axis aggregated the first industries of Lisbon in articulation with the estuary, the railway and the highway. The urban plan was based on the deactivation of the industrial area

of Cabo Ruivo, formed by the Sacor oil refinery operating since 1947, the city slaughterhouse, the general war material deposit and the major waste and water treatment of the city. The site at the east end of the city, located between the municipalities of Lisbon and Loures, was chosen as it offered the opportunity to regenerate a part of the city giving shape to urban policies which reflected a more critical and interventive approach to the urban structure.

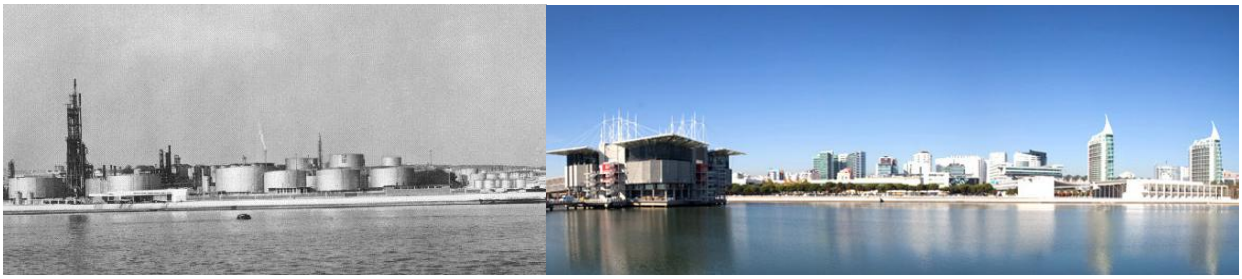

Fig. 5-6: Sacor refinery in Cabo Ruivo (1961) and Parque das Nações (2011). Sources: Serôdio, A. in arquivomunicipal.cm-lisboa.pt (consulted 23.01.2012) and portaldasnacoes.pt (consulted 20.03.2012).

The process started in 1993 with the creation of a private company with public funding (Parque Expo) that would be responsible for all the development and implementation of the plan, and in 1994 a master plan was approved, establishing the master plan of the area as well as six detailed urban plans. The urban design presented as goals the creation of a metropolitan centrality and of an area with environmental quality, revealing the strategy to reinforce the image and competitiveness of the city. The requalification brought improvements in the infrastructures (the construction of the bridge Vasco da Gama, the extension of the metro line, etc.) that allowed for the creation of a new centrality in the metropolitan area, with 340 hectares (from which the exhibition occupied 60 hectares). After the exhibition some of the key buildings remained, creating the multifunctional centrality aimed by the plan, as well as hotels, offices, housing and public spaces in the form of urban park, squares and a river promenade. The program of the operation proposed 638.000 m2 of housing, 240.000 m2 of multi-uses (offices, shopping and others), 85.000 m2 of industry and 467,000 m2 of equipments. Housing and multi-uses/equipments are the dominant urban uses, corresponding to 45% and to 50% (respectively 17% + 33%) of the total 1.430.000 m2 of construction. The urban design technique for functional organization defined areas for equipments (corresponding to the area of the exhibition, including small restaurants and bars); the mixed area (corresponding to the interior zone between the equipments area and the railway including offices, hotels, shopping and residential buildings) and the housing areas in the north and in the south (Costa, 2006). Divided in two phases, the master plan is nowadays fully implemented and the area presents 20.000 inhabitants and 20 million visitors/year, as it constitutes one of the touristic spots for foreigners but also Lisbon's inhabitants (mostly at the weekend).

Fig. 7: Urbanization Plan of Parque das Nações, 1991. Source: GEORGE, P.; MORGADO, S. "Área Metropolitana de Lisboa 1975-2001. De la monopolaridad a la matricialidad emergente = Metropolitan Area of Lisbon 1970-2001. From monopolarity to an emerging matrix pattern" In FONT, A. (ed.) L'explosió de la ciutat : morfologies, mirades i mocions sobre les transformacions territorials recents en les regions urbanes de l'Europa Meridional, pp. 62-85. Madrid, 2007 (reviewed edition).

As part of one of the oldest metropolitan filaments of Lisbon, located in an area in close articulation between the river and the railway and highway, the area of Parque das Nações presents a radical intervention in a segment of an area with great potential for urban regeneration (the axis Xabregas- Vila Franca de Xira). The importance of this urban project doesn't rest only on the created spaces, but also on the opportunity to regenerate obsolete sites of the city by proposing new infrastructure, programmatic mixture and allowing for the integration and dialogue with the surroundings and with the river. Catalyzed by the international event of Expo '98, that acted as the engine for the requalification of the oriental part of Lisbon, the adopted strategy was based on re-mixing programs and creating an articulation between the city and the former industrial

harbor area, by the use of planning instruments (master and detail plans). The example of Parque das Nações allowed for opening the debate about urban regeneration of brown fields in Lisbon and the metropolitan integration of former industrial peripheral areas.

5 CONCLUSION

The current organization of Lisbon's metropolitan territory is the result of a widening and intensification of the structure outlined in the 60's, followed by an urban explosion in the following decades that has led to the present redefining moment, when the future of the metropolis should be questioned and discussed.

The establishment and consolidation of the metropolitan filaments consists in a dynamic process of layering of the territory that has been pointing towards an increasing functional specialization by the concentration of complementary programs, without a programmatic mixing. The mobility network played a decisive role in the establishment of the activities and the occupation of the territory, along with the natural conditions of support, the urbanization and, later, the palnning activity. Thus, urban morphologies emerged, related to activities logically located in a close relationship to the degree of connectivity offered by the mobility network. In this way, the territorial hierarchy is defined by its connectivity were the airport, harbors, railways and the highway system form the high-speed mobility structure (at regional, national and international level), and the national roads systems ensure the local level of distribution and accessibility. It is the dialogue between these two systems that allows for the development of the metropolitan filaments along the transversal axes (national roads), that communicate with the high-speed network.

The origins of the metropolitan filaments reveal a response to the metropolitan demands, structured prior to the planning, related to the settlement of the industrial fabric until the 70's. Since the mid-twentieth century, the close relationship between the railroad and industry was present as an urbanization and economic engine for metropolitan Lisbon. After the 70's, this reality was replaced by the territorial relationship established between the high-speed road network and logistics, exploring different locations that coexisted and complemented the previous industrial layer. The 90's transformations, the deindustrialization process, the current functional specialization and the growth of the quaternary sector originated new (physical and virtual) spaces and created territorial scars related to the abandon of industrial areas, encouraging the discourse of urban regeneration and occupation by new uses.

At a metropolitan scale, the intensification of the specialization of the territory has created axes where the absence of planning originated the segregation and the lack of communication with the surrounding urban fabrics. The recent metropolitan changes have created vast unoccupied areas as the result of the abandon of industries, creating empty spaces and that can be seen as an opportunity to regenerate and adapt to the contemporary demands. The presented example of the regeneration of the area of Parque das Nações was an exceptional process that drew the guidelines for preceding urban regeneration processes. Although there have been punctual actions of re-mixing and re-using obsolete industrial areas, there is still a great challenge in creating overall strategies for integration and re-use of the metropolitan filaments in the urban structure of Lisbon's metropolitan territory. This is one of the biggest urban challenges for metropolitan Lisbon in the near future.

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Real Estate Taxation in Poland and its Influence on Spatial Development

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1 ABSTRACT

Taxes are the price we pay for public goods, and property taxes in particular are the price for local infrastructure. Theory says that in order to compensate for the „unearned" income, tax contributions should be proportional to the gains from public investments. However, in practice this issue turns out to be very complex, and different countries have very differentiated property taxation systems. For example, either the whole property (land with improvements) or only land may be subject to taxation. Also, the tax rate may be based on property value, on its size or on both of them. In some countries, for example in Poland, apart from regular real estate tax, other taxes or fees may be occasionally imposed, what makes the issue even more complicated.

Depending on specific regulations, real estate taxation may cause various social and spatial redistributive effects. Generally speaking, the lower is the tax in relation to the value of public investments, the higher the attractiveness for private investments will be. The aim of this paper is to look at the relationship between real estate taxation and spatial development processes in Poland. In the first part of the paper the question will be addressed, how just and effective is the current system of taxation, or, in other words, what redistributive effects are likely to occur? In the following part possible alternative solutions will be considered, which can be drawn both from the experience of other countries and from theory. Finally, in the conclusion some remarks will be made on the role of real estate taxation in urban development and urban policy.

2 REAL ESTATE TAXATION IN POLAND

2.1 Historical context

Taxes on property are probably the oldest form of taxation. It was a common rule in the Middle Ages that only the landowners should bear the cost of national defence. Obviously, most taxes in that time were paid by the gentry, but as the rulers realized how much income does urban land generate, also the merchants and artisans were asked to pay their contribution to the crown. Not to mention that the privilege to own land in a city (i.e. to gain "citizen" rights) was related to the obligation to defend it. In Poland a medieval property tax was called "szos" (the name is derived from a similar German tax "schoss").

In more recent times (after WWII), real estate taxation in Poland has been influenced by the socialist ideology. The aim was to achieve a communist society, where there would be no private property, and consequently no market, values nor prices. Yet, socialism – the official ideology of Polish People's Republic – was only "the way towards" communism, so the actual socio-economic system was somewhat mixed. In contrast to the other countries of the Soviet Block, the expropriation of private landowners was only to some extent successful (the capital city of Warsaw is a notable exception). However, the government often failed to recognize differences in land value, which obviously brought many negative consequences. "Planning disasters", like the location of a heavy-polluting steel plant close to the historical city of Cracow, are only the most spectacular of them.

However, in spite of the doctrinal neglect of property values, a decree was passed in 1946 by the responsible minister (a decree was a typical for that period form of legislation, a substitute for a bill), which stated that real estate should be taxed according to the rental value. The rates of property tax were set on a high level: from 20% up to 30%, but only private property was subject to taxation, while the state-supported cooperative ownership was tax exempt. Having in mind the general political climate of that time, such form of taxation might be seen as a means of repression against the private sector. The same decree also allowed local authorities to introduce a number of additional property taxes: a dwelling tax paid by tenants, an "urban tax" for the purpose of covering the costs of road construction, and also a curious "tax on excess housing space".

The system of real estate taxation under socialism was quite complicated, and especially in the early years it was frequently modified. For the purpose of this paper it is interesting to ask when and how taxation based on value has been substituted by taxation based on size. This change did not take place at once, but rather in

several steps. Notably, a decree from 1955 stated that vacant land should be taxed on the base of size, not value, and a 1975 bill applied this rule also to non-rented buildings. There were also several other more or less significant modifications, but until 1990 the system remained mixed. Then the political conditions changed, and in 1991 the new non-socialist government passed a bill on local taxes [1], stating that the tax should be based on property size, not on value. Having in mind the official aim of creating a free-market economy, such regulations might seem a little odd, but at that time the property market has not been well developed yet, so the bill might have been seen as a temporary solution. However, this system of taxation remained largely unchanged in force until today.

2.2 Property tax today

Real estate tax in Poland is imposed on most property, except from rural land and forests, which are subject to special taxes. These taxes are not covered by this paper, and neither are taxes on transfer of property, since it is assumed that they have no or only marginal impact on spatial development. Property tax rates are set by municipal councils, but they must not exceed maximal rates which are published by the Ministry of Finances. These rates are updated yearly on the base of consumer price index. For the year 2012 the maximal rates are as follows (table 1):

Maximal property tax rates (PLN per sqm):	Land	Buildings
Commercial use	0.84	21.94
Housing	0.43	0.70
Other (including facilities of public purpose)	0.43	4.45-10.24

Table 1. Maximal property tax rates for various uses in the year 2012. Source: Ministry of Finances. 1 EUR = ca. 4 PLN

It is worth noting the large difference between the rates for commercial and housing buildings. However, these data tell us only a little if they are not related to income and property price data. According to the Central Statistical Office (Główny Urząd Statytstyczny, GUS), the average salary in Poland amounted to 3435 PLN in 2010. Yet, one must have in mind the income gap between urban and rural areas, which is up to about 50%. A similar gap can be observed in the case of property prices. Substantial price increases have occurred following the EU accession, especially in the largest cities. Prices of land for construction vary depending on region from 30 to 280 PLN/sqm in the case of housing and from 40 to 250 PLN/sqm in the case of services. Obviously, in the capital and other important centres the prices are much above the average: land for housing costs 1200 PLN/sqm in Warsaw and 650 PLN/sqm in Poznań. [2] Housing prices have nearly reached Western-European levels: in a regional centre like Poznań it is difficult to find a dwelling below 4000 PLN/sqm, and in Warsaw prices as high as 6000 PLN/sqm are considered a bargain (certainly, such dwellings can be found only at the outskirts). Prices in medium-sized cities are up to 50% of the capital level, and in rural areas it is a common practice to cut the costs by own work input.[3]

On the base of the available data we can roughly estimate that in the case of housing use, the property tax may reach about 0.1% of value in small cities and rural areas. In large urban agglomerations, however, the tax burden will be much below that level, even if tax rate was set to maximum, which is typically the case. In either case, the property tax burden makes up only a marginal share of the average household budget. Yet, assuming that the local governments aim to maximize their profits, urban and suburban households will be generally better off than the rural ones. The case with commercial buildings is a little different, since the tax rate is over 30 times higher than the respective rate on housing. In small cities and rural areas the tax burden may even exceed 1% of property value, but in the largest cities, and especially in the CBDs, it will be typically below that threshold.

[1] Ustawa z dnia 12 stycznia 1991 o podatkach i opłatach lokalnych (Act on Local Taxes and Fees). All legal acts and other sources of law in Poland can be found at: www.isap.sejm.gov.pl.

[2] Data on land prices were estimated by consulting company "Promocja", www.sekocenbud.pl.

[3] A reliable source of housing price data is The Polish Bank Association (Związek Banków Polskich, www.zbp.pl). However, these data cover only the largest cities. Moreover, the averages tend to be elevated by the prices of expensive apartments, which in fact make up a rather small share of the market. For the purpose of this paper, these data have been confronted with offers available on the internet.

Municipalities may differentiate tax rates according to location, age, technical standard of the building, and the kind of commercial/social activity. However, it is very unlikely that the municipalities ever use this option, since it would require them to run a rather costly quasi-valuation procedure at own cost, and even then they would not be allowed to raise the rates above the maximum. Finally, it is worth noting that the bill contains a very long catalogue of tax exemptions. Among others, all universities and colleges are exempt from the tax, and probably the most curious exemption has been granted to the Polish Association of Allotment Holders, which appears to be a surprisingly strong lobby institution (many allotments are located on valuable urban land). Other tax exemptions may be granted by the municipal council.

2.3 Property tax in the fiscal system

As shown above, the actual burden of the property tax in Poland is very low in the case of housing, and moderate in the case of commercial use. Altogether, the property tax makes up a rather small share of all public revenue in Poland. Other taxes, in particular value added tax (VAT), excise duties, personal income tax (PIT), and corporate income tax (CIT) bring much more revenue. However, most of this revenue is collected by the state budget, while the property tax is especially important for the municipalities (table 2):

Tax/recipient:	Municipalities (gminy)*	Counties (powiaty)	Regions (województwa)	State	Total
VAT	-	-	-	107.9	107.9
Excise duties**	-	-	-	55.7	55.7
PIT	23.2	2.8	0.9	35.6	62.5
CIT	2.0	0.1	3.9	21.8	27.8
Property tax	15.1	-	-	-	15.1

Table 2: Revenue from selected taxes (billions PLN) in Poland by recipients (2010). Source: Ministry of Finances and Central Statistical Office. * Including large cities with county status. ** Total excise duties on energy sources, alcohol and tobacco.

The fiscal system in Poland is a centralized one. The most important taxes are collected directly by the government. Local self-governments (municipalities) charge several taxes, among them a vehicle tax, an inheritance tax, and even a dog tax, but the property tax is by far the most important of them. Municipalities also receive a proportional share of PIT and a much smaller share of CIT. Sub-regional and regional self-governments (counties and regions) may not impose taxes on their own, but only receive a small share of income taxes. All levels of self-government are also supported by subsidies from the state. In 2010 the municipalities received about 34.5 billions PLN of the general subsidy (subwencja ogólna), which is mainly intended to finance the system of primary education. Also, since the EU accession the self-governments, mainly the municipalities, have received structural funds for investment purposes. In the period from 2006 to 2009, total transfers to municipalities exceeded 12 billions PLN.

A remarkable observation can be drawn from the comparison of the tax burden of different production factors. Traditionally three factors of production are differentiated: land, capital and work (recently, there has been a tendency to add technology as a fourth factor). From these three, work is by far the most heavily taxed one: apart from personal income tax, there are also health care and social security contributions, which in fact yield even more revenue for the public finances. On the other hand, land is taxed on a very small rate, even compared to buildings, which are classified as capital assets. Large differences in the tax burden may lead to a tendency to reduce the usage of the most taxed factor (in this case, employment) on the one hand, and use excess amounts of the less taxed factors on the other. A study on the impact of taxation structure on economic growth in OECD countries has shown that countries with higher income taxes tend to perform worse than average. On the other hand, taxes on immovable property turned out to be the most "growth-friendly" (Arnold 2008).

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3 REAL ESTATE TAXATION AND SPATIAL DEVELOPMENT

3.1 Spatial development in Poland

Property sector in Poland has developed very rapidly in the last years. This is a catching-up development following many years of stagnation. Large scale state-subsidized housing construction programs of the 1970s ended up in the financial and economic crisis of the 1980s, from which the property sector was slowly recovering over the next decade. State financing ceased, and private financing was not available in sufficient amounts. This situation started to change when foreign capital flowed into Poland as the country moved on the path of European integration. With increasing purchase power, and especially due to better financing conditions (low cost mortgages), the property sector got a new impulse. The accession of Poland to the European Union (2004) symbolically marked the transition towards consumption society. Translated into the spatial language: new residential complexes, office "parks" and shopping facilities, all equipped with large amounts of parking space, and sometimes – but rather exceptionally – accompanied by other functions, for example parks or cultural facilities, have spawned in and around the largest cities. For Polish cities, which under socialism remained rather compact, land consumption has now become an issue.

The system of spatial planning in Poland has been criticised many times for its inability to manage urban growth. Municipalities have been charged with the main responsibility for spatial policy, which they under the given circumstances can hardly fulfil. Local authorities have a very imperfect set of planning instruments at their disposal, and they are not very keen to use them, for economic reasons, as will be explained in the following part of the paper, and sometimes also for political ones. Planners and professionals are, at least at the basic level, familiar with contemporary trends in planning. Applying for European funds has popularized the usage of "western" planning vocabulary, so the documents and strategies are filled with terms like "sustainability", "revitalisation" etc. However, the actual developments are rather quite far from that (Radzimski, Beim, Modrzewski 2010).

Most of research on spatial development in Poland has been concentrated on the weaknesses of the planning system itself. On the other hand, very little attention has been paid to the role of fiscal system. It seems like the relationship between taxation and spatial development is underestimated, or even not considered at all. However, without disregarding the role of development plans, I will argue that if we want to understand the nature of urban development processes, we should understand the role of property taxes in the first line.

3.2 Spatial effects of property tax

Before investigating the particular case of contemporary Poland, let us introduce some broader context. It has become an established practice in the developed countries to make the local authorities responsible for the basic infrastructure, like roads, public transit, water-supply, sewage system etc. However, some decades ago we could still find not so few examples of privately financed infrastructure. In the well-known U.S. "streetcar suburbs" it was quite common to have the tram line constructed by the developer. The estate was delivered as a full product, consisting of both housing and transit. Today the rules are somewhat different, although we can still find examples of private financing of infrastructure, and more and more examples of public-private partnerships.

Public financing of infrastructure (either at local, regional or national level) is usually explained with reference to the theory of public goods. It is a specific kind of goods, which, as the theory says, are consumed collectively, i.e. they can be consumed at the same time by a large number of people, and nobody can be excluded from the consumption of these goods, or it is very difficult to do so. These features, the theory follows, make public goods less attractive for market providers, and therefore justify (in some cases) the intervention of government, in order to maximize the overall welfare. Public goods are sometimes referred to as an example of a "market failure" (Klosterman 2003).

And here the problem begins. To say that "the public should pay" actually means that some kind of a tax is necessary. But what tax would be the proper one? In simple terms, we can take one of two approaches here. The first one is to charge tax rates independent on the quantity of individual benefits from public investments. This solution is quite an easy one, because we do not need to ask how much each individual gained. Yet, easy solutions are not always the best ones. The other option is to make the charges proportional to the gains. Such way of taxation aims to make taxes more similar to user fees. Because of the spatial nature

of local public investments, which are mostly punctual or linear (so not evenly distributed), it is hard to assume that anyone gets the same or almost the same. Therefore, the latter approach seems to be more just.

What form of tax would be then practically the most appropriate to pay for the local infrastructure? A reasonable solution seems to be a tax on property value (ad valorem). It is quite obvious that public investments, for example in light rail transit, are capitalized in property value, and research has shown that depending on the project such gains may reach from 5% up to 30% (Hass-Klau, Crampton 2004, Doherty n.d.). So, if the respective property owner pays an increased tax rate, he simply returns the subsidy he received. If he still pays the same rate, he de facto receives a net subsidy.

In this light we can see that the system of real estate taxation in Poland has got a built-in mechanism of property owners subsidisation. To be sure, municipalities could differentiate real estate tax rates (remarkably, only according to features such as the age of buildings or technical condition, but not the market value), but this is rather a purely hypothetical option. Municipalities, which have very short budgets at their disposal anyway, would have to pay for a quasi-appraisal procedure by themselves, and even in this case they would not be allowed to raise tax rates above the maximums set by law, which, as we have seen, are very low compared to market values. So the local governments have to look for other sources of investment funds, but hardly any are available. It is possible to apply for government grants for special purposes, and in the last years also for EU funds. Altogether, the system of money transfers becomes very complicated.

This system is ineffective and, as I will argue, has got negative impact on spatial development. By enacting a local development plan (miejscowy plan zagospodarowania przestrzennego), local authorities take the legal obligation to supply the necessary infrastructure. In order to do this, they need to pay for the acquisition of land for public purposes (unless they already own it, which is a rare case), and then for the construction work. Even the first step may turn out to be too expensive, and the authorities are well aware, that the investment (unless it is a large shopping centre – see below) will bring only a small increase in direct tax revenue. There might be also some indirect gains from personal income tax or corporate income tax, if new inhabitants or companies are attracted, but these will typically appear after some time, and they will likely be not large enough to cover all the public expenditures. Therefore, it is not easy to predict that in the absence of economic stimulus the authorities are generally not very keen to invest in infrastructure. In particular cases investment decisions may rely more on political factors, than on the economic ones. Local authorities avoid enacting local development plans, using some kind of "incremental planning" instead, which does not cause financial obligations for them (Beim, Modrzewski 2011). The most evident result of such policy are infrastructure shortages in suburban areas (fig. 1), especially in the field of public transit, which lead to automobile dependency and congestion.

Fig. 1. Typical infrastructure shortages in suburban districts of Poznań. Photo: A. Radzimski.

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Shopping centres are a special case, since the tax rate for commercially used buildings is much higher than the respective rate for housing. Poland has experienced a huge increase in retail space in the course of last years. This process started already in the 1990s with supermarkets and discounters, but recently growth can be observed especially in the sector of large multifunctional facilities (shopping malls). They first appeared in the largest cities, and now are also growing in the mid-size ones. Total sales area usually varies between 20,000 and 50,000 sqm, but larger objects can also be found. Shopping malls make up a significant share of the property tax revenue, which is a strong argument for the local councils, who decide upon the approval of such facilities (fig. 2). Another potentially important source of tax revenue are office centres, but the office market in Poland is mostly developed in Warsaw, and to a much smaller extent in the regional cities (Cracow, Wrocław, Poznań, Gdańsk).

An important disadvantage of the current property tax is that it allows landowners to keep their land idle for long periods of time. Persons or companies who dispose over free capital may buy land, either in the expectation of price increases, or just because it is perceived as a low-risk investment. Such "frozen" properties cannot be used in the productive sectors of economy, so apart from the spatial effects, such "investment strategy" may become an impediment to economic growth. Moreover, not only land market seems to be affected by the taxation system, but also the housing market. Although there are no exact data, it is estimated that several thousands of dwellings built in last years have never been inhabited so far. It is very probable that speculative buying by private persons and investment funds played a role in the unprecedented increase of housing prices in the years 2006-2009.

Fig. 2. Shopping mall: not the prettiest part of the cityscape, but a good source of the property tax revenue. Photo: A. Radzimski.

3.3 Instruments of property value capture

As already mentioned, the current form of the property tax in Poland does not allow to capture an increase of property value caused by public investments. There are, however, special quasi-taxes that have been invented for this purpose. These are the charges on property value increase due to 1) zoning regulations, and 2) division, or subsequent merging and division of property, or the construction of new infrastructure. The first one is charged by the municipality if a more profitable land use has been allowed in the local development plan (for example, housing instead of agriculture). In this case a part of property value increase might be repaid to the municipality in the form of a planning charge, or planning rent (renta planistyczna), as it is usually called. However, there are two limitations that greatly reduce the applicability of this instrument. Firstly, the municipality may decide how high the charge will be, but it must not exceed 30% of the value increase. It is worth noting that in the opposite case – when the property value has decreased due to zoning regulations – the owner may claim from the municipality full compensation, purchase or exchange of the property. Secondly, the charge may be levied only if the owner has sold (or donated) the property within the

period of five years after the plan has been enacted. [4] As we can see, both these regulations put the municipality in an underprivileged position.

The other charge, which is called "adiacent fee" (opłata adiacencka, the name is probably derived from the English/French adjective "adjacent"), is an example of what is known in the literature as "betterment fee". It may be claimed by the municipality in several situations. Firstly, if the property value has increased due to division or subsequent merging and division of properties. Such actions are usually undertaken in order to make land more suitable for construction. In this case the charge must not exceed 30% of property value increase, and may be imposed over three years after the changes took place. In contrast to the planning rent, the charge may be levied even if the owner has not sold the property. Secondly, the charge applies when new infrastructure has been built with the means of the government, self-government or the European Union. Also in this case the deadline is three years, but the limit is higher, namely up to 50% of property value increase. Yet, the definition of infrastructure for fiscal purposes is rather narrow. It generally includes only technical infrastructure, so that schools, kindergartens or parks, which may greatly contribute to property value, are excluded. Moreover, only some kinds of technical infrastructure are included: roads, water supply, sewage system, electricity, heat, gas and telecommunication lines. Also, as the name suggests, only "adjacent" properties are charged, while indirect effects, for example resulting from the construction of a major road, are not included.

Both charges described above are rather problematic tools for the municipalities. It is quite obvious that to apply such "extraordinary" fiscal instruments is politically very unpopular. Also, this form of taxation bears a high transaction cost, since each charge must be based on valuation. An analysis has shown that the cost of property appraisal may take up to one third of the revenue from the fees (Czochański, Dziubińska 2008). Therefore, we should not be surprised that the municipalities show some restraint in imposing the charges. For example, in the city of Poznań the revenue from both charges in 2010 amounted to 1.7 mln PLN, i.e. less that 0.01% of total revenue. For comparison, total revenue from the property tax amounted to 296 mln PLN (13%), and total spending on public roads exceeded 400 mln PLN. Also, the city spent 6.8 mln PLN on the spatial planning office, a special administration unit which elaborates local development plans and other planning documents. [5] So the revenue from planning rent has actually not even covered the costs of elaborating plans. In another large Polish city – Łódź – the charge on gains from infrastructure has been set to null. Such decisions can hardly be justified from the point of view of public finances, but they should be rather judged according to the above mentioned criterion of "political popularity".

3.4 Private financing of infrastructure

The overall efficiency of real estate taxation in Poland is low. Since the municipalities do not get enough return on their investments, they are in result short on money, and also short on infrastructure. So, if the public sector turns out to be unable to fill the task, perhaps the private sector should come into play? Indeed, such process is really taking place, but on a rather small scale. In middle-class suburban districts more and more privately or partly privately financed streets and pavements can be found, not to mention private kindergartens (fig. 3). Such solutions based on consensus typically work on the scale of a small (and rather rich) neighborhood. However, problems occur as we move up to the scale of a large district, or to the city and agglomeration scale.

In these scales several solutions are considered which would facilitate private financing of infrastructure. These are in particular: 1) contracts with developers, 2) public-private partnerships. Although there are no specific regulations of city-developer contracts in the planning law, it is possible to apply general rules of the civil law. Yet, neither the public side nor the private side have shown much interest until now. The few examples have demonstrated that the position of municipalities in such a contract is weak. Once the developer has already finished his project without respecting the contract, it is very hard to get him to fill his obligations. In the case of public-private partnerships, some municipalities have shown initial interest. A wide range of facilities has been considered for public-private partnerships, including underground car parks, tram lines, and even social housing. Yet, the response of investors has not been very enthusiastic so far.

[4] Ustawa z dnia 27 marca 2003 roku o planowaniu i zagospodarowaniu przestrzennym (Spatial Planning and Development Act).

[5] Data have been drawn from the budget report of the City of Poznań, published in the Public Information Bulletin (Biuletyn Informacji Publicznej, bip.poznan.pl, 20.02.2012)

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4 WHAT ARE THE ALTERNATIVES?

Everything said before leads to the conclusion that it would be reasonable to replace the current system of taxation, with constant "base" tax and "extra" taxes on value gains, with one ad valorem tax. But this point is only the beginning of discussion, not the end. Both in theory and in practice we can find many forms of real estate taxation, and the choice of the proper one is not so obvious. Let us have just a short overview.

The German "grundsteuer" is based on property value set by the financial administration (einheitswert), which is then multiplied by the usage-specific rate (grundsteuermesszahl) and a location-specific factor set by the municipality (hebesatz). With over 10 bln EUR total revenue, this tax is the third most important source of revenue for municipalities, after "gewerbesteuer" – a special local tax on businesses, and the local share of personal income tax (15%). In the United Kingdom there was a long-established system of property taxation called „rates". In 1989 in Scotland, and in 1990 in England and Wales rates on housing were substituted by a „community charge" (also known as „poll tax"), whereas commercial properties continued to be taxed according to the rates. In Northern Ireland rates on housing still remain in force. In 1993 the unpopular community charge has been substituted with „council tax", a modified version of the rates. Local authorities are allowed to set the rates (not to be confused with the old tax system) of council tax, but the calculation of the tax burden is quite complicated. In the strongly centralized British administration system, the council tax is the only revenue that the municipalities work out on their own. Business rates are collected by the government and then redistributed according to the size of population, and most of the municipal revenue comes from government subsidies. For comparison, municipalities in the United States are to a larger extent self-financing, although the share of property tax in local revenues declined from over 80% in 1932 to less then 50% nowadays. [6] American households typically spend more on property tax than the European ones (median property tax on housing paid in 2010 amounted to 1236 USD, according to the data of the Tax Foundation), but instead they enjoy lower taxation in other fields, particularly on the goods and services.

Fig. 3. Inscription under the sign: „Private area. Entrance only for the residents of Italia estate". Photo: A. Radzimski.

Despite all the differences, a common feature of all the systems mentioned above (and many others too) is that the tax is levied on the value of the whole property (land with improvements). This is probably the most widespread option, but not the only one. In some countries, like Denmark, Estonia or Australia, the property tax is a land value tax. It means that for fiscal purposes only the value of land is considered, without

[6] Data drawn from: History of Property Taxes in the United States, http://eh.net/encyclopedia/article/fisher.property.tax.history.us (30.04.2012).

buildings or any other improvements that the owner had undertaken. This form of taxation has got also a group of proponents among urban economists. One of them puts forward some arguments for the land value tax (LVT): "Current tax policies tend to discourage the development of urban land, because the fruits of those developments are directly taxed. To the extent that those policies are replaced by policies that tap geo-rent, the landowner is incented to develop his land. Recall, an underused site pays the same geo-rent tax as a developed site. The untaxing of production combined with the tapping of geo-rent will induce infilling of the city center, making for a more compact city, agreeable to mixed use and pedestrian activity. Hence, the demand-side push for sprawl is diminished" (Foldvary 2005, p. 124).

The proponents of LVT claim that such tax would have a better influence on urban development that the most common form of taxation. They argue that the landowners would be less likely to hold sites idle, and so the pressure on suburban development would be reduced. They also propose to compensate the increased burden of taxation by lowering other taxes, in particular personal income tax. Foldvary follows: "Today, government works are financed in large part by taxes on labor, profits, sales, and non-land real estate. The owners of land receive an implicit subsidy. This implicit subsidy is of great empirical importance, yet is not discussed in microeconomics textbooks, and is usually ignored in the tax analysis in public finance" (Foldvary 2005, p. 116).

More skeptical towards the idea of a pure land value tax are the authors of a study published by the World Bank (Maurer and Paugam 2000). In their opinion, there are several problems related to the implementation of this tax, for example the acceptability of rates, which would be higher than in the case of whole property taxation. However, they agree that high taxation of buildings is a factor that supports suburban growth instead of infill development. Therefore, they suggest that the transition economies in Central-Eastern Europe should not follow the path of the West, but rather use a double rate system instead. In this system the tax rate imposed on land is higher than the rate imposed on improvements. It is worth noting in this context that one of the transition economies (Estonia) has already adopted a land value tax.

There have also been attempts to reform the system of real estate taxation in Western Europe, and in particular in Germany. This country has got one of the oldest traditions of institutionalized urban planning, and the German planning system is believed to be one of the best in the world. Yet, even in such a well-planned country urban sprawl remains an unsolved issue. Several years ago a research project commissioned by the federal state of North Rhine-Westphalia ended with a conclusion that in order to develop more compact urban structures and reduce unnecessary mobility it is essential to substitute the grundsteuer with a combined tax, imposed on land value and plot size (Apel et al. 1995). Yet, although some time has passed, the rules of taxation in Germany have not changed. There seems to be no strong political will to bring the subject on the agenda.

In Poland the discussion about a possible ad valorem tax, which is usually called "cadastral tax" (podatek katastralny, from cadastre – property register), returns from time to time. This subject appears occasionally in the media, and the articles usually reflect some fears related to this form of taxation. One of the most often raised concerns is the situation of households with low income living in valuable dwellings in good locations. Indeed, if the burden of the property tax was increased without simultaneously lowering other taxes, then the less affluent groups of society would possibly fall in a serious financial trouble. However, it is quite obvious that media coverage is usually superficial and does not go so far to consider complex changes in the fiscal system. Yet, the media have an impact on the public opinion. To make things clear, if ever any alternative real estate tax is considered, it is the tax on whole property value (land with improvements), with single rate. The proponents argue that it is the most widespread form of real estate taxation in Western Europe, and so a good example to follow. Yet, as we have seen, apart from the single common feature the forms of taxation vary significantly, and also alternative solutions are considered.

From the legal point of view, Poland is partly ready for the introduction of an ad valorem tax. According to the Real Estate Management Act (1997) a nationwide property register (kataster) ought to be created, including property values for fiscal purposes. There are certified real estate appraisers, who would conduct the valuation (they already appraise properties for a variety of purposes, for example in the case of expropriation). Yet the crucial issue has not been solved – who and how should pay for the valuation procedure. The 1997 Act states that this should be determined in another act – which has not been passed up to now. Another option would be self-appraisal, but to allow this would require legal changes, and such

solution would certainly meet resistance from the professional lobby. Politically the subject of cadastral tax has been out of agenda for a couple of years.

5 CONCLUSION

Much has been written in the last years about that how the system of spatial planning could be improved. Even the European Union became interested in the subject, although the Community is officially not allowed to intervene into the spatial policies of the member states. Research projects are running, conferences are being organized, and documents like Leipzig Charter are being published. Not disregarding all these efforts, one must admit that we are still away from the desirable goal of urban sustainability. Perhaps some element is missing in the puzzle, and there is a good chance that it is a fiscal solution. The costs of public investments are only to a small extent covered by property owners, who are the largest beneficiaries of them. Poland is probably an extreme case, but other countries do likely suffer under the same disease. Local authorities are dependent on subsidies, and a huge bureaucracy is needed to manage the system of money transfers. This causes a confusion among taxpayers and a growing disbelief in the ability of public authorities to fill their tasks.

The system of taxation needs to be simplified, and more money should be managed locally. If people see the "fruits" of their taxes, they can more easily check the efficiency of public spending. If they see that infrastructure costs in low-density suburban locations are too high, they may choose to move closer to the city centre instead. Fiscal changes alone would probably not make cities compact, because a set of factors on both the public and private side are significant. Yet, an important economic stimulus for urban sprawl would be reduced. Certainly, much depends on the particular solutions, and this question is open at this point. Transition countries like Poland should draw lessons from the experience the West, but also consider alternatives. Perhaps also countries with long established systems of property taxation should consider a reform, in order to give the local governments more autonomy. Finally, I would like to stress that I do not believe that taxes would do the planners' work. Planners are creative, and taxes are not. Good urban design has always been and will be welcome, and fiscal solutions would just allow planners to sail with the wind, not against it.

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Rebuilding Old Downtowns: the Case of Doha, Qatar

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1 ABSTRACT

City planners and urban designers often argue that downtown development/re-development plans can be best understood when providing two different categories of products; the regulating plan consisting of general controls and diagrams, and the master plan consisting of specific interventions and perspectives. In the case of developing and/or redeveloping old downtowns, this paper argues that these plans are best understood when considering the change in the socio-cultural, behavioral, environmental, and economical conditions of the place.

Doha city, one of oldest cities in the gulf, has witnessed a rapid change in its demographics over the past decade. The city has been thoroughly modernized, a massive change in its inhabitants culture and behavior has occurred and the need to re-develop its old downtown has arose.

Rebuilding the old Doha downtown aims at improving the quality of life and ensuring that heritage and culture carry-on as the country grows and evolves. It is anticipated that rebuilding the old downtown will restore a sense of community, improve the environment, create innovative and inspiring living spaces and enable both locals and expatriates to communicate and integrate.

"The Heart of Doha," a mixed-use urban development project is selected as a study case. The project is being constructed where the old downtown is being demolished. It aims to develop a modern downtown that takes cues from Qatari vernacular and urbanism, yet has a highly contemporary and sustainable approach to bridge the gap between the past and the present history of Doha.

This paper studied the development of Doha city, the reasons that enforced rebuilding the city's downtown and how the change in its socio–cultural, behavioral, economical, and environmental conditions affects its redevelopment plans.

2 INTRODUCTION

Qatar has witnessed an unprecedented growth that affected the country's physical, economical, cultural, and demographical status through the past few decades; its economy has changed from a fishing and pearling based economy to a diverse economy after the discovery of the oil in 1939. Doha, the capital, has expanded dramatically along its major routes leaving the downtown, sprawled, deteriorated, congested, and overcrowded. As a result, an immediate need to regenerate the downtown of Doha. Revitalizing the old Musheireb was proposed as a national project that aimed at to integrating the past and the present of the country. The country's historical heritage, economy, culture, environment, and social enrichments were considered. Three old houses, Alkoot fort in the heritage quarter, and some sikkats and lanes from the old setting were revitalized, other than that the whole area was demolished to be replaced with modern Islamic architectural concepts. The projects aims at energizing Doha's downtown while encouraging local citizens to relocate back at the heart of the city after years of migration to its suburbs. It has been argued that the project is not respecting the local heritage and culture of the place, however, the poor condition that the downtown experienced had called for this demolition act; existing houses are already decaying, streets are no longer accommodating the huge traffic flow, existing infrastructure and utilities are not capable of serving the area anymore, in addition to the overcrowding problem and the distribution of low-income workers in the area.

3 THE TRANSFORMATION OF DOHA, QATAR

Qatar covers an area of 11,437 square kilometers, with a coastline of 563 kilometers. The country is a mostly low-lying, flat, and between terrain stretching into the Gulf from the lands of Saudi Arabia. The Country's central location in geographical terms is politically supported by its position with the states of the Gulf Cooperation Council (GCC); Saudi Arabia, Kuwait, Bahrain, The United Arab Emirates, and Oman.

Qatar's total population has reached 1.7 million people, compared to 1.5 million in 2008, and is expected to reach 2.0 million in 2015 with a constant annual growth rate of 3.97 % and about 3.2 million people, more than double, by 2030. The rapid increase in population over the last few years is attributed to the strong

performance of the economy, which has resulted with a large number of projects, thereby leading to the influx of professionals, service and contracting sector staff and others. (QNB, 2009). However, the composition of the overall population of the country in 2010 was 76 % males and 24 % females. The total population has increased by 128 % since 2004, GDP grew 210 % at current prices from 2004 to 2009, and total government expenditures increased from 2004 to 2009 by 316 %. (Qatar census, 2010).

The State's urbanism movement has gone through three significant phases; the traditional phase, the transition phase, and the modern-oil-related phase. Each one, along with factors of political nature and trade has played major roles in the rise and fall of early towns of Qatar as shown in Fig.1

Doha, the state's capital, is the largest city, with over 80 % of the nation's population. It is also the administrative and economic center of the country , with over 80 % of the nation's population residing in Doha City and its surrounding suburbs. The capital is located on the Eastern Coast of the State of Qatar midway between the country's Northern Coast and its southern border that stretches around 190 kilometers, 98 kilometers north of Doha and 92 kilometers to the south of the city (Al-Kuwari, 1992). According to Qatar Census (2010), Doha (Ad-Dawhah) is a house for 744,029 people comparative to a 340,000 people in 2004 on a total area of 11,427 km². "Doha City" or "Ad-Doha" refers to the city's circular shape that reflects the bay that lies to the east of the city.

However, factors of change behind urban growth were determined to be five according to (Buainain, 1999). First, Doha's geographical location at the center of the settlements provides easy access by population. In addition, Doha's flat topography lacking natural physical barriers aided the expansion. Second, Doha's variety of transportation facilities such as motorways, airways -international airport-, water way-sea port-was another aspect that enhanced urban growth. Third, municipal's national wide scale development plans have been highly invested and implemented such as construction of housing projects, and providing good infrastructure, and others. Forth, Doha's remarkable population growth promoted urban development and creation of new neighborhoods. Finally, the rapid economic activity that is centered in the capital city provided various employment opportunities which attracted local citizens and international residents. However, these stated factors contributed in changing the image of the city and the Doha's skyline by the sea.

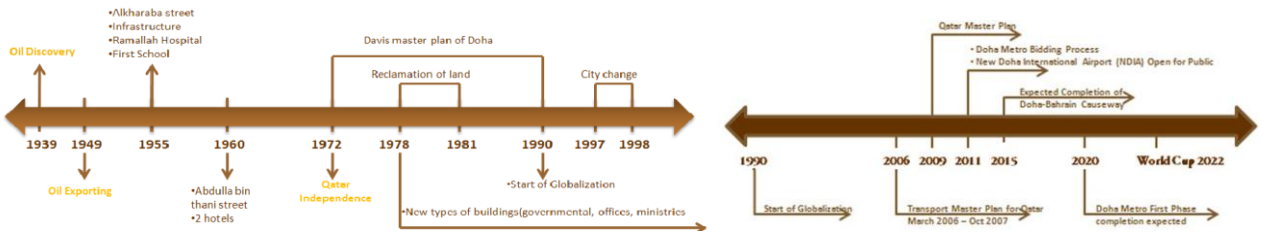

Fig. 1: Qatar's Development Time Line 1999 – 2022

3.1 Doha's Early Traditional Phase; Pre-Oil Era to 1950's

Qatar's ancient inhabitants were referred to as skilled seafarers and merchants. They were settled in the North-western area of Qatar, Al Zobara, the oldest sea port in Qatar. In early 1800's, Al Bida'a, the original site of Doha and other cities in Qatar were developed at a distant from the tribal conflicts that took place at Al Zubara territory in the north of the peninsula. Moreover, it was considered as partially secured from the conflicts among Abu Dhabi Emirate and Bahrain. In addition to the stated reasons, Doha's deep sea water and its circular shape were of the major attracting factors to fishermen and other inhabitants at that time. (Buainain, 1999) During the early twentieth century, people migrated to Doha and continued their pearl-diving, fishing, and nomadic herding activities. In fact, pearling was the major source of living in addition to some other trading activities like importing commodities from Iran, India, and other adjacent countries. Limited water sources, and poor soil conditions affected the early distribution of population in Qatar, however, and as the pearling industry developed, sea ports were established which later made the city as a main trade center. Politically. Doha has emerged as a headquarter of the ruling tribes which hosted the new governmental foundation and therefore became the main capital of the state. See Fig. 2 for the city's development 1937 through 1959.

Fig. 2: Doha City Development through Its Early Traditional Phase (Boussaa et al., 2011)

3.2 Doha's Transitional Phase; Post-Oil Era (1960's)

However, oil was discovered in 1939, its exploitation was halted between 1942 and 1947 because of World War II and the Bahrain embargo. Accordingly, the oil wealth acted as a catalyst for the urban development and the true sense of development in the country began at 1955 where the need to accommodate expatriates emerged. The period between 1949 and 1969 witnessed an increasing in the population by 600 and new administrative centers sprang up to manage the vast revenues.

3.3 Doha's Rapid Modernization Phase; (1970's till today)

Following the withdrawal of the British, the State of Qatar declared its independence on September 3, 1971. Doha as the capital of the new state attracted thousands of foreign experts and workers, employed in the construction and engineering industries. During early seventies Qatar has witnessed an extreme increase in the construction of its governmental buildings; offices, ministries, governmental authorities, so the built environment has emerged. Between 1978 until 1981, the reclamation of land from the sea started to empty out the down town. The reclamation project formed a symbolic and functional tool for the future of Doha where the Corniche has become a symbol for the new city, implementing the governmental and commercial buildings. Since then, Doha has seen the most extraordinary expansion in international banking, sports and tourism activities, as evidenced by the many modern towers, malls, hotels and seats of power scattered throughout the city, and through huge housing developments like the Pearl, a whole commercial, residential, tourist and leisure complex beyond the West Bay area.

Fig. 3 Doha City Development through Rapid Modernization Phase (2000-2008)

This unprecedented rapid urban growth experienced by the State of Qatar for the last few decades (see Fig.3) made effective and coordinated planning difficult which in turn resulted in several problems such as urban sprawl, traffic congestion, and improper spatial allocation and distribution of public facilities and infrastructure.

4 PLANNING OF DOHA AND THE DEVELOPMENT OF THE OLD CENTER

Planning in Qatar was essentially seen as a practical process that mainly aimed at the distribution of electricity, water and sewerage systems around Doha and the smaller towns within the peninsula, based on a

hierarchical road system. To accommodate the population growth and the vast change in Doha's urban life, the government of Qatar appointed several foreign planning consultants to plan for the future of the city; among which Llewellyn Davis was hired between 1972 and 1999. Along this period Davis planning consultant produced a new master plan for Doha and several planning progressive changes took place. Fig. 4. The government was advised to buy back the traditional residential quarters in central Doha and clear them for higher density commercial and governmental land-uses. This single act approach, was the reason behind the migration of large numbers of local Qatari residents from the heart of the city to its suburbs; the death of the old Doha center. The city center was then occupied by Asian workers that accepted the overcrowded conditions of the city center transferring the old memorial Doha downtown into a native deserted city center.

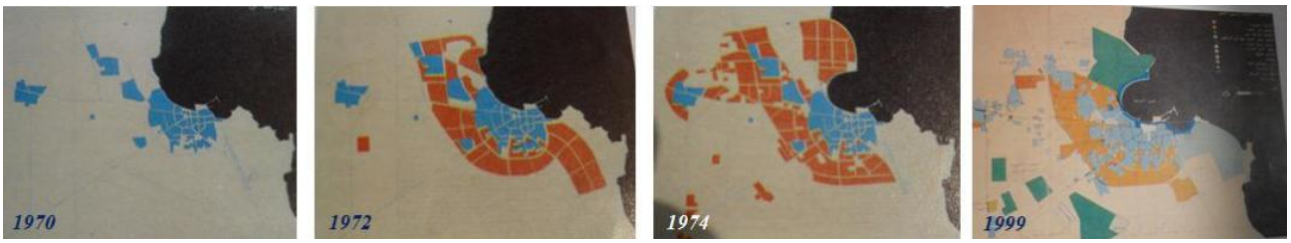

Fig.4 Llewellyn Davis Master Plan. (Hassan, A., 1994)

Davis master plan focused on the heart of Doha as the main goal of development, it mainly focused on preserving the Souk area as the traditional trade area, providing a mixed use residential apartments above the retail shops to accommodate the increased number of expatriates, providing the needed educational facilities for this population, while locating the governmental entities at the northern side opposing the Cornish. Fig. 5

Fig 5 "The Heart of Doha" Initial land use plan by Llewis Davis, (Hassan, A., 1994)

Within the New National master Plan for Qatar, a new district to the north of the old heart of Doha was conceived to be reclaimed and developed as a modern globalized development. William Pereira , an American based architectural and planning consultancy firm was appointed by the local government on 1977 to develop the new district. Land reclamation work was done through this period, shaping the semi circular Cornish of Doha and announcing the west bay or "Dafnah" area with its national projects including, the regional park, the central business district, the Diplomatic area, Qatar University and several 5 star hotels.

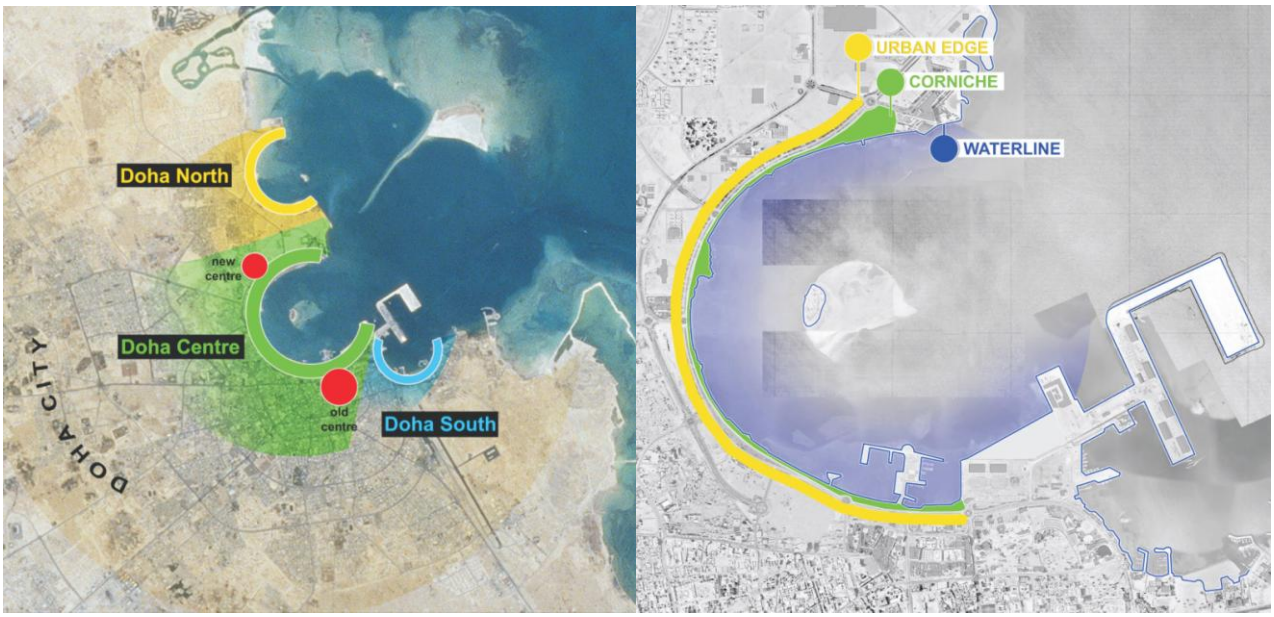

Fig 6 (a) Doha City Development Zones; (b) Elements of Doha Cornice Area

The new Cornish represented a great tool for functional and symbolic development, as it opened the space for new areas to grow and reflect the symbol of the new city of Doha. Within the process of transforming the Doha cornice into an international culture and arts center for the gulf, the government of Qatar announced the project as a competition where the Agha Khan Trust for Culture (AKTC) has instigated a process to gather the innovative ideas and projects. In their report, the AKTC divided Doha into three parts; Doha North, Doha South, and Doha Cornice, Fig. 6. The report stated that the integration of Doha North with the central city by means of other than private car transportation must be considered. Provision of pedestrian and bicycle routes as well as marine connections would enhance the value of the North cornice, which extends from the Sheraton to the Ritz Hotel. Doha South was defined as the area located from the port to the Qatar National Museum and its lagoon, while Doha cornice was defined as the coastal strip from the Sheraton Hotel to Doha Port and its interface with the area of Doha Bay containing Palm Tree Island. The cornice is built on the reclaimed land and is the result of the recent planning strategies that have transformed the dense urban fabric and intricate circulation system of old Doha on the south of the bay.

Today, Doha's traditional and cultural assets are still concentrated in the old center. There is a little left of the traditional city, and the redevelopment policies in the 1960s have totally transformed the area, but the downtown still survives. The old souk area still exists supported by the new souk buildings. Although the buildings have been renewed, the contiguous urban fabric and low rise, high density arrangement of the buildings creates a lively and dynamic environment. The Diwan (the seat of government) serves as a hub between the old center and new developments and provides an opportunity for the old center to regenerate itself while preserving surviving cultural assets.

5 MUSHERIB DEVELOPMENT PROJECT; THE HEART OF DOHA

The absence of the unique identification qualities of the city of Doha, in addition of the social and environmental problems of the globalized modern entities, were the main reasons behind the new cultural initiatives and the new projects imposed by the planning governmental sector in Doha; a number of regional city projects were initiated by the local authorities focusing on creating a cultural unique Qatari architectural language. Among these projects, Mushieb came to shed the light on the social and the economical re-birth of the old downtown of Doha.

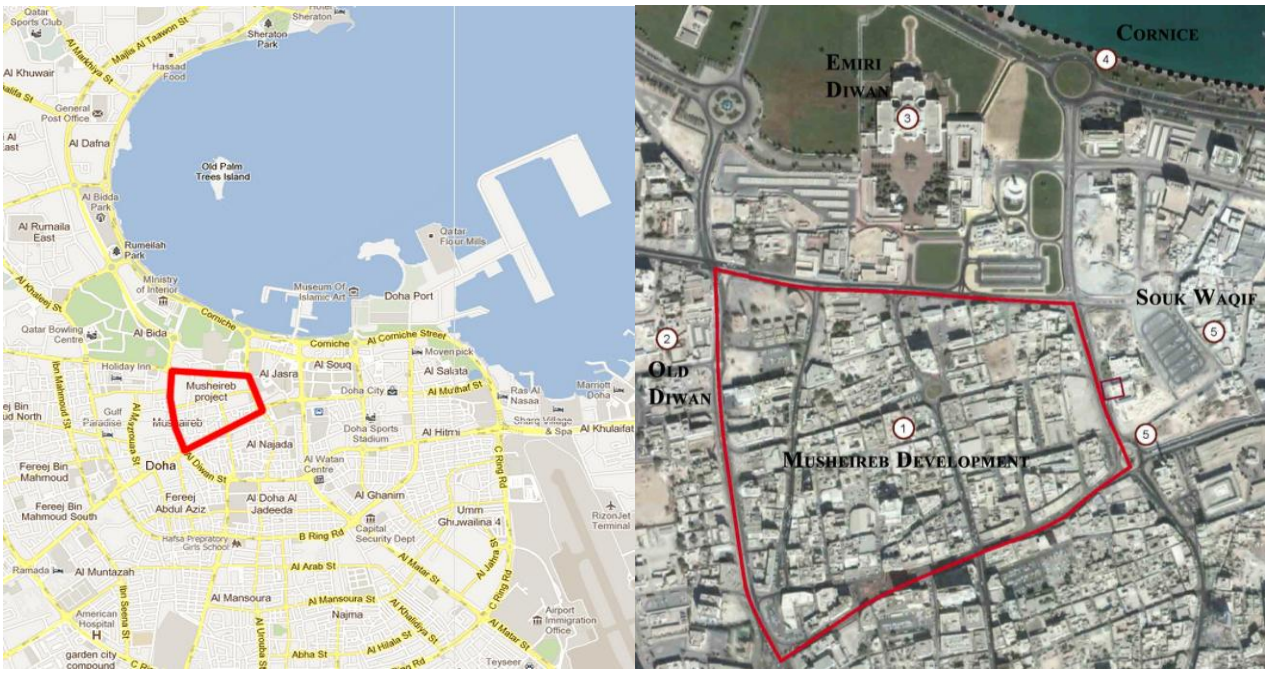

Fig 7 Location of Musheireb Development, Also Known as "the Heat of Doha"

Fig 8 The Fabric of the current downtown with the Dafna area located on the opposite side of the bay

5.1 Project objectives

Rebuilding the center of Doha City Project, also known as " Msheireb project" is developed by "Musheireb Properties". The project started in early April 2006, when EDAW/AECOM was commissioned by Qatar Foundation to plan and design a conceptual master plan for Inner Doha. Through the project, The developer's researched and re-evaluated the role played by the inner city site as the rest of Doha expanded and evolved in keeping with the contemporary trend to a global building vernacular. The decision to revitalize and regenerate The center of Doha City, also called, "Musheireb Development", or "the heart of Doha" came about with the realization that the Kahraba area, once the very hub of community living, an area from where the small Doha expanded to be the modern city today, had completely lost its historic importance.

The 35 hectare (0.35 square kilometers) development is located in Inner Doha, close to the historic origins of Qatar's capital city, see Fig.7 and 8. The project is located at Mohamed Bin Jassim District – central Doha, bordered by Al Rayyan Road to the North- Jassim Bin Mohamed Street to the East- Musheireb Street to the South- and Al Diwan Street (part of A Ring Road) to the West. The site is also adjacent to the redeveloped Souk Waqif, a successful mixed-use scheme based on a traditional Qatari souk and the historical Al Koot Fort. The site is located within a desert climate with relatively high temperature and humidity throughout the year with a close proximity to Doha Bay. The natural slope of the land towards the historic wadi on the site's southern parameter provides inspiration for the induction of water features into the site. The conceptual

urban plan aims to achieve a consistent blend of the Twelve Perspectives formulated as the guiding light for the project including: revitalizing history, heritage, and culture of the place, developing challenging architecture concepts and ideas to connect the past to the present, and achieving high levels of environmental sustainability targets that suits the community. "Musheireb Properties" partnered with international leaders for the project; "ARUP" was contracted as a principal consultant for project management, engineering, transportation, environmental and sustainability services, EDAW/ AECOM was appointed for urban design, planning and landscape architecture services, and Allies and Morrison Architects were appointed for Architecture services. The successful formation of the project could be attributed to the integrated cross-discipline approach and skills of the technical team and guidance from the hired peer review that included eminent professors in urban planning and the history of the Gulf Region from Harvard, MIT and Princeton, specialists from DTZ and Davis Langdon were engaged to provide advice on commercial aspects of the development

The project aimed at rebuilding the center of Qatar's capital city in a way that reinvigorates, modernizes and revives the site, while being true to the traditional culture and heritage that was the foundation of the first communities of Doha. The objectives of developing the" Heart of Doha" project were seen by the local authorities as follows:

- To create a cohesive urban quarter offering a balanced and flexible mix of land use, public realm and social and cultural infrastructure to provide a catalyst for renewal beyond both the period of development and site boundary and where traditional architectural values should be observed within a modern design. Other objectives of the project could be summarized as follows:
- To reduce the urban heat effect and thereby increase the proportion of the year when it is comfortable to use the outdoor spaces; designs should be developed to support and develop that theme;
- To- reduce car use and congestion within the site, whilst improving connectivity across the wider city area;
- To minimize the demand for water and ensure its efficiency; performance targets above the requirements of LEED credits are to be achieved;
- To maximize energy efficiency and reduce carbon emissions across the site; the overall form of the buildings should help reduce the need for cooling;
- To deliver new areas of high quality public realm;
- To facilitate community interaction and social exchange;
- To achieve a dynamic local economy focused on business/industries to maximize the advantages of the site's location and develop key economic sectors while nurturing entrepreneurship;
- To provide schooling within the development to meet the demands of local residents and to promote reduced private car use;
- To promote social inclusion through the provision of housing for different social groups and classes and a mixture of single and family accommodation;
- To promote sustainable waste management through the implementation of a waste and resources strategy; and
- To ensure the use of sustainable and low embodied energy materials through the use of sustainable procurement policy at both the construction and operational stages of the development.

5.2 Musheireb Development; the New Urban Form

The Musheireb Master plan (Fig. 9) creates a new piece of city that engages with the memory, processes an urban morphology of the existing Doha city center. The master plan draws references from old urban form of Qatar and the traditional "fareej" concept; a common space where several families share to interact in the traditional community to create a modern city rooted in tradition. New morphology to accommodate modern forms of transport, infrastructure and lifestyle as well as creating a comfortable walking environment were also considered. The planned new urban form was set to respect the traditional fareej typology and to create a

tight urban grain where low to medium rise buildings are positioned sufficiently close to create natural shade. A combinations of Sikkas (walkways) and Barahas (plazas) are also integrally planned to the new urban form where local residents and visitors are encouraged to walk within the sociable mixed use neighborhood. It is expected that the resulted environment will be pedestrian oriented where the dominance of car is reduced. Vernacular roads are introduced to capture prevailing wind and thus reduce the built up of heat and pollutants. An integrated basement infrastructure for service s is also considered in the master plan allowing narrower streets at ground level to be created.

The conceptual master plan started early 2004 with 5 phases of construction over a period of 8 years where the first phase is expected to be finalized mid 2012 according to the announced timeline. The first phase, referred to as the 'Diwan Amiri Quarter', currently under construction, features a combination of three major governmental buildings including the National Archive, along with heritage sites, a museum and an Eid Prayer Ground. Subsequent phases include a sum of 226 buildings that constitutes a 5-star oriental hotel along with three additional hotels, premier commercial office space, a multitude of residential types and a wide variety of retail shops and restaurants with heights limited between 3 and 30 stories. There is also a significant community and arts focus, featuring a cultural forum, school, nurseries and mosques and a two levels basement for services and private parking space. . See Table 1.

Typology	GFA (SqM)	GFA (SqFt)	Percentage
Commercial & Governmental Offices	280,000	3,014,000	36.9 %
Retail	94,000	1,012,000	12.3 %
Hotel	117,000	1,259,000	15.4 %
Residential	222,000	2,390,000	29.2 %
Community, Cultural, School, Mosques, Museum	47,000	506,000	6.3 %
TOTAL	760,000	8,181,000	100 %

Table 1. Distribution of facilities by area and percentage (Doha land, 2011)

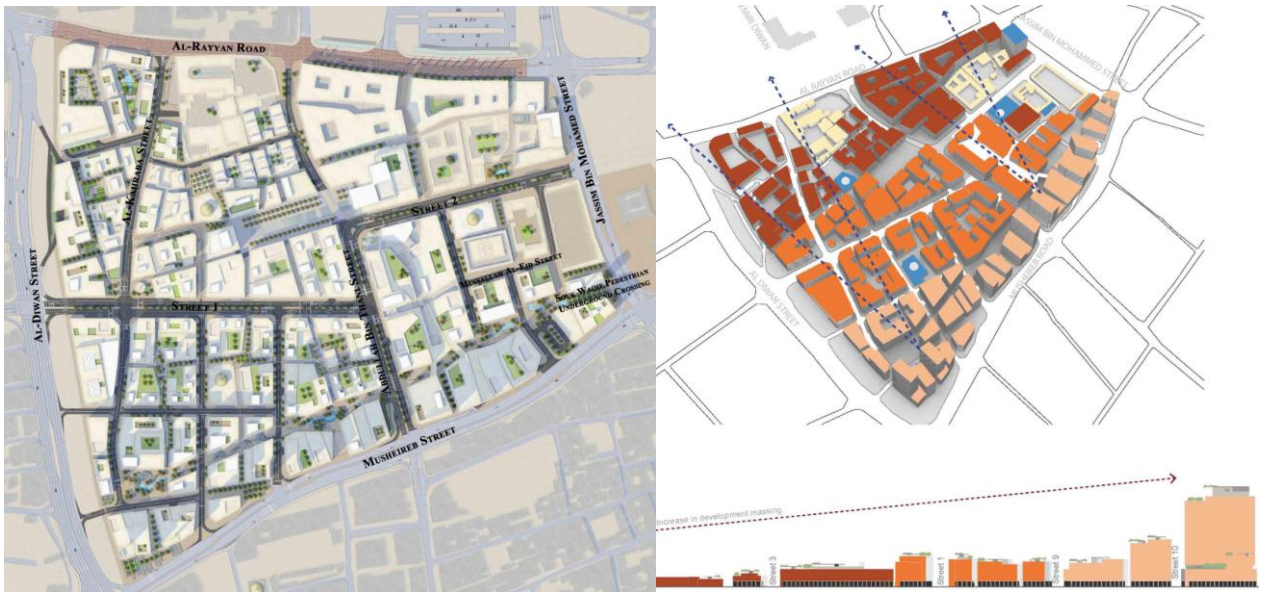

Fig 9 (a) Musheireb Development Sustainable Master Plan; (b) Massing Study (Doha Land, 2010)

The master plan has been broken down into 22 superblocks to provide a manageable structure for identifying development parcels and to structure land uses across the site. All blocks are identified by primary and secondary roads, have hierarchy of open spaces, and maintain permeability for pedestrians. Some other principles were also considered. To ensure citywide legibility and connectivity between blocks, a network of pedestrian routes are woven through each block to link one to the other. The project could also be divided into four main quarters; the Diwan quarter that includes all the new governmental buildings facing the Cornice and Souk Waqif, the heritage quarter that links the site to Souk Waqif and the old historic center, the

retail quarter that extends westwards along Sikkat Wadi Musheireb connected with the old historic retail area of the city along Al-Kahraba street, and the Kahrab quarter, the exclusive residential quarter that contains the high profile office buildings, the school, and the elegant townhouses distributed on fareej clusters on the Northern end of Al-Kahraba street.

6 MUSHEIREB DEVELOPMENT AND THE NEW IMAGE OF THE CITY

The images of the past influenced the image of the future development in the area, see Fig. 10; consequently, the standards that govern the form of the buildings within Musheireb aim to build a harmonious roof space that is diverse, animated and picturesque. These standards encourage the use of the old life systems within modern technological elements such as wind catchers, majlis rooms, loggias and bent houses. This approach aims to soften and enrich the skyline of the site whilst encouraging the day-to-day use of the buildings by creating pleasant habitable environments.

To better identify the new image created for the new Heart of Doha city, the researchers referred to Kevin Lynch's theory on the image of the city and to Hayden's theory on place making. Lynch identifies five elements that provide city image; paths, edges, districts, nodes, and landmarks (Larice, M. & Macdonald, E., 2007), while Hayden believed in the physical meaning of the built environment.

6.1 Kevin Lynch and The Image of the Heart of Doha

In this section, Lynch's five elements will be applied to the Musheireb Development to better understand the image of the new downtown comparative to the old one. Fig 10

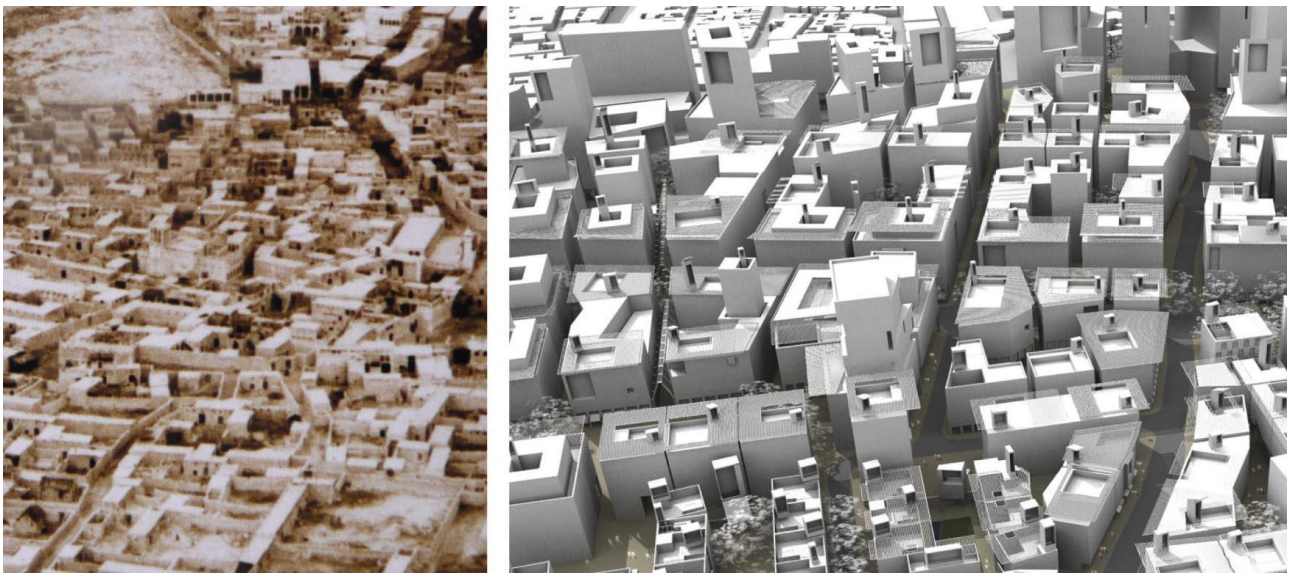

Fig 10 (a) Musheireb Old Fabric; (b) Musheireb Development Proposed Fabric (Doha Land, 2010)

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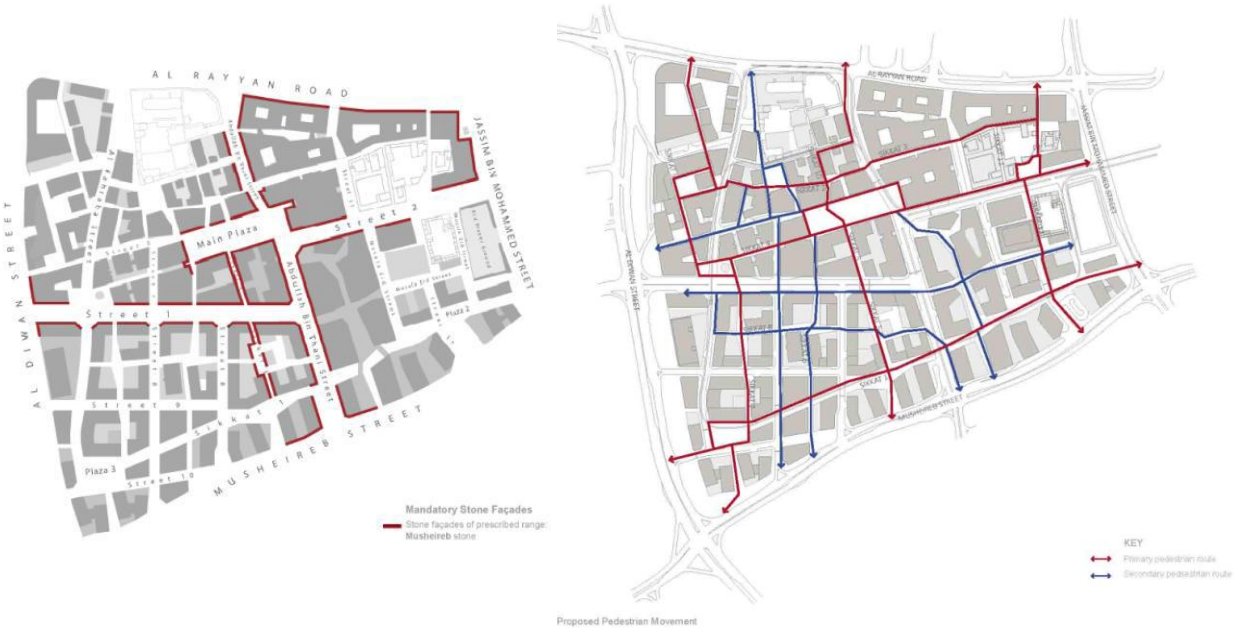

Fig 11 (a) Musheireb Development Major Paths; (b) Pedestrian Paths (Doha Land, 2010)

6.1.1 Paths

As lynch described paths as channels for potential movement along which the observer customarily, occasionally, or potentially moves and as channels that link the city's visual experience with the movement, Street 1, Street 3, and Abdulla Bin Thani Street, Fig 11, could be recognized as three of the most successful paths within the project for their distinct visual character that allows the passengers to capture the structural sense of the old downtown and help the mover to recognize the direction through their recognized facades elements and contents, projections, structure, finishing materials, lighting and signage systems intended to be used. In addition to sidewalks and pavement, a network of shaded Sikkas is being developed to increase pedestrian permeability throughout the Musheireb area. The width of these lanes carry from four to seven meters, creating serial vision and a pleasant urban environment away from the intense heart and population generated by cars.

6.1.2 Nodes

According to Lynch's definition, nodes could be seen as primary junctions, places of a break in transportation, crossings or convergence of paths, moments of shift from one structure to another or might be simply defined as concentrations, which gain their importance from being the condensation of some use or physical characters, as street-corner hangouts or enclosed squares. Two types of nodes could be easily identified in the project, those at major intersections such as Barahat (Plazas) and other social nodes, and those that are characterized by concentration with a thematic activity such as the "Eid Ground". See Fig. 12(a)

6.1.3 Districts

Districts at the "Musheireb Development" (Fig. 12(b)) are recognized with their perceived internal homogeneity and their identifying character with comparable high life standards. It could be seen that the developed master plan has divided the area into eight smaller quarters; Al Karhraba North, Al Kahraba South, Al Diwan, Plaza 1 Quarter, Plaza 3 Quarter, Heritage Quarter, Musheireb Palace, and Al Diwan Al Amiri Quarter.

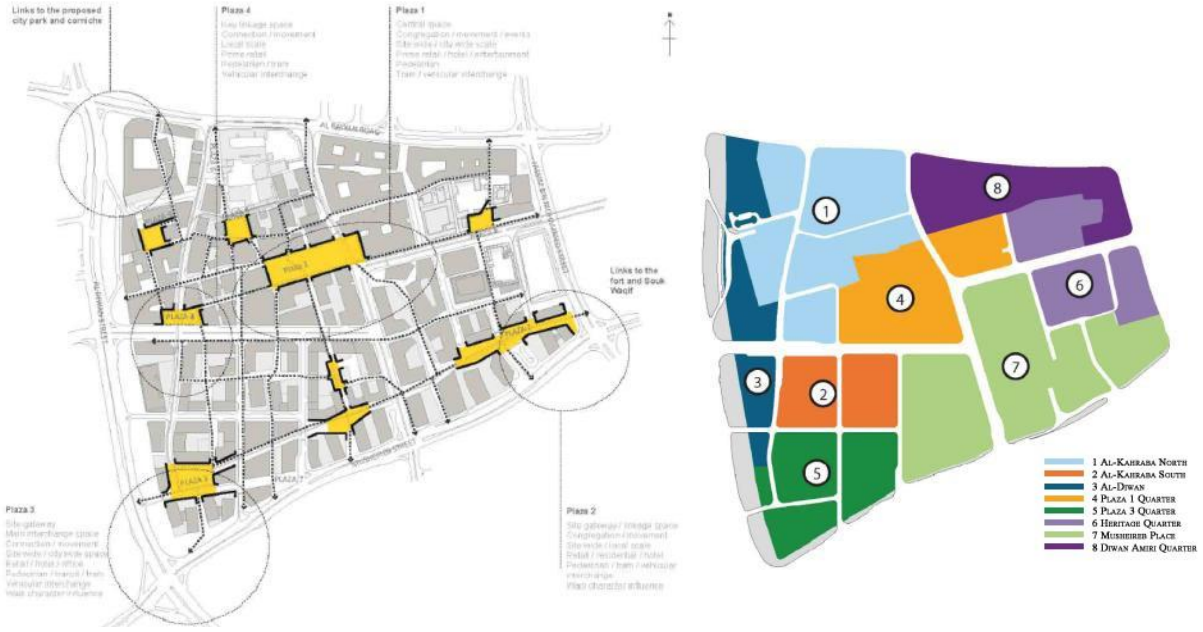

Fig 12 (a) Musheireb Development Nodes (Doha Land, 2010); (b) Musheireb Development Districts

6.1.4 Edges

As pointed out by Lynch, edges are visually prominent, continuous in form and impenetrable to cross movement. They could be defined as paths or boundaries of districts and might often act as edges. Accordingly, the proposed arrangement of buildings and the building heights within the project could be seen acting as solid physical edges specially at the southern part of the project where tall buildings are intended to be located along districts 5 and 7, as shown on Fig. 12 (b) and Fig. 9 (b).

6.1.5 Landmarks

The comprehensive regeneration of the inner Doha area presents an exciting opportunity to create a new distinctive "sky line" for the area, to complement West Bay (Dafna area) on the opposite side of the Bay , Fig. 12. The gradual increase in massing of buildings from the north of the site, peaking in the south along the alignment of Musheireb street creates an interesting skyline for the site. Looking towards the Bay, the roofs will provide an attractive foreground for the developments located further back; In other words, the new image for the new downtown developed area.

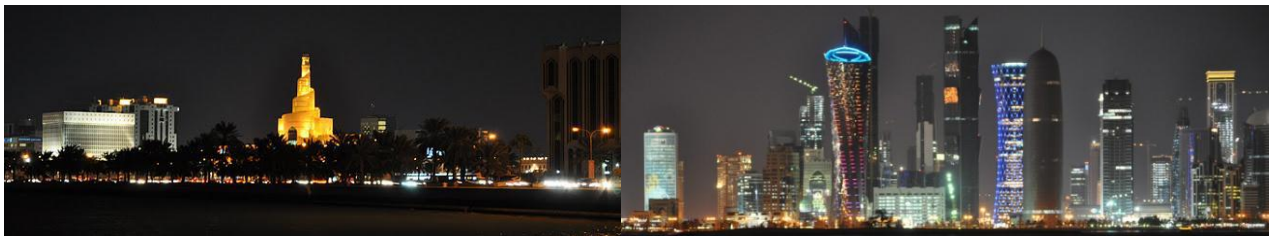

Fig 13 (a) Skyline of Musheireb Development and the surrounding area with Al-Fanar, Souk Waqif as a landmark; (b) West Bay (Dafna Area) Skyline 2010 as seen from Musheireb Development location

6.1 6.2 Dolores Hayden and the "Heart of Doha" Memory

According to Dolores Hyden (Hayden D., 1997), "place making is as much about meaningfulness to local people as it is about unique and memorable form." . In that context, Place memory is the key to help citizens to define their past and to connect the physical built environment with their culture. Within the "Musheireb Development" project, storytelling plays an important role in creating the social memory ,the sense of belonging was found to link people to the place for its historical importance. Places with memories were re-used such as. "Musala Al Eid", the concept of "Wadi Musheireb", "Barahas", and "Sikkas" were used to revitalize the old heritage and to connect different generations.

The quality of these four key spaces were examined against the "Project for Public Space" idea introduced by Dolores Hayden. Key attributes used to evaluate these spaces included, access and linkages, comfort and image, sociability and the uses and activities intended to be held at.

6.2.1 Access and Linkage:

After analyzing the master plan in terms of connectivity, safety, and pedestrian access, thee project was found to be:

- Well connected with the surrounding context by means of different public transportation options;
- Visual connections are well achieved where building heights varied from high-rise in the southern part to low/mid-rise along the north side;
- Public transit stops are conveniently located next to most of the hyper nodes areas identified in the master plan;
- Retail frontage were added to the ground level of the project, enhancing the connectivity of the project and fulfilling some safety considerations;
- Pedestrian routes and bicyclist routs are well connected;
- Car use is limited in the inner heart of the project; and
- Underground parking is planned for.

6.2.2 Comfort and Image:

Criteria used to evaluate comfort and image included pedestrian first impressions on the project, location of convenient facilities, safety, cleanness, and environmental quality. The following conclusion was drawn:

- The architectural language used to draw the memory of the place plays an important role in embracing the identity of the place;
- Safety was considered through the intimate designed pedestrian lanes and the retail frontage designed on the ground floor.
- Environmental management systems will be used to control the project. LEED criteria and measurement guidelines will be used to evaluate the project in terms of sustainability, in addition, environmental traditional systems were very well addressed in the architectural drawings of the project.
- In terms of cleanness, no evaluation could be determined at this stage of the project.
- In terms of location of convenience facilities; no evaluation could be determined at this stage either

6.2.3 Uses and Activities:

Criteria used included types if activities, targeted user profile, usage of space throughout the day, and management. The evaluation of this attribute could be summarized as follows:

- The project offers mixed use facilities where different activities take place;
- Since the project aims at serving a fully integrated community, different user categories are begin served;
- No clear ideas on the daily uses of the different project spaces has been identified so far except for the residential, schooling, and retail uses; and
- The management procedures are not clear yet.

6.2.4 Sociability:

When people see friends, meet and greet their neighbors, and feel comfortable interacting with strangers, they tend to feel a stronger sense of place or attachment to their community – and to the place they are in. Criteria used to evaluate the sociability attribute included; sense of belonging, group ageing, and facilities.

- The mix-used nature of the project offers services to wide range of different ages;
- The uses of Barahat were not clear in the master plan, and hence it was not clearly evaluated; and

- It is still not clear whether or not the projected social spaces will create a sense of belonging and engagement, Nevertheless, it is expected that a social memory of the place will be created.

In conclusion, the benefits of the place could be seen as follows:

- The project has a high real estate values;
- Higher demand on the projected services;
- It helps in re-vitalizing the Heart of Doha;
- Provides basic facilities for residents;
- Offers enhanced environmental qualities;
- Improves walkability and reduces car dependency

7 CONCLUSION

Qatar has grew dramatically through the last 40 years from a fishing and pearling based economy to a diverse economy after the discovery of the oil specially in the past three decades. The capital, Doha, has changed physically, economically, culturally, and demographically. The city has grown from one single core and expanded from it outwardly along major routes leaving Doha's downtown heavily congested due to the remarkable increase in Qatar's population from 750,000 in 2004 to 1,700,000 in 2010. It was very essential to redevelop the downtown of Doha to accommodate the urban expansion in the heart of the city. Many projects had been proposed and completed to improve the conditions in Doha's downtown. One of the main projects currently under construction is Rebuilding the center of Doha City project known as the Musheireb project. The Musheireb project was proposed to be a fresh and integrated approach where heritage, economic, sustainability, environment, and social enrichment are considered holistically. The project aimed at rebuilding the center Doha in a way that reinvigorates, modernizes and revives the site, while being true to the traditional culture and heritage that was the foundation of the first communities of Doha.

In this paper, two concepts including the Kevin Lynch's five elements concept and the Dolores Hayden place making concept were applied to better understand the image of the new downtown compared to the old one. According to the analysis, the project fulfilled many of the criterions listed in both concepts, however, the response of locals to this development is still unpredictable. There are some concerns that local people will not leave their houses located in the suburbs to live in apartments or villas even in a luxurious and well-designed project like Musheireb. In conclusion, Musheireb is a vibrant project for a city downtown according to its components and to the guidelines it addresses, however, it is not clear if it will address the social, heritage, and cultural needs of the local people. A post occupancy assessment will be needed in the future to evaluate if the project met the public interest and needs or not.

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Regeneration of Heritage Urban Space of Delhi, Shahjahanabad, the Walled City

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1 ABSTRACT

Delhi, a capital city of India is new extension of older settlements. This historic power centre has seen the rise and fall of many empires, which have left behind a plethora of monuments along with crunched settlements. Walled City (Shahjahanabad) is the seventh city of Delhi. It's rich heritage is dying. "King is no longer the rich King he used to be, the city looks as if pains were taken to keep up the buildings worth preserving" (Lady Fanny Eden, 1838).

Mughal monarch Shahjahan moved his capital from Agra to Shahjahanabad circa in 1638 AD with organic street pattern. That time the city was designed for 60,000 population which is spread over 569 hectares enclosing a wall punctured with seven major gates from which radiated highways to all parts of his empire. As per Indian 'Vastu Shastra' (Architecture) is perceived to have influenced its settlement geometry as a bow and arrow shaped semielliptical city. City was planned on man macrocosm analogies (Datmann, 1969); Spine as Chandni Chowk, Ribs as streets, Head as fort, Heart as Jama Masjid, Organs as Sarai (Rest House) and Wall as skin.

It was planned with a concept to have different identified areas earmarked with specific uses and trades such as jewellery, clothing and accessories under moonlight square 'Chandni Chowk'. The streets/lanes and bye lanes were of varying width designed primarily for pedestrian movements and animal driven vehicles. The original layout of the city was changed with the advent of British regime. Subsequently, the introduction of railway line along with growth of industries and commerce was largely responsible for increase in population thereby making the area most densely populated in Delhi. Presently more than 1500 persons reside in a hectare in part of this area. As found typical of central core of the metropolitan cities, the residential population of the walled city has been steadily declining from 0.042 millions in 1961 to 0.035 millions in 1981 and 0.0235 million in 2001 (MPD-2001) due to movement of people away from the central core.

The image varies from the ancient forts and settlements of Mughal Emperor's to the distinctive retail and wholesale markets of the modern days. Immensely rich in cultural heritage, Shahjahanabad with its palaces, mosques, bazaars (markets), gilded domes, havelis (mansions), katras (locality) and maze of lanes and bye lanes had been one of the most beautiful cities of the Orient. In public memory Shahjahanabad is a mess of chocked traffic movement, intense commerce (not only wholesale but also crowdpulling actvity), a maze of dark narrow alleyways, and a great tangle of billboards and electric cables. The walled city is plagued with problems of traffic congestion, infrastructure deterioration, unauthorized construction, dilapidated housing condition and makes traders of the area to convert their residential premises for non-residential uses. Urban renewal is often part of the gentrification process in Walled City. But this 'Special Area' is lacking to meet the demand of present need to typecast planning policy.

The consecutive three perspective plans do not follow its original pathway and always deviating from old. 1st Master plan (1961-81) 'Urban Renewal' policy was framed for redensification with maximum 100-150 pph with facilitate with essential community facilities deviating from existing density of 1500 pph of area did not help out to reshape the city. 2nd master plan for 2001 emphasized it as 'Special Area' with new planning code for making residential hub from deviating retails trade area. And now 3rd Master Plan 2021 imposes the fairy tale renewal and redevelopment policy in sake of revival of lost glory. One of the most challenging developments in cities revolve around the world are renewal, regeneration, reframe, remixing and redevelopment. This paper aims to highlight the malpractice of ever changing policy for reshaping city without considering its natural gamut and frameout the sustainable pathway for revival of its glory.

2 INTRODUCTION

Shahjahanabad or the walled city is the seventh city of Delhi. Prior to it, six other cities were built on different sites namely Lalkot, Siri, Tughlakabad, Jehanpanah, Ferozabad and Purana Qilla. Barring Shahjahanabad all other six cities perished. However, the Shahjahanabad city by and large retained its

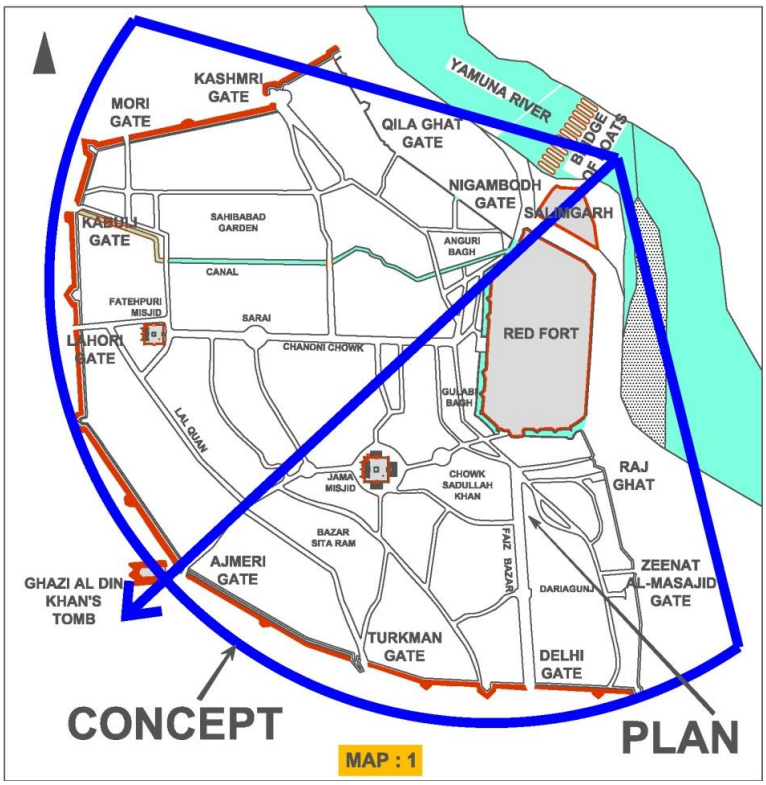
tradition and original character over the period by accommodating the growing and changing population as well as various kinds of economic activities.

Shahajahanabad was built in 17th century for a population of 60,000 covering an area of about 569 hectare. The city was developed in typical Mughal style, densely built with organic street pattern. It was planned with a concept to have different identified areas earmarked with specific uses such as different activities and trades in different lanes. The streets/lanes and bye lanes were of varying width designed primarily for pedestrian movements and animal driven vehicles. The original layout of the city was changed with British regime and further alignment of railway line along with growth of industries and commerce was largely responsible to increase in population.

Now, it is characterized by intense wholesale and retail commercial activity. It is also the cultural, administrative and economic heart of the old Delhi. Further the city is also renowned for its rich heritage and secular architecture. As per the Master Plan of Delhi (MPD) – 2001 and Zonal Development Plan the walled city has been designated as Special Area (Zone-A) for which conservation and environmental upgradation are the utmost need. The city suffers from inadequate infrastructure, traffic congestion, unauthorized constructions and misuse of residential premises for non residential activities. Hence the city has a presence of mixed land use with commercial activities in the ground floor and residential use in the second floor. There is an urgent need for redevelopment of these areas by decongestion so as to provide better living environment which should be backed by shifting of non-conforming industries, noxious and hazardous trade, upgradation of physical and social infrastructure, revival of old glory.

3 DELAYERING

Three distinct layers have marked this city; the Mughal City (1638-1819), the Colonial Shahjahanabad (1819-1947) and the post Colonial Shahjahanabad (1947 onwards). The tenacity of traditions and the porosity of space over a time span of nearly four centuries make this city miserable. These periods have been briefly summarized below.

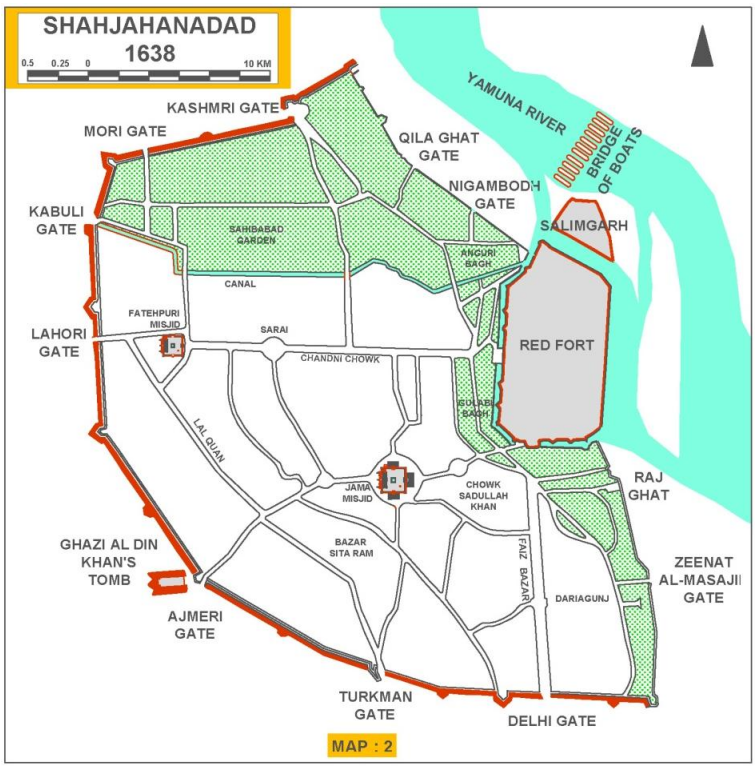


Mughal City: Mughal monarch Shahjahan established Shahjahanabad circa 1638 as a capital city from Agra, city of seven wonder Taj Mahal when the monarchy was at its peak and he its greatest builder. The city for 60,000 people, spread across 569 hectares enclosing a wall punctured with seven major gates (Kashmiri Gate, Kabuli Gate, Lahori Gate, Turkman Gate, Delhi Gate and Zennal Al Masjid Gate) from which radiated highways to all parts of his empire, was planned on principles prevailing for cities in that era. The city's urban design was an amalgamated model of Persian, Islamic and Vedic principles. Its architects Ustad

Hamid and Ustad Ahmed made this with Islamic cosmology, man macrocosm analogies; Spine – Chandni Chowk, Ribs streets, Head fort, Heart Jama Masjid, Organs Sarai, Wall skin. One of the most common descriptive models of the Islamic city in German Geography is that Dettmann (1969) described it as formal geometric pattern. The Vedic texts of 16th century Vastu Shastra and the Mansara on architecture and city planning respectively are perceived to have influenced its settlement geometry as a bow shaped semielliptical (Karmukha) (Map 1) city located on a river, its axes interpreted as the bow and the archer's arm, and, its circumferential streets the bow shaft. The junction of the two axes, an auspicious center, is the Emperors Palace. Scholars have further explored the dimensional relationships of the city's main elements, and chroniclers have recounted boulevard streets with water channels, grand mosques, havelis and gardens of the courtiers, arcaded bazaar (market) streets, prominent localities, baolis (stepwells), sarais (rest houses), kotwalis (Police stations), exclusive garden retreats, baradaris (community halls), chhattas (arcade) kuchas gallis (net weaving), madrasas (islamic school), maktabs (elementary school), khanqahs (place for spiritual retreat), khirkis (window) – a host of other elements of the material culture, some still surviving.

The hot and dry climate of Delhi made it necessary to develop an elaborate hydraulic system in order to ensure a constant, year round supply of water. It entered the city by the Kabuli gate in the North West and then split into two branches – one down the middle of Chandni Chowk and other into fort. There were 678 wells in city as per Roberts report in 1847 (Gupta 1981 p 19). Mughal garden had splitted in Chhar bagh (four gardens) concept. Tis hazari bagh just outside Kabuli gate, Raushanara begum garden near Lahori gate, nawab sirhindi and one near kashmiri gate. City was subdivided into 12 thanas (Police Post). According to Robert's report on the Census of Delhi in 1845-46 the city had population with 137,977 in 576 mohallas.

The main axes of the city were the two major boulevards connecting the fort to the city gates, larger and more important one was Chandni Chowk running from the Lahori Gate of the fort to the Fatehpuri Masjid (mosque) (Map 2). From there the road sidestepped to the north before continuing to the Lahori Gate of the city masjid. The road was laid out between two local points of the city creating an imperial axis. Chandni Chowk was forty yards wide and contained 1500 shops of a uniform design. Each shop occupied on room under one section of long arcade two squares divided chandni chowk into three sections. First square in rectangular square and second one is octagonal square. Second one is faiz bazaar running north-south from the Akabarbadi gate of the fort to Delhi gate. Other than these two the third bazaar was between fort and Friday mosque. Others several existed in city. Fort place was self contained unit with diwan-e-aam (Hall of Public Audience), diwan-e khas (Hall of Private audience) and etc. another important mosque is Jama Masjid.



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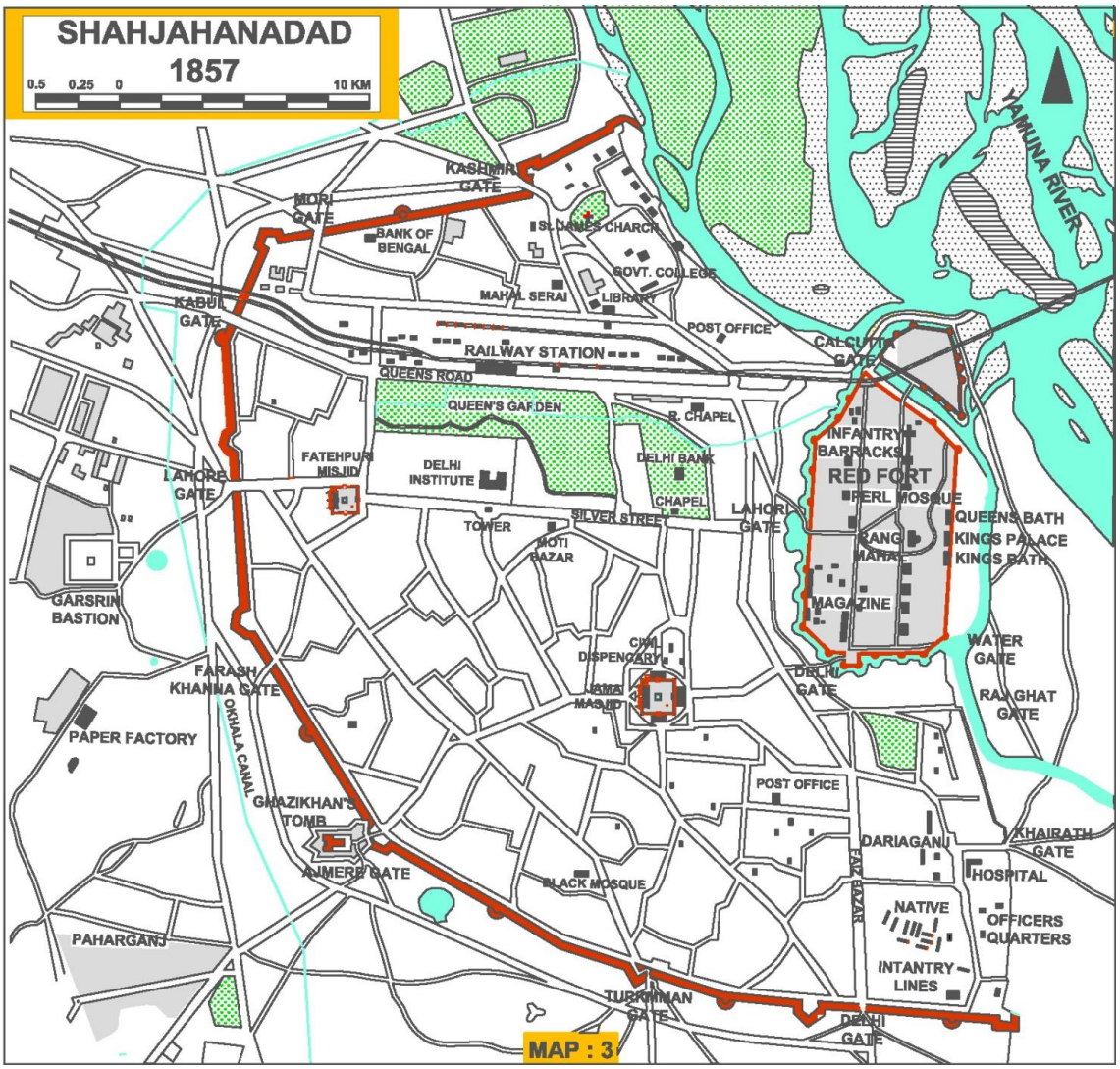
Courtyard houses of various scales, complexity and ornamentation signified the owner's status and social ranking; the larger Havelis reproduced a scaled down version of the Palace complex and were self contained. These Havelis with their spillover dependants building around them formed the nucleus of the 'morally system. Several locality names (Teliwara, Malliwara, Katra Nil, Farash khana, Ballimaran, Khari Baoli…) survive in the original, imprinting the associations, images of work settings, caste or social grouping, or the peculiarities of that area (Khari Baoli saline water stepwell, Chahlpura locality of 40 houses, Chandni Chowk silver square etc). Faiz bazaar and Chandni Chowk the two main axes had well stocked shops of even imported goods. The city had a healthy trade presence.

Colonial Shahjahanabad

Two phases mark this period, a begin 1803 onwards and an aggressive 1857 to 1947 one. Early British rule was marked by mild activities, as, proposing sanitary guidelines, restoring the indigenous Shahjahani water system, establishing satellite settlements outside the city walls (Civil Lines, Mubarakbagh, Kishanganj, Cantonment) and the Residency for Ochterlony and, later, Metcalf. After the 1857 revolt, large parts of the city were restructured making British power more visible. The notable changes were ejecting the city's population and destroying one third traditional neighbourhoods.

Introducing Edgerton Street (Nai Sarak) (Map 3) into the fabric and other new streets towards the centre and north of the city had formed. Replacing the Royal Sarai with the Town Hall had introduced the railway system 1867 by removing gardens and katras in that area, clearing the surroundings of the Palace complex 500 yds around as a defence measure, holding three Darbars, (1877, 1903, 1911); established a temporary capital as Civil Lines (200 acres) and planned a new capital. The reconfigured roads for isolating the Red Fort and changed water channel to roads divided red fort and Chandni Chowk and ultimately fragmented the city; introduced trams , the chowks was functioned for commerce rather than for community.



Post Colonial Shahjahanabad

The new establishment was seized with housing people of a divided country and Shahjahanabad offered an opportunity from its vacated properties by muslim families after partition of India in 1947. The new Master Plan detailed out strategies (through zonal plans) (1961) of population densities, land uses, exiting of obnoxious industries, and as well as special programmes for greening, improving, rehabilitating, conserving or redeveloping degraded areas. Schemes which got implemented were an implant of an outside world (Turkman Gate cluster housing in four storey apartments) which destroyed about 3 hectare area of old gate (Phatak Talyan), one largest courtyard and two mosques from Shahjahan's time i.e Dujana house, an earlier Palace of Mughal nobility was demolished to rehouse displaced persons but was only partly executed. Bazars around Jama Masjid were cleared and a garden introduced with shops relocated in a low profile Meena Bazar. Besides these planned changes, the city was on a commercial overdrive. Wholesale trade (60% of the entire city's) aligned along most bazaar streets in Chandni Chowk, Chawri Bazaar and introduced into traditional neighbourhoods. There was a tenfold increase in three decades. In the process, the katras and havelis are reshaping for commerce in an uninterrupted process. Whilst there is population loss in the city, those who cannot afford are getting more cramped in their living space. Three perspective plans for last 50 years put earmarked policy framework to revitalize the city glory. But in reality policy never comes into action in forefront and lack behind to substantiate the demand of present urge.

4 CHARACTERISTICS OF SHAHJAHANABAD

Table 1: Population Growth in Walled city (1951-2001)

YEAR	POPULATION (000)	% GROWTH
1951	381	-
1961	420	10.25
1971	409	-2.62
1981	400	-2.20
1991	350	-12.50
2001	235	-32.86
2011	158 (estimated)	

Source: Zonal Development Plan, Zone-A

Demographic Characteristics: As found typical of central core of the metropolitan cities, the residential population of the walled city has been steadily declining from 0.042 milllion in 1961 to 0.025 million in 2001 (MPD-2001). This has been mainly due to movement of people away from the central core. This was, however, accompanied by a reverse process of increase in the other activities and working population, which had further aggravated. The population figures indicate saturation by 1961 and afterwards it has been declining continuously as evident in table 1. It is mostly a high-density area. The density varies from 1596 to 17 persons per hectare (pph). The highest density is found in Chitli Kabar where as many as 1596 persons reside in a hectare. The lower densities are found in the areas of Red Fort, Railway Station, Daryaganj and Kashmere Gate, which are relatively built at later date in early forties. These areas contain some open spaces. In other areas like Churi Walan, Kucha Pati Ram, Farash Khana and Tilak Bazaar are also very high-density areas comprising of 1354 to 1501 persons per hectare.

Landuse Characteristics: Out of 569 Hectares, the area under residential measures 181 Hectares, this is 31.8% of the total area. The area under commercial use is 11.7% of the total area. The public and semi public facilities, (dispensaries, police and fire stations, dharamshalas/religious shelters, night shelters and public toilets) occupy an area of 41.80 hectares, which is 7.5% of the total area. Parks and playgrounds including Gandhi Grounds (in front of Delhi Railway Station) and open space in front of Jama Masjid occupy an area of 96.87 Hectares or 17.0 % of the Walled city area. Roads and streets occupy 131.70 hectares constituting 23.1% of the total area. There are 10 main roads with the right of way of 80 feet to 120 feet, where the commercial activities are recommended on the ground floor and also commercial activity on upper floors to continue.

Economic Characteristics: As per the available secondary data out of the total enterprises located in urban Delhi, about 7% are located in the Walled city. Out of total employment 35.80% people are engaged in retail trade followed by manufacturing and repair (18.42%). Beside these the other important avenue of employment includes wholesale trade (11.90%), financial services (9.05%) and Hotel & Restaurants (3.77%). Total revenue of this area is Rs 14.6 Crore compare to main business hub in Delhi Connaught Place

is only Rs. 4.6 Crores. Chandni Chowk-Khari Baoli –Shradhanand Marg Commercial Complex not only caters for the needs of Delhi, but also serves as the major commercial center both wholesale and retail for the entire Northern India. Food grain market at Naya Bazaar and Khari Baoli, hardware and paper trade at Chawri Bazaar, iron and cement at Ajmeri Gate, cloth markets in 'Katras' of Chandni Chowk, electrical appliances at Bhagirath Palace area, motor parts in Kashmere Gate and cycle traders near Jama Masjid constitute the vast wholesale trade for which Delhi is the major center.

Housing Characteristics: The extreme congestion within the Walled City and incursion of a myriad variety of activities and trade has deteriorated the living conditions. Majority of city houses are in advanced stage of decay and several areas have been overtaken by blight. During rainy season the houses are in danger of collapse. Even otherwise a large number of dwellings have undergone radical transformation including additions and alterations, which paradoxically made them more unlivable. As per surveyed by Housing and Urban Development Corporation (HUDCO) and Municipal Corporation of Delhi (1998) observed that out of total number of the properties surveyed at the selected stretches of the walled city only 4.6% are with ground floor construction while 23.8% have G+1 construction and remaining properties i.e, 71.5% have more than first floor construction which signifies the intensification of the building activities in the walled city.Shahjahanabad has within it 42 of the 170 protected monuments controlled by the national Archeological Survey of India (ASI). The Indian National Trust for Architectural and Cultural Heritage (INTACH) have documented and furnished list of 800 listed heritage building within Walled City.

Traffic & Transportation Characteristics: Metro Rail has given relief from traffic suffocation to users of old city. Total traffic is about 50,000 in a day on main corridor i.e. Red fort to fathpuri Masjid. Presently bus service has been provided to cater local traffic from main Chandni Chowk corridor. But due to presence of slow traffic like Rikswa (Cycle Driven tri-cycle), Hand driven cart, animal driven cart, auto, it becomes chaos.

5 MASTER PLANS APPROACH FOR WALLED CITY REGENERATION AND ITS SHORTFALL

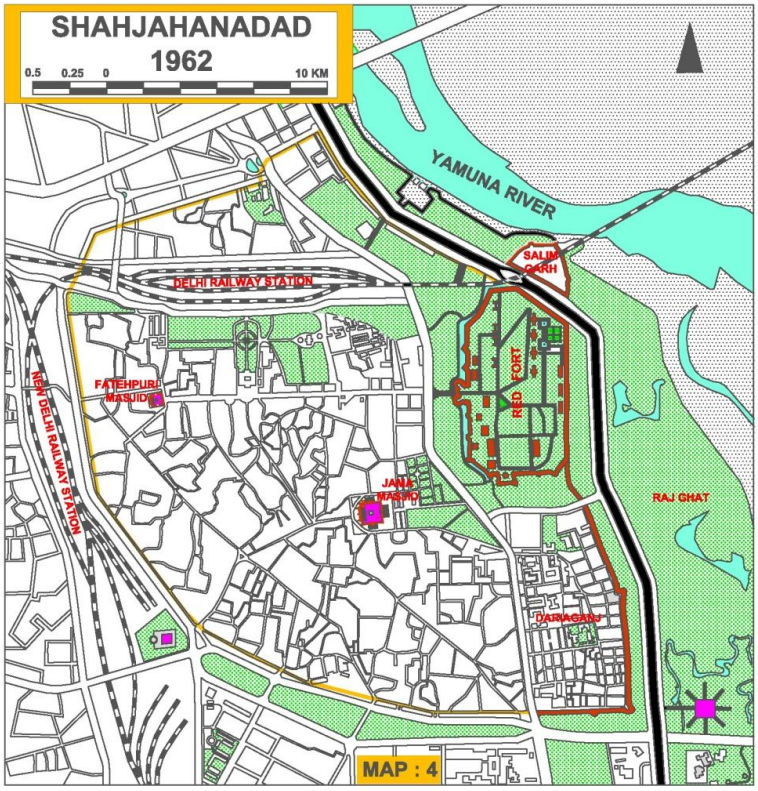
The Master Plan for Delhi provides policy frame work guiding for walled city's development. The consecutive three perspective plans do not follow its original pathway and always impose new deviating from old. The ever changing policy does not help out for reshaping the city from uninterrupted process of cramped development.

Delhi Master Plan 1962 Approach: The first master plan of Delhi (MPD) 1962 (Map 4) projected the concept of 'Urban Renewal' comprising of redevelopment, rehabilitation and conservation strategy. The 'first stage' of development considered redevelopment operations. It was framed for redensification with maximum 100-150 pph with facilitate with essential community facilities deviating from existing density of 1500 pph of area.In recognition of the approach described above, the preparation of Zonal Development Plan (Zone-A) aimed at:

(i) Provision of a circulation pattern with minimum widening of roads and demolition of structures in order to avoid major dislocation of the people and work. Standards for roads out skirting the zone vary from 24 to 36 feet. Suitable parking lots of sizeable areas were to be provided at convenient points where existing road width was 10-15 feet.

(ii) Provision of minimum community facilities in accordance with the prescribed standards; substantially lower planning standards were prescribed in MPD-1962 for the Walled city due to paucity of land. The land for the provision of community facilities would be made available by:

- Utilizing the space under Evacuee and Government properties;
- Clearing the non-conforming land uses;
- Acquiring and demolishing dangerous and the dilapidated structures.



Turkman Gate cluster housing in four storey apartments imposed with destroying about 3 hectare area of old gate i.e Phatak Talyan under the above part (a), one largest courtyard and two mosques from Shahjahan's time i.e Dujana house, an earlier Palace of Mughal nobility was demolished to rehouse displaced persons but was only partly executed. Bazaars around Jama Masjid were cleared and a garden introduced with shops relocated in a low profile Meena Bazar. Besides these planned changes, the city was on a commercial overdrive.

The entire Walled city was identified into three major components of urban renewal on the basis of the degree of deterioration and obsolescence. These were:

(i) Conservation Areas: The residential areas that needed protection from the spread of slums. Katra Neel, Ballimaran, Dariba Kalan and New Darya Ganj were grouped in this category.

(ii) Rehabilitation Areas: The areas partially blighted where buildings deteriorated due to neglect. Phatak Habash Khan, Chadni Chowk, Naya Bans, Farash Khana, Churiwalan and Kutcha Pati Ram were classified as rehabilitation areas.

(iii) Redevelopment Areas: The areas in very dilapidated conditions. Jamuna Basti, Lal Darwaza , parts of Matia Mahal and Suiwalan were classified as areas ripe for radical development

However, not much headway was made in improving the conditions.

Delhi Master Plan 2001 Approach: As per second master plan, MPD –2001 (Map 5) Walled city has been earmarked as 'Special Area' for the purpose of development. This area cannot be developed on the basis of normal regulations. Special regulations have been worked out for this area and incorporated in the Development Code.

The main objective for the development of Walled city is to clean the area from noxious and hazardous industries and trades to check further commercialization and industrialization of the area and to revitalize the same to its glory of the past.

The population in the walled city increased to saturation upto the year 1961, but since then, there is large-scale infill by commercial use replacing residential use. The trade and commerce activities have intruded much more in all the residential areas in the Walled city.

The special regulations as per MPD-2001 specifically emphasized:

(i) The predominant land of this area is to be made for residential.

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Editors: Manfred SCHRENK, Vasily V. POPOVICH, Peter ZEILE, Pietro ELISEI

(ii) The noxious industries and hazardous trades should be shifted from the walled city immediately within a maximum period of five years to be replaced by other compatible uses.

(iii) The public and semi public uses and services like hospital, dispensaries, colleges, school, police stations, fire stations, post offices, local government offices, parking,etc sholud be retained in their present locations and also additional sites could be indicated in the Urban Renewal and Zonal Plans. Any changes or additions thereof shall be in accordance within the overall policy frame prescribed in the plan.

(iv) Control for building /buildings within the use premises:

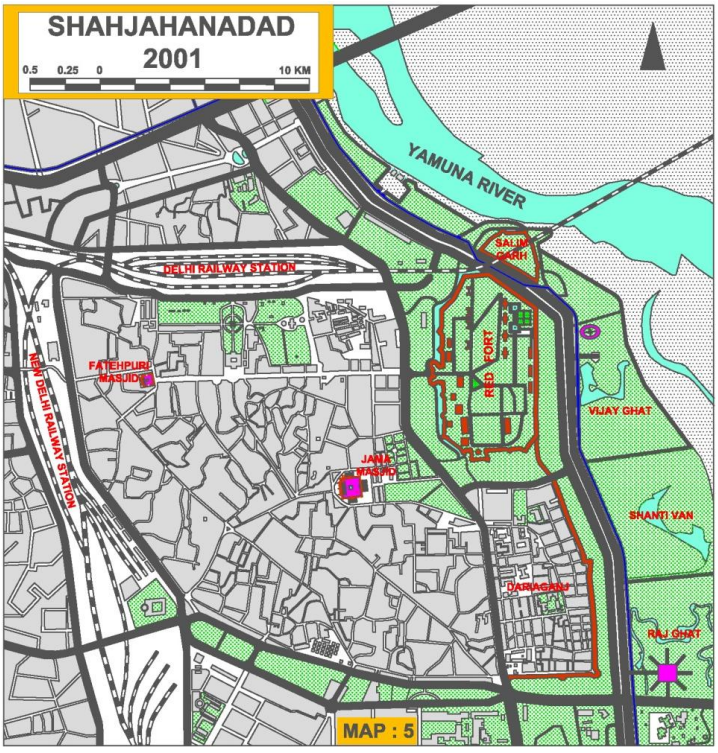
- Maximum ground coverage and FAR should be same as for the residential plot in plotted development.
- The street width in front of the plot should be left on the basis of Urban renewal scheme of the area.
- The building shall be permitted to be constructed practically in the same form and style as existing as far as possible.

(v) Within Walled city the building control regulations for special area should had been as under:

- Lajpat Rai Market: The single storied market on either side of Chandni Chowk to be retained.
- The isolated use premises like school adjoining Jama Masjid, presentation Convent School and the church at Kashmere Gate, Municipal Offices at Old Hindu College Building Complex should be retained with existing building volume.

Second MPD emphasized to rebuild walled city as a residential hub from exiting commercial trade house of Delhi that was impractical in nature. Deviating from first master plan with controlled density new code had introduced for this special area planning. It was envisaged that as far as possible Urban Renewal Project shall be self-financing. But in actual practice, no headway could be made in preparation of urban renewal schemes.

Delhi Master Plan 2021 Approach: According to the third MPD for 2021guidelines, a major theme is redevelopment of old and degraded areas while taking care those buildings of 'heritage value are protected and conserved' with special emphasis on:



Chandni Chowk recreating the lost glory: The Red Fort, Jama Masjid and Chandni Chowk have been put forward for protection and conservation of heritage buildings. Chandni Chowk as it is the centerpiece and dominant axis of the Walled City without going for large scale demolition and disturbing the present

activities, identified for revitalize the area for optimum transformation in the ambience of the Chandni Chowk can be achieved. It includes:

(i) Boulevard Development: Capturing full road right-of-way, re-paving of road by granite stones, transplanting grown up trees, development of tourist/information booths, music stands, kiosks, telephone booths, public toilets, etc., controlling signboards, hoardings and putting up new signages, shifting of overhead cables and wires in the underground space.

(ii) Improving street lighting, light masts and lighting of building facades.

(iii) Running of free coaches/trolley buses between Red Fort and Fatehpuri Mosque.

(iv) The informal unorganised shops and vendors to be restricted in the lanes perpendicular to it.

(v) Create a tourist/people friendly environment Chandni Chowk with complete pedestrianisation and trees.

The large scale encroachments on public lands, particularly road right of ways continue unabated.

Metro Corridor Development: Lack of zonal plan for this area for 2021 the Master Plan guidelines state that an opportunity for redevelopment in Delhi is offered on the two sides of the metro rail routes. The main priority is to decongest the old city and to shift traffic generating activities from the old City. About 50 per cent of the Inner City is within 8 to 10 minutes of walking distance from Metro Stations in Chandni Chowk. This has released congestion from already choked roads and reduced the parking demand. This has provided opportunity to pedestrian some of the roads in the Walled City and other area. It has improved accessibility and encourages decentralisation of wholesale trade from old Delhi. Already flower whole sale market had shifted from Chandni Chowk to Noida phase I in NCR

Shifting of wholesale trade, noxious industries and hazardous business from the old City: it is proposed to develop counter centres in the form of Integrated Freight Complexes at the peripheral location to shift from the Special Area in a time frame by a set of incentives

- New industrial area,
- Development of Truck Terminals, Vehicle Repair Workshop, Old Car Markets, Motor Parts Markets at periphery of Urban Delhi and
- Railway Freight Terminals.

The dreams of shifting of wholesale trade, noxious industries and hazardous trades have by and large remained on the papers.

Building Bye Laws improvement: Highly optimistic policy in Special Area planning has proposed front and setback of building. The incentive of additional FAR, alongwith other measures like liberalisation of land use time bound approvals, etc are also found in policy. But this special area needs special focus from general condition of Delhi. There is no space between building, 100% covered area. Without breakthrough of building practically front and set back cannot be framed. On other round policy never appreciates major demolition of structure. The self contradictory policy needs to work out feasible, applicable zonal plan for landuse control with main emphasis on conservation practice. Action plan along with sector plan is more appropriate than only strategy planning in this case. The main problem of land control in this area is ownership and original permissible limit identification. So, Conversion charges, development charges, betterment levy and other charges are impractical. The fairy tale renewal and redevelopment policy does not make justice to community.

Practitioners suggested several attractive areas/streets (like Chandni Chowk & Dariba) can be taken up for urban renewal and pedestrianisation. Not only the Inner City, but also 30-40 years old housing complexes continue to suffer degradation and unauthorised additions and alterations. These are ripe for urban renewal, for which local bodies should encourage the residents/cooperatives and Resident Welfare Associations to take up urban renewal. But due to without incorporating local people perception planning are formulated and remain on paper itself.

6 OTHER PLANS

Steering Committee Recommendations: According to the Streering Committee constituted by the MOUD (1996) recommended decentralise the wholesale trade particularly those which are hazardous. The Steering Committee pointed out that the residential area having unique character especially within the walled city

should be conserved with care and sensitivity as well as entry of vehicular traffic needs to be restrained to maintain the desired level of circulation and parking.

Delhi Urban Heritage Foundation: In 1997, Delhi Urban Heritage Foundation was set up under Delhi Development Act. It had emphasisesd to frame out rules and regulation and institutional framework for conservation of heritage and urban renewal. It also referred to create partnerships and commitments among stakeholders, to mobilize government/private investments, monitoring of the implementation projects.

Chandni Chowk Redevelopment Plan (2009): Municipal Corporation of Delhi (MCD) has formulated Shajahanabad Redevelopment Corporation (SRDC) division for revitalization of Walled city. It has come up with several redevelopment plans firstly: Redevelope Chandni Chowk i.e. Red Fort to Fatehpuri Masjid square, secondly Conservation of Heritage Building, thirdly Conservation & Heriage walk fourthly multi level car parking near railway station . The main emphasis of this plan is as follow:

- create unique urban space for ultimate tourist destination by using environment friendly technology, pedestrianization,
- eco friendly battery operated transport system within city premise,
- restricted vehicular path with underground cable system,
- tree avenue street furniture for leisure, information centers,

The goal of this action plan is to make walled city as ultimate tourist destination without considering its heartbeat activity. The Steering Committee recommended almost 15 years back to decentralise the wholesale trade from this urban fabric. But recent action plan only restrict vehicular movement on particular stretch without palnning of decentralise the traders. Commercial encroachment from the informal sector neither of which were planned for by the original city planners of Shahjahanabad. To remove the encroacher without wholesale shifting is not possible at all. It can say that ‘a chain is only as strong as its weakest link’. Imposing growth never sustain from deviating its original footway. Imposing regeneration has proved leading to its condemnation as a whole of Walled City.

7 CONCLUSION

The walled city is plagued with suffocating condition with traffic congestion, infrastructure deterioration, unauthorized construction, dilapidated housing and overall low quality of life. The transformation of residential premises for non-residential uses acts as a barrier in the conservation of heritage, urban renewal, land assembly, legitimate property tenure, titles and transfers, infrastructure upgradation, financial mobilisation, development rights, etc. Unattending application of plans leads it as a staus of slum under the Slum Area Act, 1956. Neither the legal framework, nor the present organisational structure have been able to control unauthorised reconstruction of historical havelis/buildings or in taking up any meaningful redevelopment. On the other hand indiscriminate application of the several plans has proved counter-productive in economic and physical regeneration of the Special Area. In order to address Special Area effectively to the emerging issues there is the need for conservation and decentralisation of activity to make amendments. The utmost strategy for revitalizing the glory of Walled city are:

(i) Conservation approach to retain the overall traditional character of the Walled City. Those building are heritage importance should be conserve. Shahjahanabad has within it 42 of the 170 protected monuments controlled by the national Archeological Survey of India (ASI). The Indian National Trust for Architectural and Cultural Heritage (INTACH) have documented a list of 411 Listed Buildings within Shahjahanabad. The Delhi chapter of INTACH has proposed 8 Conservation Zones. There are 10 heritage walks (SRDC)

(ii) Decentralisation of trade, commerce and industry from core area of Shahjahanabad. The main street, now termed Chandni Chowk, runs from the Red Fort to Fatehpuri Masjid is fully congested with garments whole trader. North of the street, there is the mansion of Begum Samru, now called Bhagirath Palace is known for electronics goods. South is the street is Dariba, a famous street from Mughal period for jwellery shops, beyond which is Jama Masjid. Daryaganj is a section that used to border the river at Rajghat and Zeenat-ul-Masajid. Its main arteries are Netaji Subhash Marg/Bahadur Shah Zafar Marg leading to India Gate (north and south) and ends upto railway station. And other Khari Baoli roads aligns on east west from chandni chowk road was carrying flower wholesale market now it has shifted. Lala Lajpat Rai for electronics goods, The Ajmeri Gate to Chawri Bazar axis wholesale paper trade located towards the Jama Masjid and

ironhardware towards the Ajmeri Gate, Cycle wholesale market towards fatehpuri masjid, Nai sadak for printing press, Grocery roads need to be shifted in designated area. Environmental up-gradation requires reducing degenerative effects of traffic ongestion.

(iii) Visual integration of major landmarks to revitalise the past glory. Enhance the existing visual link between the three major landmarks namely Red Fort, Jama Masjid and Fatehpuri Mosque as per original concept of Walled City of Shahjahanabad. This could have been possible to restrict FAR increase. The old building does not carry the loads for further rise. Judicious landuse regulation could have been possible to revive its glory.

(iv) Pedestrianisation of Chandni Chowk to impart grandeur to the monuments will make completely free of vehicular traffic so as to restore the human scale and convenient living. Battery operated vehicle, man driven rickswaw all make chaos and accident.

(v) Introduction of mughal activities such as traditional/craft bazaar, heritage walk/rides, generation of urban culture at neighbourhood level such as festivals/fairs to attract tourists. Encroachment of facets is to be vacated. Ancillary commerce will automatically shift with the shifting of trades and wholes market

Regeneration of heritage urban space of Delhi, Shajahanabad will be possible to manifest its glory through decntralise trades, landuse control and zonation practice monitoring amendments and stop further development and back to in-situ situation.

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🏆 *reviewed paper*

Remixing New Ideas with Old Countries–the Attempt to Apply Airport City Concept and Special City Quartier Concepts to the Armenian Landscape

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1 ABSTRACT

The article poses the question, how administrative units and enitities, responsible for a developing country can generate value of modern city quartier reflections even if correlations are not "visible" at first sight. Based on the strategic concept of Airport Cities, introduced by John D. Kasarda of the Kenan-Flagler Business School at the University of North Carolina, model ideas and potential development pathways will be presented and discussed with selected employees of the administrative bodies of planning authorities and airport responsibiles of Erivan airport Zavrots. The existing lessons learned and their impulse generated have lead to valuable insights.

2 CONCEPT AND APPLICATION AREA

2.1 Airport city concept as development engines

In John Kasarda book "Aerotropolis: Airport-Driven Urban Development" (2000), a new phenomen called "Airport city" has been introduced to city planners, airport executives and academic economic thinkers as well as administrative bodies on variuos levels. Based on the dynamics created by the pure traffic ("the buzz") and the directly connected functions of airports, business infrastructure and internal allocation decider should seek proximity to airports. For the establishment of corporate real estates and communities of airport city inhabitants should be placed at vene-alike lanes to and from the aviation functions instead of supposedly preferable movements away from noise, traffic and environmental impacts towards urban areas or movement towards traditional city centers.

Airports which have either been traditionally and small within the city centre or new and allocated in the outer vast suburban area on large scale seemed the two available options. New developments like "densification programmes" at Memphis or consequent Area Development at Amsterdam Airport with dedicated companies for city development and quartier marketing seemed to herald a new area.

Airport executives from around the globe pursued this strategic approach and therefore allocated planning resources, investments and shareholder groups in structured, even clustered ways at the heart of their operations. Their investment did not exclusively focus on the development of direct and traditional non-aviation functions like travel value shops at departure gates, but have spread into entertainment parks, brainwork campuses or media centres. This changed settlement as well as planning approach have changed significantly from its former pure infrastructural setting for landings and takeoffs of planes. The revenue streams which could have been generated from rents, fees, marketing campaigns and real estate development have nearly grown as high as the aviation-related income (ratios differ significantly due to definition, revenue assessment and airport profile).

Based on academic research of the past decades, an internal benchmark study has been undertaken in 2008/2009 to assess existing planning approaches, models, success factors and development paths of selected Asian and European airports. Due to preselection criteria and decided strategic commitment of the respective managements, the group of probands was subjective and certain results might be predetermined as certain characteristics of Airport City concept applications were self-evident. Referring to this preset selection criterias and therefore limited assessment, a more open approach and therefore an attempt to apply the ideas to completely different airports has been taken into consideration.

2.2 "Old country–need for action"

Inspired by engagement with economists and academics for cultural history and economics at the DUA (Deutsche Universität in Armenien) in Armenia, the idea to apply the idea to this emerging country was born. In interviews and discussion rounds, the ideas of Airport City as well as the results of the aforementioned benchmark studies have been presented and selected feedbacks have been tracked for this article.

Armenia, as an interior land, surrounded by Georgia, Aserbaidschan, Iran and Turkey but restricted by effectively two closed borders, has to rely on the aviation and the corresponding infrastructure to engage with the rest of the world in terms of economic traffic, knowledge transfer and social planning tasks (living, studying, travelling, etc.) to manage the challenges at hand–dealing with employment situation, effects of the diaspora, need for development of soft and hard infrastructure, etc. [1]

With roots grown in a culture of trade, Armenia has the general open mindset for infrastructure projects and should be in touch with modern infrastructure concepts and models to align its planning activities, objectives and resources accordingly. Within the last decade, comparably large infrastructure projects have already been launched–communes and cities fight for scarce resource and search for governmental support for development projects, ranging from universities to city routes. The question of adequate allocation of these resources as well as planning attention and intelligence is faced by the administrative bodies as well as associated advisory boards.

Even in hindsight to its historic role as a hub of trade routes, its geography and its position as one of the emerging countries within the Caucasus region with the strongest boom, the objective to become "hub for trade and tourism between Asia and Europe 1[2]" seems too eager and ambitious–however, the value of the vision might be alignment of various stakeholders, the inhabitants and the market forces.

2.3 Presentation of success factors for Airport Cities, resulting from initial benchmark study

Within the initial benchmark study, relevant and determining factors for the success of an airport city have been identified and defined. Each of these factors has been assessed for the Zvartnots, based on secondary research and selective interviews. Deeper assessment has been planned in next phase of cooperation.

- Ownership structures: Factor includes aspects like investors, their profiles and objectives as well as their potentially varying expectations, priorities and planning horizon.
- Location/Connectivity: Factor deals with infrastructural network aspects, intermodality with other infrastructures, levels of competition/cooperation for transport mode
- Airport core functions: Factor assesses the positioning in terms of hub, capital airport, percentage rate of logistics, effectiveness of aviation functions (mid-/long-term)
- Area and space situation: Factor includes evaluation of current and short-term situation as well as potential for extension for intended cluster settlement
- Framework parameters: Factor includes institutional and legal framework, responsibilities and competences within administrative units, etc.
- Planning and development culture: Factor includes prognosis and trend assessment, milestones and schedules of responsibilities and takes a closer look at planning and resource allocation procedures
- Leadership: This "soft" factor deals with the positioning of the airport, or more precisely the airport management team. It provides insight into the role, either as the "engine" of the process, supported by resources, competences and corresponding staff profiles, corporate culture and structure elements.
- Shareholder and stakeholder engagement: Factors deals with potential vision and mission for the concept, the handling of joint platforms for engagement and interaction, the level of trust and comfort for joint activities as well as formalized processes like mediation procedures or installed task forces

2.4 Application of success factors and lessons learned

Regarding the aforementioned factors, the following initial assessments have been undertaken for Zvartnots International Airport in 2011 with focus on the hard factors. The results represent only excerpts of the overall report.

[1] Various interviews with representatives from DUA (Deutsche Universität in Armenien), 2010/2011
[2] http://www.armien.am/forum/index.php, Artikel: Der neue Flughafen Zvartnots verbindet Deutschland mit Armenien 6x wöchentlich, accessed on the 17th of November 2010

2.4.1 Ownership structures

Early in the process, the need for investment into the existing facilities as well as management know-how transfer was perceived. Alike other countries in comparable situations, e.g. former satellite countries and their capital airports, the decision for cooperation and concession models like PPP or management contracts have been made. This resulted in 2001in a 30-year contract concerning the operation and building of new facilities by the Armenia International Airports CJSC with an Argentine company, which belongs to business man Eduardo Eurnekian [3]. By involving the financial resources, the aviation-related infrastructure investments for rising passenger flows, e.g. terminals, new tower, arrival have been secured. The question still remains, if the resulting aviation-related fees cover the revenue expectations of the consortium or which other steps for the close-by areas might be necessary, to strengthen the location, the city and the country as a whole for internal/national and external/international markets.

2.4.2 Location/Connectivity

One key element of airport profile is their connectedness to city, region and country. Due to the current state of development, the main transport to and from the airport is via one main road and via taxi. As the rest of the country is on comparably lower development, the existing state might be sufficient for the medium term (1.44 mio. passengers in 2009; 1.6 mio. passengers in 2010). The capital Eriwan is approximately 10 km away and the next airport also lies close by. A more detailed assessment of infrastructure plans for the area is planned in the next step.

However, assessing the factor "location" on a meta level, e.g. Armenia´s position as an interior country, with relatively limited infrastructure connections to its neighbours, it might result in a negative result, and therefore "blocking" factor for Armenian development. But on the other hand, it might lead to the overall conviction and push towards leveraging even more of the attractiveness of the airport and, with this, its importance as infrastructure supplier and node for all kinds of traffic.

2.4.3 Airport core functions

Bearing the latest passenger numbers in mind and the underlying growth path, the provided facilities, as seem more than sufficient for the upcoming decades. The outlined and mostly finished activities like arrival halls, tower and logistic facilities had been necessary to cover the demands after the change in the political situation with the former UDSSR and the declaration of independence. The factor can be assessed as generally positive, taking into consideration the general size of the airport.

2.4.4 Area and space situation

The airport is located in medium proximity to the city, defined by the main road and forestral areas on one side. The overall situation is therefore positive, as potentially limiting factors like close-by residential areas, water or environmentally protected areas or historically protected buildings are not existent.

In discussions on this aspect of whether the allocation of clusters, buildings and business should take place here, the general impression was reinforced that there might be areas which are more pressing for investment. Nevertheless, the question of long-term development and conservation of future potential should be kept in mind, as John Kasarda mentions repeatedly [4].

In addition to the questions, if respective settlement and allocation should be pursued, the question needs to be answered which clusters should be selected and attracted. The traditional clusters are logistics (which has already been included in the planning process), aviation-related services like aircraft maintenance and catering but also hotels and conference operations as well as connected social/entertainment and leisure services. The overall size of the airport and situation of the airport leads to a limited provision of these services and proposes the allocation of tertiary services within city limits.

2.4.5 Framework parameters

As mentioned before, the political situation in Armenia and the resulting framework parameters have been undergoing significant changes within the last decades, including the Berg-Karabach conflict, the situation and borders and the aftermaths of diasporas. However, the position and profile is continuously improving

[3] www.wikipedia.com on Zvartnots airport, assessed on the 17th of November 2010
[4] Kasarda, J., Lindsay, G., Aerotropolis – the way we´ll live next, 1st edition, 2011

and therefore the institutional and legal frameworks are still under development and design–this might have repressive as well as beneficial for planning procedures and projects.

Within the evaluation, that also covers the level of economic attractiveness of countries and locations, the level of stability of the law and more precisely the legal bindingness of contracts and negotiations have been assessed as "positive", especially referring to international organizations, such as the German society for investment and development (Deutsche Investitions- und Entwicklungsgesellschaft (DEG) [5].

2.4.6 Planning and development culture

These factors have been assessed in close relation with the framework parameters. The ongoing geopolitical and social changes also impact on the respective culture, style and approaches–however universities, independent consultancies, administrative bodies are engaging in this field. In the special case of Armenia, the effects of the diaspora need to be taken into account which might lead to a faster, better and more efficient solution. Besides financial aspects and the attraction of foreign investments, other factors come into play and have been stressed by the World Bank, especially for countries in transition [6]. These include quality of investment culture, speed of change in management culture, proximity to established markets, speed of transfer of new managerial skills, simplicity of access to existing access due to cultural links, potential position for advices to governments of home countries with respect to improvement of investment climate and deregulation. This factor therefore bears immense potential.

2.4.7 Leadership

This factor is assessed in a next step of the research project with organizational structures and processes to be analyzed for approaches of knowledge transfer, vision alignment and general positioning towards "beyond the fence" developments. The potential of engagement between transmigrants which return to their home country as well as new entrants need to be leveraged especially for this important factor of the country´s development [7].

2.4.8 Shareholder and stakeholder engagement

Within the initial benchmark study, this soft factor of cooperation and communication has been given special attention as negative experiences like demonstrations, court cases with solid blocks against further development or cost intensive mediation procedures have been collected sufficiently at other airports as well as infrastructure projects. These lessons learned should be taken into account early in the process as engagement with concerned groups like inhabitants, local business communities, environmental groups and planning units are of importance for the overall success of this kind of projects. As the development stage of the country and the airport are still on a developing path (approximately 3.5 mio. overall Armenian inhabitants and approx. 2 mio. passengers in the near future), the active consideration of platform installation, forming of task forces or marketing units is still too early.

The general public has (hopefully) realized the importance of tourism and air traffic for their country and its development–this might result in limited resistance against airport-centered developments. However, continuous monitoring of the atmosphere and support of this process is recommendable.

3 SUMMARY AND OUTLOOK

In conclusion, the main lessons learned of the idea exchange and analysis process are captured as follows:

- The success factors which have been identified during the initial benchmark studies can be taken as feasible starting points for other airports and provide in their entity a framework for thought-provoking impulses and analysis.
- Airports can be seen as nucleus for sociopolitical and resource allocating considerations of countries and also serve as interesting research areas for city planners, economists and business people.

[5] http://www.karlsruhe.ihk.de/produktmarken/international/laenderschwerpunkt_armenien, Artikel: Deutschland finanziert Flughafenausbau in Armenien, Accessed on the 17th of November 2010

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- Nor the pure direct application nor forceful imposing of a concept according to the principle of "one size fits all" is to be aspired and to be understood as a guarantee for success, but the initiation of dialogues, reflection and assessment of ideas and models.
- The individual and collective examination of transferability and the deduction of knowledge for the individual work and ideas, independent of type of position as either planner or responsible at an institutional unit with conceptual tasks for guidelines or resource allocation has been the intended purpose of the research project.
- The task of remixing new ideas with old country has been completed by the attempt to apply and connect these two apparently non-connected aspects.
- As an outlook, the research team intends to assess the soft factors in more detail and monitor the ongoing process between the actors involved mid-term.

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Resilience, Resistance, Reinvention of the Right to the City

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1 ABSTRACT

This paper looks at 're-mixing the city' as a path to sustainability from the other end of the telescope. It argues that 'the good city' - regardless of its definition[1] - requires equitable 'mixing' of both urban populations and urban fabric, to sustain diverse urban spaces with wide access. Key to social and spatial justice in the city is 'the right to the city'[2] for all, as deliberated over the last half century by Henri Lefebvre,[3] Manuel Castells[4] and David Harvey,[5] seminal among many other scholars. The paper examines urban protest movements agaist the divisive effects of the economic crisis and whether such resistance is the requisite context of an inclusive urban constallation[6] fostering the right to the city and a more sustainable and resilient re-mixing of cities.

2 CLARIFYING 'REMIXING', 'SUSTAINABILITY' AND 'RESILIENCE'

The CORP12 conference is asking whether re-mixing the city is contributing to its sustainability and resilience. It states that cities are changing constantly with a quote from Heraclitus: *"there is nothing permanent except change"*. Urban change takes place all the time, driven by complex forces and taking different forms. Some unpredicted changes are inflicted from the outside, by natural or man-made disasters, wars or terrorist attacks. Some are slow and continuous, such as the deterioration of the physical fabric, redundancy of infrastructure, inadequacy of the building stock for new uses. Some recur spontaneously brought about by those who are coming and going and those who use the city every day, "urban dwellers", an urban phenomenon Lefebvre named "habiting".[7].

Re-mixing through large scale spatial interventions in cities tends to be led from the top, predominantly by capital investment into real estate. Traditionally, planning assumed this role in many mature economies, and on occasion politicians or professional visionaries made their mark.[8]

When changes imposed from above by the few on the many become intolerable for the dispossessed they bring revolt into the streets. Using the example of present day London this paper concentrates on people's manifestations for the right to the city, and in particular for their right to use as well as to shape the city.[9] It inquires what civic resistance, demonstrations, riots and occupations may contribute to a more democratic and equitable re-mixing of the city.

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[1] The notion of "the good city" has been explored by many scholars: Kevin Lynch wrote about good city form in 1984, and David Donnison about the good city in Britain with Paul Soto, Heineman1980. In 2006 Ash Amin (University of Durham) argues in favour of the good city as a formative arena in Urban Studies; and John Friedman, pleads for The Good City, in defence of utopian thinking, International Journal of Urban and Regional Research Vol 24, Issue 2, pp 460-472,June 2000.

[2] An example of the most recent revival of the discussion on the right to the city is Andy Merrifield. Here comes everybody? Problematising The Right to the City, 2011, International Journal of Urban and Regional Research lecture.

[3] Henri Lefebvre. 1971. Le droit a la ville I. Editions anthropos. Henri Lefebvre. 1972. Espace et politique, le droit a la ville II.

[4] Manuel Castells Trilogy: The Information Age: Economy, Society and Culture. 1996. Vol I: The Rise of the Network Society 1997. Vol II: the Power of Identity 1998. Vol III: End of Millennium. Blackwell

[5] David Harvey. The Right to the City. New Left Review 53, September/October 2008. pp23-40. http://occupylsx.org/?tag=david-harvey. David Harvey addressing Occupy lsx on 12/11/11, vhttp://bellacaledonia.org.uk/2011/11/15/david-harvey-at-occupy-london/. David Harvey. 2008. The Right to the City. New Left Review 53 (8): 23-40.

[6] Matthew Grandy (ed). 2011. Urban Constellations. Jovis

[7] Henri Lefebvre. 2003. The Urban Revolution. University of Minnesota Press. p xiv (foreword). Doe comprehensive overview of Lefebvre's work on this theme see. Lukasz Stanek. 2011. Henri Lefebvre on Space, architecture, urban research and the production of theory, University of Minnesota Press.

[8] In the United States William Penn, Philadelphia plan 1682; Daniel Burnham Chicago plan 1909; Robert Moses New York plan 1939; Rockefeller family involved in New York low cost housing; Eleanor Roosevelt's social reform with national parks, etc; in Spain Ildefons Cerda Barcelona ensanche 1859; Arturo Soria y Mata, linear city Madrid 1882; Madrid regional spatial strategic plan 1997 Pedro Ortiz, etc; in France Baron Georges-Eugene Haussman Paris 1859; EPAD La Defense 1958; Ile de France development plan 2011, etc; in the UK Christopher Wren London 1666; John Nash Regent's Street 1813; Great Estates of London (late 18th early 19th century); Ebenezer Howard, Garden City of Tomorrow 1902 and its influence on new towns; Patrick Abercrombie London plan 1944; Milton Keynes Richard Llwelyn-Davies1971; London World City, 1991, HMSO a report produced by key protagonists of the financial and property sectors; revisited by Greg Clark. 2012. London World City, 20 Years On. forthcoming.

[9] Lukasz Stanek. 2011. Henri Lefebvre on Space. University of Minnesota Press.

2.1 Re-mixing

City structures and functions vary enormously throughout the world due to, inter alia, historic development, cultural context, morphological conditions, urban economy and city competitiveness. Before thinking about remixing the city, it is useful to explore to what extent cities are already mixed. Many cities are getting increasingly diverse, in terms of population, socio-economic status, activities, etc. Often, the renewal of their fabric tends to follow yesteryear's convergent solutions. They are driven by the development industry and their star architects, supported by relaxed planning legislation and urban design postulates, such as high density around transportation interchanges. Such urban change is designed to yield the highest land and property values through considerable increase of density. This is achieved by resorting to skyscrapers[10] and groundscrapers;[11] capturing air rights above public buildings and absorbing rights of way on the ground; producing securitised buildings with segregated uses for ease of trading on the stock market,[12] and in monotonous sprawling suburbia[13] delivered and sold by volume builders.

Of course the urban fabric encompasses a much greater variety of buildings, spaces and places. Quantitatively though these prototypes dominate urban change. While they contribute diversity to the city fabric overall they tend to produce segregated fragments within the city, as they are increasingly gated and inaccessible and even their open spaces are privately owned and controlled.[14] The legacy of zoning planning based on modernist separation of functions is also contributing to spatial segregation. There is thus a need for re-mixing cities with greater social and spatial justice in mind,[15] to provide wider access to more places for a larger number of people living, working and playing in the city.

2.2 Sustainability and resilience

Sustainability[16] has entered the vocabulary of urban change, following environmental and later ecological concerns. This all embracing notion is rarely specified in operational terms and tends to serve political dogma as much as the need for mitigation and/or adaptation to climate change. Here sustainability is interpreted as a feature of inclusion, making sure that re-mixing the cities provides spaces for all city users.

Resilience is the latest newcomer to the virtues required for successful urban change. On the material side, it implies durability, a high quality urban fabric, built to last with proper know-how. On the human side, it means stamina and staying power, also of those who are not well served by mainstream urban regeneration and change. It may infer balance, equity between urban supply and demand, between city uses and city users.

3 FINANCIAL CRISIS AND URBAN AUSTERITY

Referring to Castells,[17] the tripartite power base of neo-liberal capitalism consisting of the financial system, corporate media and the political class has led repeatedly to economic crises. As a palliative, those in power are resorting for citizens' taxes, usually without their consent. The political managers of the economy are imposing austerity with its corollaries of inflation or stagflation and rising unemployment at the cost of citizens' living standards and material security. Economic crises are perceived by many as failure of the market based economy.[18] Far from re-mixing cities towards greater sustainability, understood as a better

[10] For arguments in favour of skyscrapers see: London Report, Skyscrapers, Clustering 'Improve Sustainability" <http://siteselection.com/ssinsider/snapshot/sf020429.htm> about Tall Buildings and Sustainability, Corporation of London. For arguments against see Simon Jenkins, e.g. the neglect of our heritage is shameful… The Guardian 12 September 2008.

[11] Critique of London's groundscrapers, http://www.skyscrapercity.com/showthread.php?t=438095

[12] e.g. Marc Breidenbach. 2003. Real Estate Securitisation as an Alternative Source of Financing for the Property Industry. Pacific Rim Real Estate Society conference, Brisbane Australia.

[13] e.g. Edward L Glaeser and Matthew E Kahn. 2003. Sprawl and urban growth. Working Paper 9733. National Bureau of Economic Research. Definition of Suburban Sprawl http://www.ehow.com/about_5097558_definition-suburban-sprawl.html

[14] Anna Minton. 2012. Ground Control. Penguin Books

[15] See Edward W Soja. 2010. Seeking Spatial Justice. University of Minnesota Press; and David Harvey's many writings on this topic, including with emphasis on the cultural experiential dimension. David Harvey.1985. Consciousness and the Urban Experience, studies in the history and theory of capitalist urbanisation. Blackwell.

[16] The classic definition has been coined in the 1987 Bruntland Report 'Our Common Future' as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs": " but it has been criticised as being too diffuse to be meaningful.

[17] Manuel Castells. 1978. City, Class and Power. MacMillan. Manuel Castells M. Corby. S Cohen FH Cardoso. 1993. The New Global Economy in the Information Age. Penn State University Press.

[18] e.g. elaborated in the work of the New Economic Foundation. e.g. How did We Get There? The Great Transition, tackling climate change and inequality together will help us all. Free download publication http://neweconomics.org/publications

balance between economic, social and environmental wellbeing, the current financial crisis, is socially and spatially divisive.

As physical spatial entities, cities are a construct of social relations, not a given determining social behaviour by reactions to a particular physical environment. Nevertheless, cities are affecting social practices in turn.[19] Cities appear to take the brunt of the current economic crisis. Many austerity measures imposed by nation states have direct repercussions on urban services. Rising unemployment particularly among the young, high fee paying university education, lower social support systems all contribute to youth unrest. Cuts of public sector jobs and expenditure, wage freezes, shrinking pensions and higher, often progressive taxes reduce propensity to consume and threaten economic recovery.

The need of debt repayment and scarce credit availability is affecting the development industry, except for a limited amount of urban infrastructure projects which exercise a Keynesian effect on urban development. They are not offsetting the sub-prime mortgage collapse and its dramatic effects on the housing market, forcing people out of their homes and putting increased pressure on housing, especially low cost dwellings in cities. Slum landlords are already renting out sheds with beds[20] and squatters are occupying whole rows of houses.[21] The expectation that the financial and corporate sectors will return to 'business-as-usual', together with breathtaking salary inflation of the richest is a graphic expression of rampant polarisation between the 1% and the 99% as Occupy[22] is putting it. Not surprisingly cities are becoming the privileged place of urban contestation and unrest. The economic crisis has mobilised protest among those who believe in a more equitable social order, in inclusive, participatory democracy, in economic and spatial justice as discussed by Soja.[23] Conversely, those in power resorted to top down interventions by repressing such movements.

4 LONDON PROTESTS AND THEIR EFFECTS

In London, four main types of protests have taken place recently, expressing grievances about economic hardship and violations in the protesters' view against the right to the city. They include long term pacific peace camps, student protests against fee rises, spontaneous riots triggered by a police shooting, and Occupy lsx, a global resistance movement taken up in London. Other 'direct actions' in cities include those driven by necessity (use of intermediary and abandoned spaces, sleeping rough and squatting) and whatever the establishment understands under the notion of 'improper behaviour in public places'.[24]

4.1 Long term pacific protests in peace camps

Peace camps are not new in London. Their aim is to stay until they have obtained change. A memorable long term protest against apartheid was held in front of the South African embassy. The peace camp against various wars entered by the UK unjustly in the perception of the protesters was started by Brian Haw[25] in 2001. He and followers have settled in front of the parliament until February 2012, when the government has finally managed to change the law to evict the protesters, [26] a move very much contested by those who defend freedom of speech and human rights.

Peace camps are deliberately non aggressive. Exposed to seven million tourists per year, the camp on Parliament Square was disturbing for the establishment which sometimes clamped down on protesters disproportionately.[27] Haw claimed that "the question is not what is wrong but when are we all going to stop what we know is wrong". He called for evolution, not revolution. Yet, the war in Iraq went ahead, UK

[19] This reversal of the environmental determinist paradigm has been developed by Manuel Castells. (1972) 1977 (translation by Alan Sheridan). The Urban Question, a Marxist approach. Edward Arnold.
[20] Evening Standard. 23/01/12. p 19
[21] Evening Standard 18 January 2012, p 9
[22] http://occupylsx.org/
[23] Edward W Soja. 2010. Seeking Spatial Justice. University of Minnesota Press.
[24] James Q Wilson. The Urban unease. In: The Public Interest, Summer 1968, pp 26-27 based on a survey carried out in Boston in 1967, quoted by Manuel Castells in The Wild City.
[25] Brian Haw was an astute protester who managed to contest the various attempts of government to evict him. He died of cancer in 2011 at 62. He said that 'The marchers should not just have one day out in the sunshine, they should stay".
[26] The central government and now the mayor of London are prohibiting even taking photographs, something which may not be enforceable on millions of yearly tourists.
[27] Two young women, Maya Eans and Milan Rai who read out names of civilian victims of the Iraq war in front of 10 Downing Street, the seat of the Prime Minister were arrested.

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soldiers stay on in Afghanistan and political positions regarding Iran and other countries 'of national interest' remain open.

What have peace camps achieved? Concerning South Africa it could be argued that peace camps in front of embassies were creating political consciousness and embarrassment, thus contributed to the end of Apartheid. In the case of the anti-war protests, they have irritated politicians, the London mayoralty and the local authority, but whether and to what extent they contributed to the change of mind of some politicians on military interventions is doubtful. Nevertheless, peace camps prolong the debate on the right to protest in the public realm against the right to space of others.

4.2 Student protests

The London student protests were triggered by a single interest, the massive increase of university fees. This differed from the far wider claims made by the 1968 student revolt in France which aimed at social change perceived as a common cause with workers.

Forcing students into high debts at a time when political austerity measures were seeking to curb state and personal debts was considered an indefensible contradiction. The students staged sit-ins at universities and took to the streets in organised marches sanctioned by the establishment. The tactics used during the marches differed. The police ignored the initial march until opportunistic infractions into buildings and street fights got out of hands. During the second march police presence was overwhelming and interventionist, but during the third march nimble IT assisted protesters in dispersing into several smaller demonstrations and disbanding them before the police could respond.

The protesters were not a homogeneous group, nor were their perceived opponents, university administrations and the police on behalf of the state. Represented only in part by their trade union, students did not agree on a unified approach to their protests, as became apparent during the marches. While the majority was in favour of peaceful demonstrations, some factions resorted to scuffles, and anarchists, agents provocateurs and other trouble makers infiltrated the marches to use them as an opportunity for violent behaviour. Police kettling was denounced as unjustified institutional violence and draconian punishments were considered disproportionate.

What had student protests achieved? The fee increases were implemented, many universities even used the maximum £ 9,000 fees per annum as a norm. Grants and other support systems were cut and the only concession was that fees did not have to be paid up-front and that repayment was conditional to future income, no guarantee to attract more students from modest backgrounds.

4.3 Summer riots

In August 2011 an initially peaceful local protest march was organised in London against police killing a local inhabitant Mark Duggan to demand justice for the family. This was soon followed by rioting, looting, arson, physical attacks and civil disorder. Aided by BlackBerry Messenger services news and rumours sparked off violent riots in several other London districts, destroying homes, businesses and vehicles and looting shops for four days leading to millions of pounds of damages, injuries, two deaths and spreading to England albeit not to Scotland. A greatly increased police presence made hundreds of arrests, the courts issued harsh punishments and the riots eventually died down.

Although these riots reminded the 1980s confrontations with the black population in Brixton, the current events were not seen to being racially motivated. The riots were unanimously condemned and many were taken aback by their intensity, motivation and mixed participation. Not everyone agreed with the instant judgement of the government that the cause was "a broken society in moral collapse"[28] and many contested the notion of a 'feral underclass'. Academic debates identified contributing factors as socio-economic causes, unemployment and spending cuts, social media and gang culture, as well as criminal opportunism, but also chronic worklessness, illiteracy, truancy, drug abuse and youth alienation, multiple deprivation, poverty and increasing gap between rich and poor. Poor policing and political indecisiveness were also seen as contributors, but fewer references were made to racial tensions, family breakdown and lack of male role

[28] the words used by the Prime Minister David Cameron.

model, and David Lammy, the MP for Tottenham where the riots originated saw a connection with fatherless families which lack male role models.[29]

The popular press was quick to single out black male youth with criminal records but evidence proved that rioters with previous convictions were overestimated.[30] Feedback showed a very complex participation in the riots, including youngsters from wealthy backgrounds and adults, as well as parents who looted with their children, opportunistically joined by bystanders. While there was vigilantism and the popular press demanded punitive intervention, a large number of volunteers undertook clean-up operations in their local areas, some sign of social cohesion when in need.

How do these events equate with localism[31] and the Big Society, the twin prongs of the current coalition government? No public inquiry is planned to understand the complexity of these riots and how they could erupt so unexpectedly and violently. Nevertheless, the London School of Economics and Political Science has launched an investigation with the Guardian newspaper with a grant from a charitable trust.[32] Meanwhile the metropolitan police is engaging in a campaign against gang culture. Both the peace camps and the student protesters distanced themselves from the riots while some social interest groups and individuals attempted to understand their causes.

Many made a link between the behaviour of the establishment, the ruthlessness of the financial sector which brought about the economic crisis and the impunity with which the rich and powerful were able to return to privileges and unearned rewards. Many were outraged by the light touch members of parliament received for fiddling their expenses, the callousness with which phone hacking was trivialised, the cosy relation which prevailed between power bases, politicians, the police and the media, the ostentatious exposure of wealth and ease of writing off a lost generation, all factors which are cumulatively eroding authority among the silent majority.

For a number of critics this amounts to resentment of the establishment. For Alan Woods[33] riots are an expression of impotent rage which wears off as the state apparatus recovers its poise, although in his view none of the political parties are on the right track to tackle the causes of these riots. For Dick Pountain[34] the fact that the establishment was helping itself to public goods led the excluded to justify their disrespect for property of others. In his view, the digital economy is contributing to this as it erodes the concept of property "as a relationship between persons about things", thereby blurring the vision of the young between digital and material reality. Competitive consumerism and brand fetishism reinforces public perception of a two track justice system, unfair sharing of the austerity burden, and breeds a feeling of individual powerlessness.

What was the outcome of these riots? Vox populi was demanding repression to counter the erosion of the established order. The establishment was clamping down harder on the 'undeserving' poor and the idle, increasing deregulation and curbing health and safety measures. Ironically, both sides accuse each other of greed and criminality.[35] Both sides also call for more self-governance, albeit with different meanings: on the government side to shrink the state and reduce redistribution, on the revolt side to achieve greater personal empowerment.

4.4 Occupy lsx London

Occupy lsx (London Stock Exchange) forms part of a global protest movement which started on 15 October 2011 in many cities throughout the world,[36] the most visible being OWSm Occupy Wall Street in Zuccoti Park in New York. In London Occupy wanted to establish itself in front of the stock exchange, but the square

[29] David Lammy. 2011. Out of the Ashes, Britain after the riots. Guardian books.
[30] e.g statistics quoted on BBC New UK on 24 October 2011. http://www.bbc.co.uk/news/uk-15426720
[31] Localism Act 2011. http://www.legislation.gov.uk/ukpga/2011/20/contents/enacted
[32] http://londonist.com/2011/12/analysing-the-london-riots.php
Analysis of London riots, LSE and Guardian, supported by the Josef Rowntree Trust. (Interim report 05/12/11).
[33] http://www.neocodex.us/forum/topic/108651-the-london-riots-a-marxist-analysis/. Alan Woods, 9 August 2011, The riots in Britain, a warning to the bourgeoisie
[34] http://www.pcpro.co.uk/features/371011/london-riots-why-pirates-share-the-blame-with-parents. Dick Pountain, 7 November 2011, London riots, which pirates share the blame with parents
[35] http://www.neocodex.us/forum/topic/108651-the-london-riots-a-marxist-analysis/
[36] e.g. in Europe: Amsterdam stock exchange, Rotterdam Beurs World Trade Center, Ljubljana Congres Square, Dusseldorf Deutsche Bank, London St Paul's.
Paris Bourse, Brussels (8000 people), Antwerp, Berlin (8000 people), Zuerich Paradeplatz, etc. In Spain the indignados occupied Barcelona (400,000 people), Madrid (500,000 people) and other cities.

which has been privatised during urban regeneration was cordoned off as indicated by the poster "Paternoster Square remains closed indefinitely".[37] Occupy settled opposite the neighbouring St Paul's Cathedral instead. They also created a tent site in Finsbury Square and set up the 'Bank of Ideas'[38] nearby in an empty building owned by UBS, a Swiss bank. Except in New York and London most Occupy groups managed to stay only for a short period. Many continue online though and are networked globally.

The goal of the Occupy movement was to deal with inequality between the rich and powerful, the 1% and the other 99%. Occupy contests concentration of power in the banks, organisation of society around the accumulation of wealth, consumerism, violence, conformity and lack of real democracy in political decision making. Paul Mason wrote for the BBC that "what Occupy wants to do is much bigger than any single-issue campaign or cause. Its followers mean to limit the power of finance capital and build a more equal society, while rejecting the hierarchical methods of the political parties that once claimed to do so. In this sense the movement is a kind of replacement social democracy".[39] What others understood from the protestors is "that Occupy lsx is about creating a space for people to articulate arguments about the government's economic policy and its consequences: unemployment, increasingly expensive education, and the privatisation of the NHS. The vague sense of unease many of us feel is here, amplified and expressed".[40] Politicians and bankers remained conspicuously absent while many known figures agreed to speak in front of St Paul's[41] and many more participated in debates and self-management sessions in the Tent City University set up by Occupy lsx.

Deliberately bottom-up without identifiable leaders,[42] Occupy disoriented the Press which was expecting spokes persons, press releases and sound bites.[43] The politicians and the media accused them of having no demands, no proposals and no urgency, although they had reached consensus on ten principles early on.[44] Police branded Occupy lsx and UKuncut as terrorists.[45] When Occupy got media exposure politicians tried to fob them off by saying that they had made their point. Their persistence disturbed both the church which was ambiguous about its position and led three senior clerics to resign and the City Corporation which claimed that Occupy was obstructing the highway which was patently untrue. Although some officials showed up in

[37] When I stood by the security barrier peering in, armed only with an iPhone, a security guard approaches menacingly. Curiously, the press release from Mitsubishi Estate – Paternoster Square's owners – is describing the square as a "public space." http://occupylsx.org/

[38] http://www.bankofideas.org.uk/events/

[39] http://www.bbc.co.uk/news/business-15326636

[40] http://frontierpsychiatrist.co.uk/occupy-lsx-report/. 21/11/2011

[41] Among them Jesse Jackson, http://occupylsx.org/?p=2748 / Video – http://occupylsx.org/?p=2609; the Arch Bishop of Canterbury; Manuel Castells, http://www.thepolisblog.org/2011/11/manuel-castells-speaks-at-occupy-london.html; David Harvey, http://occupylsx.org/?p=1119 12/11/11; Doreen Massey at Bank of Ideas; Anna Minton in front of the royal courts of justice; Julian Assange,; Rob Hopkins from the Transition Movement and many more.

[42] For writings about such alternative governance structure see Carne Ross. 2011. The Leaderless Revolution. How ordinary people will take power and change politics in the 21st century. Simon & Schuster

[43] http://www.totalpolitics.com/blog/268367/what-occupy-lsx-are-getting-wrong.thtml

[44] This initial statement was collectively agreed by over 500 people on the steps of St Paul's on 26 October 2011. Like all forms of direct democracy, the statement will always be a work in progress and is used as a basis for further discussion and debate. http://occupylsx.org/?page_id=575

1. The current system is unsustainable. It is undemocratic and unjust. We need alternatives; this is where we work towards them.
2. We are of all ethnicities, backgrounds, genders, generations, sexualities dis/abilities and faiths. We stand together with occupations all over the world.
3. We refuse to pay for the banks' crisis.
4. We do not accept the cuts as either necessary or inevitable. We demand an end to global tax injustice and our democracy representing corporations instead of the people.
5. We want regulators to be genuinely independent of the industries they regulate.
6. We support the strike on the 30th November and the student action on the 9th November, and actions to defend our health services, welfare, education and employment, and to stop wars and arms dealing.
7. We want structural change towards authentic global equality. The world's resources must go towards caring for people and the planet, not the military, corporate profits or the rich.
8. The present economic system pollutes land, sea and air, is causing massive loss of natural species and environments, and is accelerating humanity towards irreversible climate change. We call for a positive, sustainable economic system that benefits present and future generations. [1].
9. We stand in solidarity with the global oppressed and we call for an end to the actions of our government and others in causing this oppression.
10. This is what democracy looks like. Come and join us!

[45] http://www.independent.co.uk/news/uk

the camp[46] the City finally managed to obtain an eviction order. Besides very visible personalities speaking up for Occupy in public, others participated in teach-outs, including the odd banker. Occupy also encouraged fun by accommodating music bands and welcomed other protest movements. They went out of their way to keep the camp orderly with chemical toilets, recycling bins, a kitchen,[47] a first aid facility, maintaining through passages, cleaning the space and trying to keep drugs and alcohol abuse at bay but accommodating the homeless.

Occupy refuted violence, remained courteous, obtained material help from sympathisers and were accepted by some surrounding businesses. Occupy see themselves as a group of likeminded people who join out of their free will, respect public common goals and leave the movement if they disagree with them. Occupy's wide ranging supporters were continuously discussing their purpose. This was seen by some observers as an act of performance, important in itself and actualising them in their own eyes. Thus the longer they managed to camp out the more successful they felt,[48] an important reason for the establishment to eject them.

"..the saga continues. But the clock also ticks. This week could see the end of Occupy lsx, or it could see the path cleared indefinitely. The external pressure on the movement has synced up neatly with internal conflict over its future, as Occupy tries to decide what its priorities are and which of its myriad aims it's going to have to drop for now".[49] Some say "Occupy has said all it can, done all it could ever hope to achieve and is coming to its natural end."[50]

Occupy lsx was evicted on 27 February 2012 from St Paul's and reduced to the site on the fringe of the financial Square Mile. Like many Occupy movements elsewhere, they plan to increase their online activities. Their objective is "Occupy 2.0", which includes pop-up camps, teach-outs and citizens programmes.[51] The test will be whether they will managed to achieve consensus about the use of their website and their future in general.[52]

From the very diverse comments it is clear that Occupy lsx has managed to stimulate debate on the inequitable effects of the economic crisis, but political action seems unlikely as the cohesion between financial capital, politics and the media shows no sign of waning.

5 EFFECTS OF URBAN PROTESTS ON CITY RE-MIXING AND FUTURE PROSPECTS

Before dealing with effects of urban protests on remixing the city, it is necessary to establish what the four London protest movements have in common and what distinguishes them, also from past events in the 1960s and 1980s.

5.1 Outcome of current and past resistance manifestations

Where do the London protests stand now and where will they go? The anti-war peace camps are almost rooted out after ten years. No greater parliamentary controls have materialised over engaging in wars, and what the peace camps perceive as 'unjust wars' show no sign of waning. The student protests have died down without noticeable changes to student recruitment from more modest backgrounds and little easing of new financial conditions imposed by law. There may even be signs of increasing stratification between universities and less equal opportunity despite government utterances. Many summer rioters have ended in goal while many more are vilified. Police accountability remains questionable and material damages were

[46] http://www.vice.com/en_uk/read/occupy-london-judge-tour-december This visitors included Cooper (for lsx) vs Wilkinson (for the city) Justice Keith Lindblom.

[47] Italian chef Alesandro Petruzzi, organizing a kitchen that provided 1,500 meals a day, insisted: 'I'm not political. I'm a trained chef. I know about health and safety. I decided to volunteer because this is something moral for me. I just want to be a good citizen.'

[48] http://www.demotix.com/hub/occupyworld.

[49] http://www.guardian.co.uk/uk/2011/oct/27/giles-fraser-occupy-london-st-pauls?intcmp=239

[50] http://www.totalpolitics.com/blog/268367/what-occupy-lsx-are-getting-wrong.thtml Dan Hodges 28/10/11.

[51] http://www.newint.org/blog/editors/2012/02/10/occupylsx-london-occupation-after-evictions/ mobilised by Jamie Kelsey-Fry, Naomi Colvin, Anthony Timmons and many others.

[52] This comment of an occupier shows Occupy's will to persevere: "No matter the differences between me and other occupiers - we each wake up on a cold hard ground in London because we believe there are solutions to be found. I don't think we can tell you what we want, but we can draw your attention to what is wrong, we can encourage a conversation about subjects previously kept quiet and we can work together with each other (as we are, in remarkable ways) to establish a real democracy within the group. This fledgling democracy has been a hard one to hatch but is evolving in surprisingly beautiful and simple ways. We are indeed BEING the change we wish to see. "

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inflicted mostly on poor areas with insufficient government compensation for victims, worsening living conditions mainly among the deprived classes.[53] On 22 February 2012 the courts have sanctioned the order to evict Occupy lxs from the area in front of St Paul's. Globally the occupy movement seems to have slimmed down with no permanent camps remaining, and a retreat to digital networking. Occupy have raised some debate among the political class and were given some exposure in the media but they did not become a permanent discussion partner of the establishment.

Turning to the past, during the protests in Paris in May 1968 like now students, workers, minorities, sometimes dissidents among the establishment were claiming the right to the city. Then many countries were on a unique trajectory of growing wealth and prosperity while now long term economic stagnation is likely to affect large parts of an interdependent world, critically analysed by Harvey.[54] Then head-on confrontation led to bloody battles, while now awareness of violence triggers instant reactions of the establishment which in turn were opposed by networks of communication capable of mobilising solidarity and nimble action against perceived injustice, as pointed out by Marcuse.[55] The May 68' protests created resonances throughout the world, without the help of current ICT infrastructure and took many different forms. However, they died down, often with contrary effects to what the protesters had been fighting for. Later, the '68 movements gave rise to many retrospectives and evaluations.[56] Just like the protests of '68 and the race riots in the 1980s the London manifestations were short lived and fizzled out.

5.2 Common ground between protest movements past and present

Regardless of the apparent lack of effectiveness of these resistant movements it is worth investigating their common features and whether they have managed to provoke any urban change. What these movements had in common in the past as well as at present is to reach out for inspiration from activists, radical academics and political polemists. Some of them continue to contribute to resistance movements.[57] Others who had inspired previous movements were rediscovered[58] and new thinkers with political interests are addressing current reasons for resistance.[59]

From a substantive point of view, the demands of all these movements do not differ widely in their essence and they share many similarities with earlier social movements. They request greater equality, social and spatial justice, and in particular the right to the city. They want an inclusively public realm where all can exercise freedom of speech. Their broad grievances are with financial capitalism, reckless and greedy behaviour of the wealthy, lack of respect for the environment. Their claims include single pursuits like abolition of nuclear power or protection of the rain forests, as well as broad welfare objectives such as more jobs, eradication of poverty and better wealth distribution.

The protest movements took a range of forms and provoked mixed feelings among the participants as well as in society at large against which they protested. Although mainly peaceful, some of these protests degenerated into anger, aggression and rage by those who subscribe to violence, but they were also an

[53] Interim report by communities and victims panel chaired by Darra Singh http://riotspanel.independent.gov.uk/

[54] David Harvey. 1985. The Urbanization of Capital. Studies in the history and theory of capitalist urbanisation. Blackwell

[55] Peter Marcuse. 2009. Cities for People not for Profit. Routledge

[56] For a comprehensive analysis, see: Chris Harman. 1988, The Fire Last Time, 1968 and after, Bookmarks; Leurent Joffrin, 2008. Mai 68, une histoire du mouvement, Seuil; Serge Audier, 2008, La pensee anti-68, essai sur les origines d'une restauration intellectuelle, La Decouverte.

[57]; e.g. Noam Chomsky, Anarchism today, http://anarchismtoday.org/, On Crisis and Hope: Theirs and Ours, 2009, Students should be anarchists, etc; Peter Marcuse, founder of Right to the City group, New York, linked to the Right to the City Alliance, co-sourced by the Planners Network; http://www.thenewsignificance.com/2011/10/24/peter-marcuse-what-%E2%80%9Coccupy%E2%80%9D-signifies-for-the-role-of-non-occupying-supporters/, What Occupy signifies for the role of non-occupying supporters; David Harvey, 1973, Social Justice and the City, Arnold; in The Enigma of Capital and the Crisis of Capitalism, 2010 Harvey argues that although resilient and inventive capitalism can overcome the crisis the anti-capitalist movement has an opportunity to put forward a realistic alternative to capitalism; Manuel Castells wrote La question urbaine, 1972, Francois Maspero after May '68, translated in 1977; They Urban Question, Arnold; he focuses on the contribution of social networks in Communication Power, 2010, Oxford University Press.

[58] e.g. Guy Debord, leader of the situationists defended anarchism through playful frivolous, ephemeral, irresponsible action: 1969, Societe et Spectacle; George Perec coined the notion of urban 'flaneur; and Daniel Cohn-Bendit stood for sexual freedom before turning to green issues; Michel Foucault wrote against authoritarianism, 1975, Surveiller et punir, Gallimard; Henri Lefebvre pleaded for the right to the city, 1967, Le droit a la ville. Editions anthroposL Jane Jacobs, 191, The Death and Life of Great American Cities, Penguin, who denounces the failure of town planning and advocates community based city diversity.

[59] e.g. Alan Bennett Krueger, 2007, What Makes a Terrorist: Economics and the toots of terrorism, Princeton University Press.

expression of frustration and envy of those who felt disenfranchised. Far from obtaining concessions these movements provoked backlashes, sometimes ending up in reactionary politics.

From the point of view of tactics used by these movements, many commentators saw modern communications technologies available to both sides of these protests[60] as the main difference between contemporary public manifestations and 20th century resistance movements, such as the protests of the nineteen-sixties and the race related riots of the nineteen-eighties. Alex Krotoski[61] refers to Manuel Castells, as one of the first sociologists of the internet, who considers that the more autonomous and rebellious a person's attitudes are, the more they use the internet; the more they use the internet, the more autonomous their lifestyle becomes. The Sukey communications network[62] is representative of technological support systems on the internet for such popular uses.

Virtual revolutions around the globe leave a rich trail of publicly available information which provides useful insight into the struggle of these unrests, including their internal inequality, incomprehension and inefficacy. 2.6 million tweets provided the background for an academic analysis of the London riots and their dynamic.[63] Krotoski studied the impact of global digital media and concluded that the ethical issues of resorting to information generated on the internet remain a moving target for both the establishment and grass root users, and sees the need for some consensus on ground rules for the use of this information glut.

In terms of human relations, what distinguishes past from present protest movements is that the absence of hierarchic leadership is more prominent now. It has become an irritation for the establishment which is ill equipped to negotiate with fragmented, loose, horizontal and constantly shifting networks of opponents.[64] Bottom-up direct democracy forms part of the objectives of alternative movements which contest autocratic authority, dominance of the strong over less aggressive groups, and of majority over minority rights. Their experimenting with alternative more decentralised governance has repercussions on the shape of urban living and the fabric which would best accommodate such self-management and self-reliance. It is surprising therefore, that in the UK it is the state should promote localism and it is doubtful that such 'state localism' is in agreement with local self-management of social movements.

5.3 Relation between resistance movements and urban change

The London movements may be too recent and many intriguing questions remain outstanding about their effects on the fabric and the use of the city. Why do such protest movements never seem to succeed in changing society towards their values and objectives? And why - despite their apparent failures - do such movements recur time and again?

The object of the paper is not a study of urban protests as such but their relation with urban remixing. What do these and past protests share and how do they differ in the way they may influence urban change? Referring to the 'urban question' and 'right to the city' debates, it could be argued that resistance movements are transforming the physical shape of the public realm and its meaning by their very presence in the public realm and their claim to equal rights of occupying urban spaces.

One approach to analyse such possible interactions is to relate the spatial dimension of riots to the spatial characteristics of the urban fabric where they take place. An example is The Space Syntax Network which has undertaken a 'crisis mapping analysis' of the London riots in 2011.[65] Their thesis is that overly complex spatial layouts of large post war housing estates with their underused spaces have an effect on social patterns. In their view, this urban fabric leads to social malaise and antisocial behaviour, reinforced by the presence of unsupervised children which creates a segregation of user groups. The study shows that the places where riots have occurred in London (84% in the north and 96% in the south) are within 400 m of established town centres and large post-war housing estates. Conversely, town centres without large post-war estates remained unaffected. They found that the majority of convicted rioters live on such estates. Critics query the socio-

[60] For representative case studies see: Manuel Castells, 2010, Communication Power, Oxford University Press
[61] http://dmlcentral.net/blog/aleks-krotoski/internet-research-ethics-case-london-riots-analysis, Digital media and learning: the power of participation. Alex Krotoski 10/01/2012; Internet Research and Ethics: the case of the London riots analysis.
[62] http://www.sukey.org/
[63] Analysis of London riots, LSE and Guardian, supported by the Josef Rowntree Trust. (Interim report 05/12/11).
[64] Carne Ross. 2011. The Leaderless Revolution, How ordinary people will take power and change politics in the 21st century. Simon & Schuster
[65] http://irevolution.net/2011/10/16/crisis-mapping-london-riots/

economic assumptions underlying this analysis and the direct links between physical space configuration and social behaviour and attach greater importance to studying the relationship between rioting and socio-economic deprivation.[66]

Often social resistance is disturbing the physical comfort zone of the establishment. When manifestations take to the streets they are accused of being eyesores and, more importantly, an impediment to the 'right to the city' of the majority. The response of the establishment, often confounded with anti-terrorism measures, is eviction and a paraphernalia of physical measures, such as bollards, fences, barriers, CCTV, anti-social urban furniture, sloping public benches with divisions, etc. Most alarmingly though, the planning process is assisting land and real estate owners in gating the public realm. Far from enriching spatial mix, or remixing the city in favour of greater diversity of the urban fabric as well as its use, these responses are creating more spatial segregation through privatising public realm and increasing the scale of excluded private spaces. Contested by writers like Anna Minton[67] such 'ground controls' are contradicting the intentions and meanings of movements which claim social and spatial justice.

Some are considering protest movements from the point of view of urban change when exploring alternative urbanisms. For example the UGRG concentrated on Alternative urbanisms.[68] Many contributions focused on alternative praxis, such as urban resilience strategy, enhancing community ownership in the Big Society and advocated voluntarism, philanthropy and social action with focus on localism. Papers analysed adaptive and self-reliant communities and place-led responses and concluded that reliance on self help and collective ownership requires a robust organisational infrastructure.[69] Some refer back to the demands of the situationists, which would create an unitary urbanism. They look at the spatial dimension of self organising architecture and how it redefines the notion of the commons, understood by Guattari[70] as conflating environment, social relations and individual and collective subjectivities. For them self-managed spaces enable alternative production of space, as a cultural social action and a challenge of homogeneous and hegemonic structures.[71] Others imagine the city as a refuge for political justice in the urban.[72] Squatting in Berlin in the late seventies and early eighties[73] is seen as a form of critical urbanism based on 'separation'[74] and is explored as an instrument for wider urban change. Mutualism practiced by the Transition Towns was also explored as an engine of change of the urban fabric.[75]

If urbanism incorporates a dialectic of crisis and reform, it could become a programme of reform[76] in which protest movements would have an inherent place in the city. Looking at all these alternatives the question remains whether they amount to urban resilience which could have a comprehensive impact on the man-made environment and its uses, as opposed to purely biological resilience such as resistance to physical hazards in urban planning?[77]

6 CONCLUSION

Optimistic views of urban change enacted in urban visions and movements are countered by feelings of powerlessness and disillusionment. The latter contribute to the waning of protest movements owing to police clamp downs and new legislation which supports physical exclusion from public spaces. Coming back to the initial theme of whether remixing the city can lead to more sustainability and resilience, and whether such resilience includes the right to the city for all, it appears from the evidence of resistance movements presented here that such social resilience and resistance seems to have only tenuous impact on the urban

[66] e.g. Adam White, GroupShot; and MPs on toxic mix that led to violence http://www.guardian.co.uk/uk/2011/aug/08/london-riots-mps-toxic-mix
[67] Anna Minton. 2012. Ground Control, fear and happiness in the 21st century city. Penguin (new edition forthcoming); http://www.guardian.co.uk/commentisfree/2011/oct/26/private-spaces-protest-occupy-london
[68] See paper presented at the Urban Geography Research Group conference in London in 2010.
[69] Hon Coaffee & Rob Rowlands, Mutualism as an urban resilience strategy: enhancing community ownershi in the 'Big Society'.
[70] Felix Guiattari. The Three Ecologies. In: New Formations, no 8, summer 1989.
[71] Sam Vardi, self-managed spaces, alternative production of space.
[72] Jonathan Darling. Imagining the city of refuge.
[73] Alexander Vasudevan. The squatted city, critical urbanisms and the politics of separation in Berlin 1979-1984
[74] as postulated by Antonio Negri in his movies 'a revolt that never ends'
[75] e.g. http://transitionculture.org/ and In Transition 2.0
[76] Ross Exo Adams. The problem with an alternative.
[77] David Godschalk. Natural Hazard Mitigation, creating resilient cities. Natural Hazards Review, November 2003.

fabric. Conversely, mainstream urban regeneration and gentrification are progressing steadily.[78] If anything, the efforts and aspirations of global movements seem to provoke greater restrictions on the use of the city expressed in fragmentation, gating and surveillance of the public realm, the very place where urban change towards more open cities should occur.

[78] Such mainstream progress of urban development is confirmed in Greg Clark's forthcoming reassessment of the London World City report of 1991, HMSO 'London World City, 20 Years on'; and by Eric Sorensen, ex civil servant, ex-CEO of London Docklands Development Corporation and Thames Gateway, now director of Central London Forward who dismissed the current resistance movements as irrelevant at an LSE seminar on London urban policies 12/02/2012.

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🏆 *reviewed paper*

Resizing/Re-Seizing the City – Requirements for Diversity

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1 ABSTRACT

Continuous growth and expected shortage of inner city building sites are some of the crucial challenges in Vienna, likewise affecting future social housing policy, organisation of public and individual transport and urban renewal strategies. Currently, each of these problems is addressed through disconnected planning strategies and measures.

This paper will present the concept and future research programme on the issue of Resizing. Resizing will address the dynamic interaction between public space, mobility, user participation and building structures in different city quarters regarding boundary conditions. The objective is to develop integral, long term and multi-optional scenarios which enable holistic redesign for dynamical systems such as neighbourhoods, city districts and urban areas. The notion of the habitat as a dynamical system in constant change, rather than the completed static objects, as traditionally viewed, is crucial to our hypothesis. The role of transport infrastructure and their interdependency with the building structures as well as with their utilizations plays a crucial role in achievement of sustainability aims within urban or periurban context.

Resizing addresses the challenge of growth under the conditions of sufficiency and long term resilience and within a holistic, systemic approach on the level of a neighbourhood, city or region. Re-seizing aims to activate the potentials of existing structures. The real prospective for achieving the aims of low or even zero emission lie in integral, long term scenario approaches for existing build environment. Resizing scenario strategies simultaneously take into account building stock and its inhabitants as well as the material, technical and social infrastructures of the habitat.

The goal of research is to objectify and deepen the knowledge base on the urban communities and further to develop applicable tools and strategic measures for their sustainable redesign based on the scenario/options approach. The investigation will extend beyond the building into habitat and community as well as integration of past use as knowledge base future development.

2 PROBLEM STATEMENT

According to Häußermann, Läpple and Siebel (Häußermann, Läpple, Siebel, 2008) the term city merges completely different realities: expensively growing megacities in Africa, Asia and South America, but also shrinking cities in former DDR and in rural parts of Austria which are contrasted by growth in cities with attractive job markets such as München and Vienna. There are changing former industrial cities like Linz, university cities such as Göttingen and Graz next to newly founded cities for example Brasilia and Chandigarh but also Karlsruhe and St. Pölten. Because the cities in the global perspective develop under vastly unequal conditions of size, economic conditions and prospective development, it is not possible to define one universal theory of urban development. However, European cities under the condition of industialisation in Europe have developed similarly. For 150 years in Europe, as observed by Häußermann, Läpple and Siebel, urban development and growth were interconnected, yet in future, there will be growing and prospering cities next to shrinking and stagnating ones. Within cities, there prosperity and decline will take place simutaneously. (Häußermann, Läpple, Siebel, 2008).

Therefore, the future strategies for achievement of sustainabily aims should move forward from the singular optimisation of thermal- and energetic performance towards more holistic, systemic approach which includes optimisation of infrastructures, connectivity and accessibility.

2.1 The Effects of the transport system

The growth of cities has to be considered in interdependency with the speed of the transport system (Knoflacher, 1996). While public transport due to its efficiency and focus on lines (with clearly defined

access points) was still able to integrate into the urban fabric, the car began to disperse the dense functions and structures, which were mainly divided into small sections. The effects of constant travel time budgets combined with the excellent accessibility of the private car and its high travel speed brought an enormous increase in travel distances (Knoflacher, 1997). Urban sprawl and concentration effects occurred simultaneously and were enhanced by the predominant post-War planning strategy of functionalism. Both factors contributed to a spatial separation of functions.

Urban settlements, as well as natural systems, are more stable the greater the diversity of their functions is (Amt der NÖ Landesregierung, 1988). The vitality of cities or towns (considered as organisms) is depended on reconcilable infrastructure. The speed of individual motorized transport demonstrably leads to the loss of function of many villages (Knoflacher, 1996; Knoflacher, 1997).

The Consequences for the quality of public space

The speed of the car changed public space and its perception by the residents. In addition to the direct transport-related purpose of public (living-)space it is primarily a space for social exchange.

It was further a common-, communication, recreation and adventure space, which provided social closeness and experience of neighbourhood and allowed a complex set of different uses.

These changes of public space have led to a temporary or permanent exodus from the cities, made possible by the infrastructure built for the car. Living environments that are not excessively endangered by motorized traffic have not only positive effects on social relations but also on the physical development of children (Sauter & Hüttenmoser, 2006; Hüttenmoser, 1996).

The excessive use of individual transport (private cars) corresponds with the individualisation tendencies of the society in general, as shown by the percentage of single households in dense urban areas. In Vienna, the percentage of single households has reached 47 %.

The car enabled a new city dimension

While the urban development (until about the year 1920) in the European cities resulted in structures that required a specific settlement and transport area[1] usage about 50m² per capita and below, the car-oriented urban structures have a specific area demand of about 300-400m² per capita and much further. The traffic area in the city districts of Vienna varies between 14 ("Gründerzeitviertel") to 50m² (outskirts) per capita.

This enormous land consumption is the result of the large specific area requirements of car traffic compared to other means of transportation promoted by a car-oriented urban development in the last decades characterized by structures with a low-density.

3 SUBJECTS OF INQUIRY

In the course of further research, we will analyse current sectoral planning processes and the factors, which shape them. There is a gap between detailed and short term refurbishment of single buildings and construction of smaller urban developments on one hand, and long term urban development strategies on the other. While Scenario-based planning a well as integrated strategies are widely deployed in a large scale urban planning, these methods can also be transferred to smaller urban areas such as city districts and neighbourhoods and thus enable both highly specific, as well as integral, transsektoral and mid- to long term planning processess. One specific urban district which meets the criteria of transferability and in which different elements of the built environment are present (material and social infrastructures, education, transport, housing and production sites of all age classes) will be chosen for evaluation and subsequent scenario definition. The objective is to find specific limits of growth within the existing and potential new structures under the premise of social sustainability, most notably the notion of intragenerational equity and intergenerational justice concering access to urban resources such as housing, transport, education production and recreation/leisure. It is also crucial to identify all factors shaping the transformation of the city districts such as norms, subsidies and procedures etc. next to relevant actors and stakeholders in order to incorporate these parameters into scenario transfer phases. Research aims for a better understanding of structures and agencies in existing sturctures and processesses and at the same time transfer and development of planning methodology.

[1] Including business, green and water areas

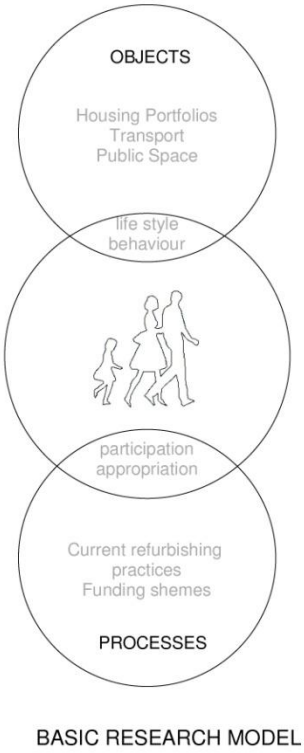

Fig. 1: Basic research model. Basic research is necessary in order to develop both redesign scenarios, as well as to determine the planning approach. The triangular research areas include: objects, users and processes.

4 SYSTEMATIC APPROACH FOR INTEGRATED DEVELOPMENT

In the context of the proposed research, the term social sustainability implies a combination of a view on density in urban quarters with more traditional aspects of sustainability, e.g. energy efficiency of buildings and infrastructures. This has the capacity to bring to light new ways of reaching regeneration and reorganisation of urban quarters.In urban planning, integrated or strategic perspectives are highly valued, and yet specialisation gains increasing importance (Hamedinger et al., 2008). The application of concepts of sustainability in urban planning has, however, led to a widely criticized fragmentation of approaches and measures. Therefore it is necessary to reclaim the importance of an integrated approach under the paradigm of social and cultural sustainability, a paradigm which has, the potential to integrate other aspects of sustainability into one perspective It will emphasise solutions which are not solely based on specialised measures, such as thermal insulation of building surfaces or improvement of public transport, but which combine many measures and thus reduce rebound-effects and achieve higher reductions of CO_2 emission.The notion of the habitat as a dynamical system in constant change, rather than the completed static objects, as traditionally viewed, is crucial to our hypothesis.

4.1 Boundary conditions

The impacts of urban growth

Till the 19th century cities could only grow within the border of the carrying capacity of their accessible environment. If the so-called “ecological footprint” of the city was exceeded by overexploitation of natural and/or human resources, the urban development came to a collapse (Knoflacher, 2010). With the availability of cheap and abundantly available external energy from coal, oil and gas for steamships, railways, car traffic and airplanes, cities grew much further than in their past. (Source) In year 2008 the share of urban population has passed 50 % of the global population (UNO, 2008). This is only possible as long as the whole globe can be used as the life supporting system for cities and cheap fossil fuel for the transport system is available. (Source) The analysis of available resources, the bearing capacity of fertile ground, atmosphere and the ecosystem was exceeded already many years ago as the report to the Club of Rome 1972 and 30 years after have proved (Meadows, 1972; Meadows, 2004).

As far as these scenarios are concerned, also strategies like "De-urbanization of cities" are imaginable where cultivation and issues like self-growing of food products could be part of a resizing process and today's sealed areas of traffic lanes have to be converted into fertile ground.

The metabolism of cities

The so called antropogenic metabolism of cities includes all material stocks owned or stored in private households or needed for its functioning. The antropogenic storage, being approximated to 350-400 Mg/capita consists to the largest amount of building residues and infrastructures (Rechberger, 2009). With the constantly increasing consumption of goods, growing cites and infrastructures, the related extraction of raw materials is also increasing and we will presumably soon be facing the limits of natural deposits. Seen in this light, the cities with its building stock and infrastructure will represent valuable resource of materials in the future (Rechberger, 2011).

The material flow balance for the city of Vienna shows slight accumulation of materials in the city (input slightliy larger than output) which implies on growth of material storage (Brunner, Rechberger, 2002).With the increased refurbishment activities in the future years even more materials will be entering the stock. The current refurbishment scenarios do not take into account the increase of material storage in the antrophosphere, nor the upcoming of the waste these materials will produce in the end – for those materials do not disapperar but remain in the cities to leave them as building waste . With the decreasing economic life duration of the buildings, the upcoming of the building waste is consequently increasing. Current refurbishment practices based on non-renewable resources have therefore double effect – the large rucksack on grey energy for the production of the insulation material (polystyrol) and upcomminig of hardly degradable or reusable materials on the other hand, at not very long life duration rates (40 years). For new incoming material flows, the construction methods need to be developed in order to enable easy and economic assesiblty, dismantling, extractability and reusability; as well the end of life in "final sink".

Buildings and CO_2 emissions

Austria is a forerunner in "green building" through largest density of passive hauses worldwide (Paula, Zillner, 2009). 70 % - 90 % of new housing construction receives a form of housing subsity. The housing subsidy has much sharper requironments on thermal building performance than the building code, the subsidy sum depends on the aimed building performance quality, which again is based on the EU categorisation-guideline (Energy Building Perfomance Directive). In the year 2000 the Thewosan (Thermal-Energetic Housing Refurbishment) subsidy was introduced, with aim to reduce the CO_2 emissions, use of non-renewable energy sources, and finally heatig costs. The introduction of this subsidy resulted in increased refurbishment activity in the following years.

The city of Vienna has own climate protection programme (KliP), in framework of which the Thewosan was launched, with following spheres of activities: Energy seizure, energy use (special focus on buildings), mobility and city structure, agriculture, public relations. The evaluation of the first KliP programme (1999 - 2010) shows that the main CO_2 emission originator in Vienna is traffic (Jamek, Mader, 2011). Also on national level in the period form 1990 till 2010 the traffic sector shows the largest increase in energy consumption by 76 %. The end-energy consumption by sector is allotted with 33 % to traffic, 28 % to industry and 26 % to private households; further 11 % to services and 2 % to agriculture (Umweltbundesamt, 2012). Traffic, next to industry plays not only crucial role in the energy consumption, but also as major originator of the CO_2 emissions.

4.2 Structural changes of buildings, infrastructure & life style

The rate of new construction for housing in Austria is approximately 1 % per year (2,200 housing units/year) (Lechner, 2010). Within this context, the existing stock offers the main medium for implemetation of measurements for achievement of sustainability.

The existing buildings have traditionally been connected to very long life duration (50 to 200 years) and as such to stability and persisency. The actual death rate of buildings in Vienna is almost neglectable, differenty from other European cities. Eventhough longlasting, the building stock has been undergoing multiple structural and functional changes throughout the lifecycle. The changes in historical housing stock ranges from the smaller but numerous retrofits of sanitary infrastructure (Basenawohnung), functional retrofit

(merging of housing units), attic conversions and since the end of 90ies the increased activity in thermal refurbishment. While the retrofit of buildings was a peripheral area of the construction industry in the 70ies, more than 50 % of the construction works are nowadays related to existing structures. Therefore measures as maintenance, repairs, modernization and/or reconstruction play a more and more important role in the construction industry (Däuber, 2007).

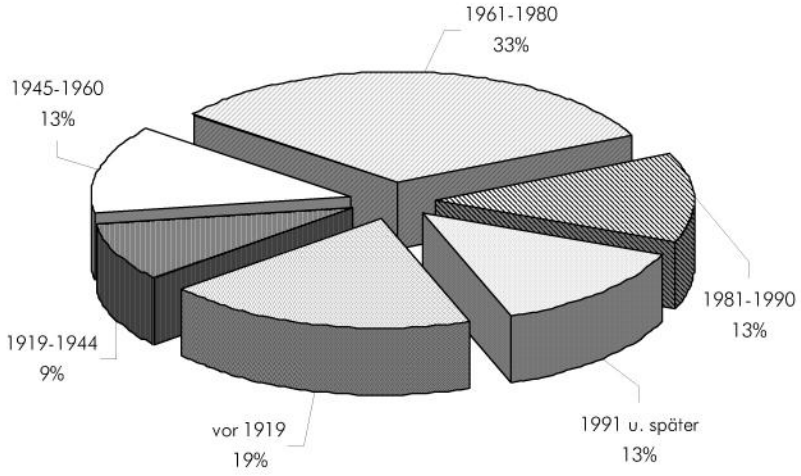

Fig. 2: Housing stock in Austria according to building period in 2002. (Statistik Austria Wohnungen 2000 in: Czerny et al, 2002)

Through public policy and number of subsidies (e.g. Thewosan) the thermal refurbishment played crucial role in the general retrofit of existing buildings. The main re-construction measurement was the refurbishment of building envelope through application of ETICS (External Thermal Insulation Composite Systems); due to the costs based largely on polystyrene insulating core. We argue that current building technologies of the thermal refurbishment of building envelope have low potential for further reduction of emission.

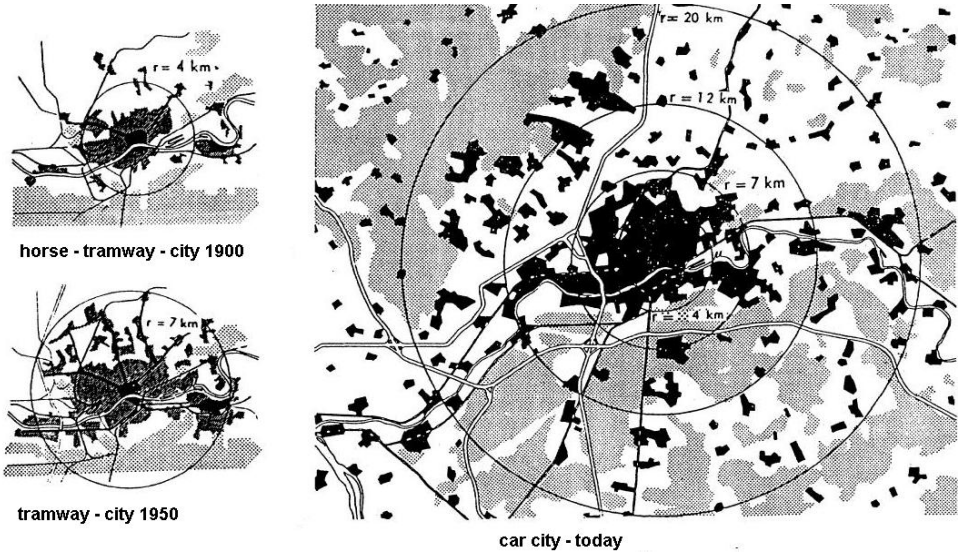

Fig. 3: The city at 1900, 1950 and today ("car city"). The settlement structures were expanded by the first means of public transport, enlarging the zone of influence into the hinterland. Ultimately high speed public and private transport pushed the city borders even further and enabled urban sprawl. This extensive construction of infrastructure coincided with separation of functions and the triumph of the car (Wortmann, 1985; Macoun et.al., 2010).

The studies of refurbished homes have shown, that through the refurbishment the lifestyle of the homeowners also changes and shifted from the energy conserving attitude (e.g. through lack of central heating only the living-room is heated) towards energy consuming attitude (heating of entire apartment) (Korjenic, Bednar, 2010) which leads to discrepancy in prediction of actual end-energy consumption and in some cases even to increased energy consumption.

Further on, the sizes of housing floor space has constantly been increasing; as well as the number of single households. Average floor space of dwellings has increased from the 88.8 m² in year 1997 to 98.2m², in year 2007; with considerable rize in the size of house owner dwellings from 116.5m² in year 1997 to 132.8 m² (2007). In 2007 in 35 % of the Austrian dwellings lived only one person (of these 43 % men and 57 % women), the rise compared with 1997 (30 %) was considerable. In Vienna the part of single-dwellings was 46 % (of these 39 % persons in the age of 60 or more years) (Statistik Austria, 2007).

In terms of measueremnts for climate protection, this leads to conclusion that eventhough the efficiency of HVAC techonologies and building performance is increasing, so is the general consumption of the floor area; which again leads to intensified resources-consumtion (energy, materials and land).

4.3 Scenario development

In Vienna, we can also observe a gap between strategic planning at the scale of the city and the actual processes of implementation. For instance, one of the goals of the Viennese strategic plan for city development is the principle "city of short distances". This strategic document however is not obligatory, in fact, it has no legal consequences. The following planning processes are divided by disciplinary and sectoral boundaries. Scenarios at the scale of built environment in neighbourhoods, to include the stage of scenario transfer, both into visions, such as strategic planning but also into instruments as well as actors, who shape the field. As this method requieres several (for instance 2-6) scenarios, different aspects of sustainability can be evaluated. As our focus lies in social and cultural sustainability , the principle of diversity and inclusion is therefore relevant for all elements of the built environment (Housing, pducation, social and material infrastuctures, transport and production) at the scale of local neighbourhood.

Diversity, inclusion, intergenerational justice and intragenerational equity

Hopfner and Zakrzewski point out that first global declarations on sustainable development (Report of the World Commission on Environment and development in year 1987 and Rio declaration in year 1992) clearly link sustainability to intergenerational justice and equity (Hopfner, Zakrzewski, 2012). This moral dimention of sustainability thus at a level of the city district addresses the question of access to urban ressources such as housing, amenities and transport. In terms of intragenerational equity social mobility and equality of opportunity must also be addressed. Social housing policy can prevent segregation or enhance it, school organisation can provide equal opportunity or deepen it, transport strategies can take into account users with different abilities or it can privilege only certain types of mobility.

Aspects of resilience

Resilience can be understood as the ability of a system to return to a stable state following a strong perturbation caused by failure, disaster or attack (IP, 2011; Patterson et.al., 2007; Hawes & Reed, 2006). The Community and Regional Resilience Institute defines resilience as “The capability to anticipate risk, limit impact, and bounce back rapidly through survival, adaptability, evolution, and growth in the face of turbulent change” (Plodinec, 2009; Amdal, 2010). According to Murray-Tuite (Murray-Tuite, 2006) a resilient transportation system has ten properties: redundancy, diversity, efficiency, autonomous components, strength, adaptability, collaboration, (Godschalk, 2002), mobility (Victoria Transport Policy Institute, 2005), safety, and the ability to recover quickly (Murray-Tuite, 2006).

With the rapid growth of cities according to area expansion and population and the increasing global interdependencies in the financial and energy sector the concept of resilience is becoming more and more important. In transport and city planning resilience is often reduced to short-term natural disasters, although the different types of structures and the interaction between built structures and users under consideration of changing boundary conditions should be taken into account.

The resilience of a city is directly connected to the type of transport infrastructure. A dense and attractive network for walking and cycling affects the flexibility in case of disturbance and thus the degree of resilience. Non motorized traffic requires no external energy for their movement and the cost of maintaining these infrastructures is relatively low.

The organization of parking cars – the key factor in the resizing process

The linking of parking space and housing (or other uses) is codified in the building regulations of the federal states. With the commitment to provide one parking space per residential unit people are not only forced to own a car, but also - depending on the distance from the apartment to the parking space – forced to use it. Other forms of urban-mobility thus remain without a chance. Although the obligation for the provision of a parking place can be fulfilled up to a 500m distance to the assigned object, by default, it is built as close as possible. Parking the car in collective garages allows the opportunity to reuse public space for many purposes. 70 % of today's lanes in side-roads would be superfluous (Knoflacher, 1996).

Re-seizing the City – Recapturing of public space – the necessary beginning

The changing boundary conditions of the last 10 years (demographic change, fuel prices, etc.) as well as the effects of transport policy over the past 40 years led to a population growth in the city of Vienna. Measures to improve the quality of public space were done at the same time (Stadt Wien, 2012).

Although a consistent, effective, area-wide conceptual extension of gentrification of public space is missing to date, a decline in the degree of motorization between 2002 and 2008 by around 4 %, based on the improvement of public transport and cycling infrastructure and the implementation of a consistent parking management was achieved. This initiates a potential for the usage of public space in its original diversity and is a necessary starting point for the resizing process in the city.

5 CONCLUSIONS

The notion of reaching sustainability of built environment through increasing of efficiency needs to be questioned, since basically it is founded in the neoclassical economical theory based on constant growth. Through rapidly growing consumption, ownership of ever more goods, increasing area of living space per capita, anthrophogenic material storage is growing and consequently the natural reserves are decreasing.

In the future more material will be provided in the cities, than in the natural environment. The refurbishment strategies have also largeliy relied on the extraction of materials form nature and its depositing in the material storage of the city. On the one hand the resources for this type of refurbishment will soon be limited, on the other will cause the upcoming of the waste as outcome in the long term scenario.

The strategies that solemnly rely on the increasing of efficiency have been shown as not successful: despite the ever more efficient HVAC technologies and building hull performance the energy demand of household has constantly been increasing. Similarliy in the efficiency improvement of the car transport, at the fuel intensity improvement of 100 %; there is the rebound effect of 44 % km more driven (Ajanovic, 2011).

The crucial question in achievement of sustainability is the question of lifestyle – the better the building performance the higher (in terms of consumption) the lifestyle. Therefore a concept of "progressive efficiency" (Harris et al, 2008) – increase of the efficiency along with the intensity of energy use together with active actions towards energy conserving is porposed as a way towards more sufficient instead of efficient life style. However to achieve this level of awareness, intensive participative processes involving users (occupants), planners, industry and political decision makers are necessary. "The question is how much sacrifice is avoidable, how much is necessary, and how much we are willing to accept" (Harris et al, 2008).

Further research is needed in order to objectify and deepen the knowledge on the existing city disticts on the principle of integrated urban development for existing city districts, with the emphasis on social and cultural sustainability. The principle of intragenerational equity und intragenerational justice are therefore crucial when defining future use and development of local neighbourhood resources which include housing, social infrastructure, education, production and transport.

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Seismic Risk Reduction: a Proposal for Identifying Elements Enhancing Resilience of Territorial Systems

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1 ABSTRACT

Facing the complexity of urban and regional systems, as they are characterized by several elements continuously interacting each other and making complex governance in ordinary and extra-ordinary conditions, tools for manage strategic choices could be suitable. Therefore, due to the systems complexity, often it is needed, before to identify strategies, to clarify what the problem is, and clearly consider all relevant aspects.

In this paper, we present a Strategic Option Development Analysis (SODA), applied to the problem of seismic risk reduction, with involvement of different kinds of stakeholders, acting on territory with several roles. The problem structuring has highlighted which are the components, in terms of available tools, elements on the territorial systems, stakeholders, etc. contributing to enhance resilience, as we recognize that this is the main characteristic that a system must have in order to answer to a seismic event.

The paper is organized as follows: in the second paragraph, a framework concerning the seismic risk problem and the relationship between seismic risk and resilience. The third paragraph contains a deepening concerning resilience, and in the fourth is finally presented the approach applied to the problem of seismic risk reduction, the SODA. Results of adopted approach are presented in the fifth paragraph.

2 SEISMIC RISK AND RESILIENCE

Natural disasters, nevertheless continuous scientific and technological development, cannot be avoided, and, as history too often teaches, when a calamitous event occurs, it produces high damages. The learned lesson seems to be that prevention strategies are not adopted in order to mitigate possible damages, but generally interventions follow a catastrophic event, trying to mitigate its effects.

Therefore, as mentioned, scientific and technological development continuously gives some contributes to handle natural disasters, and produce results in terms of strategies to adopt before a risk crisis; considering the possibility of such disasters, with a defined risk assessment, we must work in order to face them, and to react, with at least as possible loss, in terms of lives, injured people, damages on buildings and infrastructures and indirect effects. First of all, we need to know what to do to face emergency conditions; then, how to manage crisis in order to limit damages caused by natural and other disasters and finally to go over crisis and to guarantee the re-establishment of ordinary conditions.

Risk assessment takes into account several components: generally, it is defined as a function of hazard, exposure and vulnerability (UNDRO,1980). Hazard concerns natural characteristics of a natural phenomenon; for instance, if we consider seismic risk, hazard depends on historical seismic characteristics, ground geological characteristics, geotectonic and seismic-genetic structure characteristics, which do not depend on human intervention, so that we are not able to control them.

Exposure, instead, concerns the human presence in a certain area. So, if hazard conditions are worrying (i.e. hazard is high), then human settlements must not be established there. Anyway, generally knowledge about hazard is subsequent to settlements, stratified during the centuries, so that displacement represents a strong decision with several impacts on inhabitants. Concerning the not yet urbanized areas, instead, hazard knowledge is strategic in order to allow a rational and safe planning.

The third component is vulnerability, that is defined as the tendency of a certain element to be subjected to damages or corruptions, depending on its own physical and functional characteristics (Fera, 1997). Generally, vulnerability is referred to the elements composing a settlement; in the case of seismic risk, for instance, vulnerability mainly refers to seismic vulnerability of buildings, and other structures, as roads, bridges and so on, and its evaluation depends on structural characteristics, determining building behavior in

case of seismic actions. Technical codes supply building criteria taking into account the relation between the structure and the hazard on its location.

In the last decades, anyway, the concept of vulnerability has been presented also with a wider meaning, considering it at urban scale. Considering for instance Manyena (2006), it has been recognized that global activity in a town can be compared to activity of a network system, where each edge, working at local level, contributes at global level. From this point of view, it becomes evident that physical damages are not unique components of global damage. Moreover, it has been observed that earthquake effects are not limited to physical damages, but they have some ripples on economic, social and political activities, and they have a strong role onto city capacity to react.

This framework, taking into account the wider concept of vulnerability, leads to a new approach in risk prevention, going over building structural adjustments, and highlighting that single components work as a whole system, in which it is possible to recognize not only physical elements, such as buildings and streets, but also social, economic and political functions.

New approaches must define tools able to mitigate such urban seismic vulnerability; therefore, it should forecast, before a seismic event, what kind of response the single components might show. Such an approach aiming at mitigating urban seismic vulnerability, must maximize system resilience, as the capacity of a certain system to adapt to new, generally negative conditions, to re-establish normality (Comfort, 1999).

3 RESILIENCE: GENERAL FRAMEWORK

The International Strategy for Disaster Reduction, Hyogo Framework for Action 2005-2015, defines resilience as the capacity of a system, community or society potentially exposed to hazards to adapt, by resisting or changing in order to reach and maintain an acceptable level of functioning and structure, and that is determined by the degree to which the social system is capable of organizing itself to increase its capacity of learning from past disasters for better future protection and to improve risk reduction measures. Not accidentally the strategy is exactly called Building the resilience of nations and communities to disasters: resilience concept is placed at the core of strategies.

In origin, the concept has been developed in the field of ecology: following the Holling (1973) definition, it is a property of a system, measuring its ability to absorb changes of state variables, driving variables and parameters and still persist; the concept is strictly related to that of stability, intended as the ability of a system to return to an equilibrium state after temporary disturbance. In the risk management literature, resilience to natural hazards is defined (Pelling 2003) as the ability of an actor to cope with or to adapt to hazard stress. It is a product of the degree of planned preparation undertaken in the light of potential hazard, and spontaneous or premeditated adjustments made in response to felt hazard, including relief and reuse.

In the concept of resilience it is possible to recognize also a social dimension: according to Bruneau et al. (2006), community seismic resilience is defined as the ability of social units to mitigate hazards, to contain the effects of disasters when they occur, and to carry their recovery activities in ways that minimize social disruption and mitigate the effects of future earthquakes. This can be achieved both working on structural aspects and emergency response and strategies, involving institutions and organizations, and in particular those related to essential functions for community well-being, as acute-care hospitals. Communities must be capable of coping a stress situation, where they must manage demands, challenges and changes, with available resources and competences (Paton et al., 2001). In the Godshalk (2003) vision, community networks must be able to survive and function under extreme condition, as condition sine qua non the city system will be vulnerable.

Considering resilience as a property of each system component and of the whole system, anyway, is not helpful in order to identify strategies. How to measure this property? How to put in action strategies working on components and on the global system at the same time? How to recognize the augmented resilience before a disaster? Obviously, this is not a unique aspect to be considered. Considering natural disasters, several strategies could lead to enhance resilience in terms of augmented capacity of absorption and recovering from changes (Barnett, 2001), referring to resilience properties. Bruneau et al. (2006) consider that resilience is characterized by almost four main properties:

- the robustness, as the ability of elements to resist to a certain stress, without suffering degradation or loss of functionality;

- the resourcefulness, as the capacity of identifying problems and finding solutions depending on priorities and available resources;
- the ability, as the capacity to meet priorities and to achieve goals as quickly as possible;
- the redundancy, as the substitutability of elements in order to satisfy some requirements no more satisfied by a degraded element.

Even if such properties seem to be abstract, they can find a concrete application. For instance, decentralization of decision making (i.e. creating several decision making centers in a town) or strategies about mobility, generally refer to redundancy, and so on.

Paton et al. (2001) define a resilient city as a sustainable network of physical systems and human communities, where the first ones include all kind of structures and infrastructures, acting as the body of the city, its bones, arteries, and muscles, and the second ones represent the social and institutional components of the city, including all kind of associations and organizations and acting as the brain of the city, directing its activities, responding to its needs, and learning from its experience. The metaphor makes clear that during and after a stress, both systems are determinant: if body collapses, the entire system collapses; if brain breaks down, the entire system breaks down.

Therefore, the most important aspect concerns how to define and apply strategies. Observing cities, they can be modeled as network systems, with a main trunk, hierarchically more important than some secondary branches. In terms of response to a disaster event, therefore, trunk elements must have a faster response, because they are charged of main activities of city, and moreover they represent place identity.

4 HOW TO IDENTIFY RESILIENCE: THE PROPOSED APPROACH

The last two sections open several issues, but not yet show the way to identify elements to enhance territorial systems resilience: they show exactly the research process, that, at this point, lead us to a precise conviction. We are at now persuaded that the seismic risk mitigation is a particular kind of problem, that we are not able to solve with traditional paradigms of operative research, but, that need a preparative phase of structuring.

Seismic risk mitigation involve several stakeholders, with several different expertise, and a different role in a particular field of city and territorial systems organization. Therefore, the problem needs to be handled at several reference scale, considering differences between the quarter, the city, the region, and in a context of knowledge more and more precise, but not exact, so that we are facing with a problem – the earthquake occurrence – that we don't know exactly when, how and where it will occur.

Moreover, we recognize that a strong component of resilience is related to communities, that must be involved in a something, as a participative process, to be prepared.

In this huge amount of aspects to be considered, and in front of the exigency to involve the stakeholders, the most helpful tool, we thought, could be starting from the problem structuring. So, the proposed approach, Strategic Option Development Analysis, in order to develop a participative process, build a cognitive map representing the problem and highlight, with the stakeholder contribution, which are the elements enhancing resilience.

4.1 trategic Option Development Analysis

SODA (Eden, Ackermann, 2001) is a method aiming at identify general problems with the support of cognitive mapping, in a participative context, where actors are related to the main issue, and need to agree about possible solutions. The method is of the techniques of the family of problem structuring, suitable when it is not possible to adopt classic method of operative research, because problem nature is not well clarified, there are qualitative and quantitative aspects, there are several points of view to take into account, several actors, knowledge is not exact, consequences of potential actions are not certain and so on.

Main idea is to focus on the problem, and, with creativity and spontaneity, identify all elements related to the problem, in terms of sub-problems, causes, effects, other related problems etc. Discussing around the problem helps each participant to clarify its ideas, and to enrich its store of knowledge also with contributes from other participants. Conflicts can be solved, finding evidence for their existence, and identifying small actions toward an overall objective, that everyone shares, and obviously is related to the resolution of problematic situation.

The method is based on the hypothesis, helping in the process development, that a best solution cannot exist, but that it is therefore possible identify partial solution, steps towards a solution, conflicts resolution, and that the participative process produce anyway a positive result.

Kelly (1955)‘ theory of personal construct is adopted in the SODA approach. In brief, the theory affirms that each subject, affected by his own experience and cultural background, looks at the world and builds a representation through a systems of concepts. He defines concepts in natural language, and considering his emotional component. Therefore, in a participative context, several subjects are involved to contribute to a shared vision of the particular problematic situation: the discussion can produce a map, as a merge of the entire concept that each subject can express, and identifying common relations.

Generally, SODA approach is adopted in several steps. First one is characterized by individual interviews, during which the facilitator helps the interviewed subject to express ideas concerning problematic situation, and represents these ideas on a cognitive map. Once all interviews have been carried out, a collective workshop is organized. Facilitator presents a merged map, derived from the single maps, and helps subjects during discussion.

The merging phase is strategic, in order to allow each subject to identify in the merged map its personal contribute, but at the same time, it is important to highlight conflicts, and work, during workshop, on their resolution. This last passage leads to a team map, containing also identification of strategies and actions. As mentioned, not always it is possible to identify a solution, but anyway, the shared vision of the problem is an important result.

4.2 Cognitive mapping

SODA main goal is to clarify the problematic situation and identify possible solutions, through a shared representation, that make possible to take into account qualitative aspects, and at the same time highlights the importance of relations between elements in the situation. For this aspect, cognitive mapping is a suitable technique. Maps are something that everyone builds in its mind every time he searches for the meaning of world. As Kelly (1955) affirms, in the attempt to give meanings to the world, men build a concepts system, where the number of concepts is limited, and each concept is conceived in relation to some personal emotional perceptions. Then, concepts are hierarchically organized, identifying some cause-effect relations. In the SODA context, cognitive maps are representation about a problem. They are composed as a network with edges and nodes. The direction of an edge defines a hierarchy, and usually denotes causality.

Once maps are conceived, it is possible perform some analysis in order to highlight particular aspects; for instance, the shape of the map helps to identify the complexity level of problem. When a map is plate, there is no evidence of a strong hierarchy between concepts, and on contrary, with a pyramidal structure, it becomes evident the presence of a reduced number of heads, and of some predominant concepts, and so on. Another interesting aspect is related to number of edges entering in a particular node: this denotes the relative importance of node compared to other ones.

The possibility to automatically perform analysis is particularly useful when the map reaches a large number of concepts, making difficult reading; analysis, moreover, help to identify contradictions and conflicts, often present in a merge map, obtained starting from individual maps.

In this research, Decision Explorer software has been used in order to build the map and, then, to perform the analysis. Decision Explorer is software developed at Bath and Strathclyde University, as a tool for managing soft issues, as the qualitative information surrounding complex and uncertain situations, and at not developed by Banxia Software.

It is important to clarify that cognitive maps generally are built in order to better understand a specific problematic situation, sharing with other involved stakeholders, and not to build a knowledge model. As declared, also the cognitive map that has been realized does not represent a knowledge model about seismic risk.

5 THE ROAD TO A SHARED MAP ABOUT SEISMIC RISK MITIGATION

In order to reach our research goal, a workshop has been organized, inviting several experts on seismic risk mitigation. In particular, the experts comes from the field of seismic risk, the field of Civil Protection and the field of urban and spatial planning, and they have been chosen in a large variety of different expertise.

During the identification phase of possible involved stakeholders, it emerged that seismic risk mitigation is a very large field, interesting institutions and scientists, each of them with different responsibilities and, usually, working on its own specific subject and not interacting with other actors.

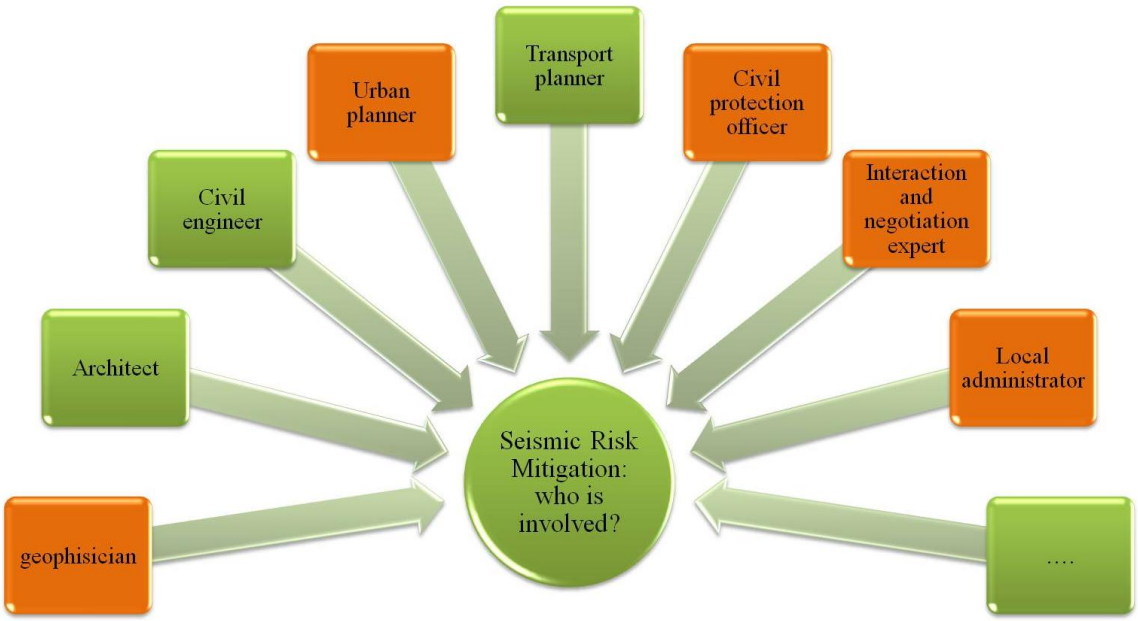

Figure 1: Stakeholders potentially involved. In the orange box, the experts invited to participate during workshop.

The workshop, conceived in a unique session of about four hours, has been organized in three main parts; during the first one, a general framework has been presented to invited experts. In the second one, a discussion about general framework has been carried out: each expert expressed its opinions and gives some interesting issue to develop. The third phase has been individual: each participant was asked to write its own map starting from the general framework above discussed.

The general framework focuses the attention on main elements characterizing seismic risk mitigation problem, as shown in the following map:

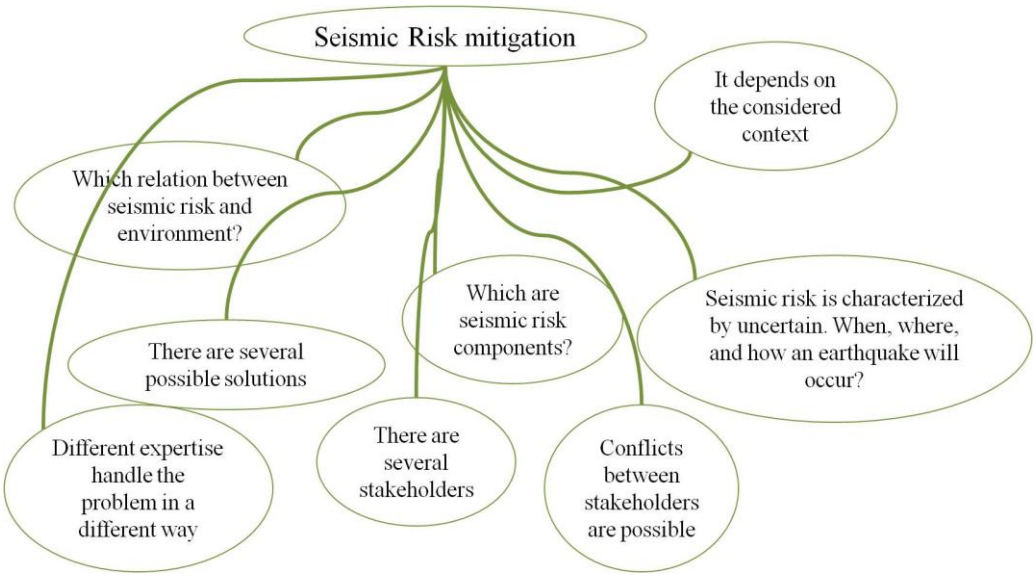

Figure 2: problem positioning

Discussion followed. In this phase, each expert clarified its ideas and discuss with other of their reciprocal position in the context of seismic risk mitigation. In this phase experts interacted in a strong way; each of them asked to speak several times; the feeling, unfortunately, was that they felt the difficulty to compare with different expertise, and finally the asked creativity was not significant: each expert contributed to the discussion, but he continued to stay in its field, without a perspective change.

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In the third phase, each expert was asked to create its own synthetic map, considering the elements on the general framework and evidence emerged during discussion. Workshop unfortunately stopped at the delivery of experts' maps, but research still is on: the collected maps are the basis for the team map obtained, discussed in the next paragraph. Map is not reported because it is very large and moreover it is in Italian language.

6 EVIDENCE FROM THE MAP

The obtained team map presents a high level of complexity. It is composed by more than 200 concepts, with an intricate network of relations, both of causality, connotativity, means-ends. This means that team map highlights some possible contributes to seismic risk mitigation. Through map reading and analysis, the possible contributes to seismic risk mitigation have been grouped in six strategies, referred to different domains, and including a certain number of actions, as schematically represented in the next figure:

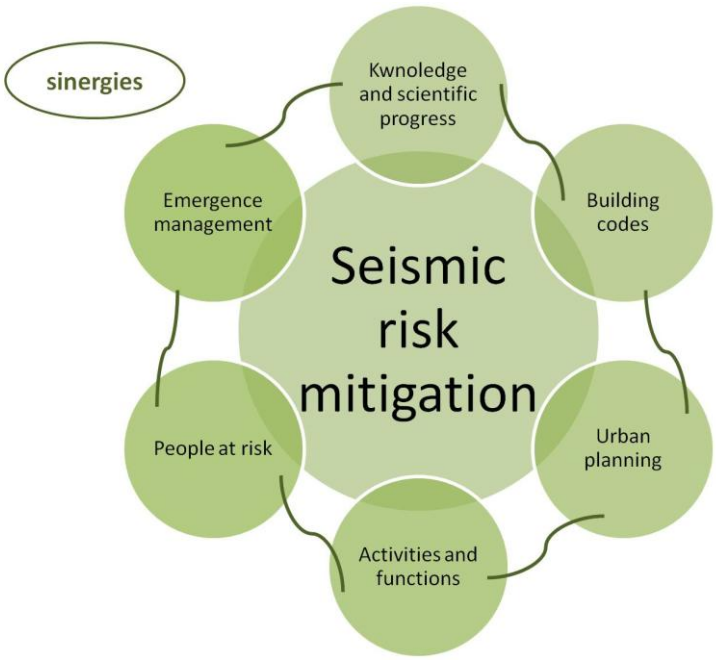

Figure 3: groups of strategies identified in the team map

As the scheme proposes, it emerged that the overall objective, the seismic risk mitigation, depends not by the single strategy, but by the global achievement on the overall strategies. Therefore, the map highlights some interrelations between actions of each strategy, indicating the need of harmonization, as mean to produce synergies. The six strategies are briefly described in the following:

(1) Knowledge about hazard: scientific development is strategic. Each progress in the science can produce effects on avoided damages. The consciousness that natural risks cannot be avoided must not stop the research about, because we are persuaded that as much as possible a phenomenon is known, as better we can defend.

(2) Building codes. Resistance of buildings is not enough to resist to the earthquake, but it is true that main effects of earthquake affect structures. It is important improve buildings characteristics. Moreover, it is interesting the new emerging theme of perceived safety. A possible strategy relies on the contribute that private citizens can give to make safer their buildings. At now, a citizen buying a car asks for car safety characteristics, but not so often a citizen, buying an apartment, asks for structural characteristics, taking for granted that it is.

(3) Relation between buildings (that is, vulnerability) and territory (that is, hazard) urban planning. If an area has a high risk, urban plans must avoid settlements, and prefer safer solution, even if they are expensive, and even if this produce conflicts with landowner.

(4) Territorial system functioning. Not only buildings make a city. In each building a function is carried out. There are squares, schools, hospitals, offices, prisons, public spaces etc., and each day people move from

their homes to other places, contributing to a flux. This flux of people and activities must be regulated, in order to optimize the global functioning and avoiding possible collapses.

(5) People at risk. Strong evidence emerged during workshop: seismic risk is not well known. People do not perceive the importance of prevention, nor are conscious that they are exposed to risk. When an earthquake occur, it is perceived as something impossible to contrast, ignoring that prevention is possible, in several ways.

(6) Emergence management. Finally, with the consciousness that seismic risk can be contrasted but not avoided, strategies to manage emergency phase must be defined. Institutions, experts, decision makers and citizens must be prepared to react, each one with its own contribute.

As mentioned, synergies between the six strategies emerged as necessary to reach the objective. If each strategy is strictly separated from the other ones, the global result will be underdeveloped. A global vision is strongly recommended, in order to make effective each strategy, and avoiding a possible negative resonance, but searching to amplify benefits.

Figure 4: photos from workshop with experts

7 CONCLUSIONS: WHERE IS THE RESILIENCE?

Analysis on team map produces an interesting result: in the node represented by resilience concept, a high number of edges enters, making evident that resilience is considered as the property of a territorial system influencing the behavior after a disastrous event. Therefore, as resilience is defined as a property of the whole system, we argued that it can be enhanced working on the whole system, and adopting coherent strategies.

Here is the resilience, in the synergies between strategies, founded in a global approach to the problem. This evidence is as more important, as the workshop highlights that at now experts are not used to work in team, but considering their field as the unique one. During the workshop, each of them continuously tried to defense its position, and only after discussion the need to harmonize single strategies was finally recognized and accepted.

As workshop represents only a test, in conclusion we want to enhance the need of working with involved stakeholders, as SODA approach allows, in order to make them conscious that seismic risk mitigation depends on system resilience, and system resilience can be achieved working on harmonized strategies.

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Sensing the City – How to Identify Recreational Benefits of Urban Green Areas with the Help of Sensor Technology

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1 ABSTRACT

Urban green spaces have different benefiting values for urban life. Besides their ecological values, they are important for retreatment and recreation and provide positive contribution for the subjective well-being of the citizens. The EU emphasizes this importance for the urban spaces in various guidelines and directives, like in the Charta of Leipzig with its contents of a vital city. However in terms of a measurable classification, there is just a concentration on the European Union Environmental Noise Directive. Additionally, questionnaires to request personal subjective opinions are used. This research study aims to show if this issue could be reduced to one dominating factor or how the well-being of the citizens could be reflected by more complex correlations. By now, a qualitative and concurrent method to arise the recreation value by the well-being of the citizens is missing. The research approach includes the usage of an ambulatory assessment device (wristband) with psychophysiological measurements. Hence, a wristband ("SMART-Band") has been developed which can measure unobtrusively emotions in real time as product of unswayable body functions. By this method, subjective feelings and emotions could be transferred into quantifiable values. Furthermore, correlations with these values and the noise level from EU directives are in focus of the research. The study took place in four different urban spaces with specific noise loads and recreational characters. The test persons (n=18) were equipped with wristbands ("SMART-Band"), video cameras and noise detection technologies (instruments of the Laboratory of Monitoring and Spatial Sensing of the University of Kaiserslautern). For supplementary validation, information gained from questionnaires and tagging smartphone technologies are used.

2 INTRODUCTION

Through developments in recent years such as ubiquitous computing and pervasive sensing (Martino et al., 2010), the human environment is increasingly enriched by vice versa connected sensors, which generate spatial planning-relevant data. With the help of new mobile technologies, citizens are more and more integrated in this network of applications and could interact with it in the future. First thoughts on this have been considered some years ago with the theory of "Citizens as Sensors" (Goodchild, 2007) or a "People-Centric Urban Sensing" (Lane et al., 2006). This ensures that citizens, who should be the focal point of any planning consideration, may be considered as active sensor for the urban environment. Pervasive Sensing in its current status is marked by the fact, that the primary external influences singularly are measured, but the direct effects and interactions of the citizens will not be considered. So far, it is important that not only the sensor measurements of the citizen were taken into account, but also into which emotions they were resulting. This study will introduce devices and methods, which will consider the human sensor and its emotional perception. One important influencing factor is urban noise on test persons and the correlation with their emotions. Aim is to define methods and new insights for defining the quality of a place. The study "Sensing the City" shows the potentials of psychophysiological monitoring and prospects for their use in urban planning. The study takes place in three urban areas in the city of Kaiserslautern in which the participants are connected with different kinds of psychophysiological monitoring devices and audiovisual measurements.

3 STATE OF RESEARCH

3.1 Monitoring and Spatial Sensing

Monitoring contains an observation of a phenomenon over a specific period of time, with the result of using the gained forecasts for a reactive or constructive control. Regarding the used data, monitoring needs a systematic collection, analysis and documentation of these data in order to do an analysis over time of quantitative and qualitative entities (Streich, 2011). Charateristically for monitoring methods are very detailed and strictly implemented protocols with exact timestamps and a continuous recording of the observed object or event. Only by using this data collection, it is possible to generate time series, which are the basis for forecasts. Especially in the working field of spatial planning, the accompanying time series analysis was emphasized. With the appearance of Web 2.0 and associated technological opportunities as mentioned in both previous points, many new developments will influence the approach of monitoring. Besides, the empowerment of non-experts to create, analyse, visualize and publish geospatial information will contribute data for monitoring.

Due to the mentioned elaborations, it has to be distinguished between deductive monitoring (top-down) and inductive monitoring (bottom-up). Deductive monitoring is mainly composed of data generated by time series analysis: People collect data sets, with or without the awareness that they wear a sensor device to collect data, or unconsciously, like the connection dataset of cell phones. Regardless of the fact how these monitoring technologies deal with personal data and data security, the continuous recording of these kind of data has a large potential, not only for spatial planning. Inductive monitoring approaches, especially in spatial planning have to be considered in a different way and could be described as a concluding approach from the entirety. It could be seen that the following trend is going to be detected: the growing amount of interest in the use of "Sensing the city". Sensing the city in this case means the combination of georeferenced data with the help of ubiquitous mobile computer systems and sensor technology. Furthermore, in this context, the term "Geoweb" from the British magazine "The Economist" (2007) is mentioned as well as it is metaphorically referred to "Web 3.0" or "GeoWeb" (Batty et al., 2010, p.1). In particular, the GeoWeb phenomenon refers to "the development and changing nature of map-based, data mash-ups. It tries to explain the basic concepts behind map mash-ups, how geospatial data gathering and analysis has changed and how new technologies and standards are impacting on this" (Batty et al. 2010). During the last years, a drastic increase in available GIS-data source and especially rapid developments and price reduction in sensing technologies could be observed. To make use of this immense amount of data within monitoring systems, real-time data integration mechanisms and approaches have to be developed (Resch et al., 2009) and would be desirable in this context. Essential parts of a "Sensing the city" system are (smart) sensors, humans (as sensors) and a monitoring system (Exner et al., 2011).

3.1.1 (Smart) Sensors

"Base-sensors" for spatial planning are sensors for detection of location and direction of an object (Streich, 2011): These sensors can be subdivided in sensors for self-location (for example a GPS-Tracker) or position detecting, how it is used for radar equipment or the detection of Cell-ID in mobile phone networks. With the help of GPS and a compass, it is possible to detect the moving direction. Other available technologies are data collecting devices with the assistance of visual sensors (like digital cameras), audio sensors or in addition sensors for the measurement of the degree of air pollution. A general overview and classification in sensor types could be distinguished: sensors for state variables and material properties, sensors for geometrical and mechanical parameters, electromagnetic and optical sensors and other possibilities for image processing (Schanz, 2007) or, like in the present case, the skin conductance and the skin temperature (Zeile et al., 2011). All the sensors produce mostly quantifiable data and could be used in different planning related issues.

Crucial point is to organize these complex and heterogeneous data sets and new technologies. So it is necessary to develop new methods for its use, administration, organization and management. Basic research for the handling of these data sets is essential in this regard. An interesting approach for this is to use "bikers" as sensors as shown in the Copenhagen Wheel project (Outram et al., 2010), in which environmental conditions like CO and NOx concentration, temperature, noise (dB) and humidity were directly measured by sensors during bicycle rider's tours through the city. Focus in these cases were

particularly citywide sensory data, data management, the integrated real time visualization in a top down process with a bottom-up approach. Hence, one of the most important issue in planning processes is "to involve humans into a "sensing process", because they function through their body impressions as a synchronized multi-sensor" (Exner et al., 2011).

3.1.2 Human as sensors

Like above mentioned, it is necessary to integrate people's skills for gathering sensor data. In 2010, "The Economist" stated out to this point: "Everything will become a sensor, and humans may be the best of all". Due to the technological development in smartphone business, the combination of Smartphone - Human Interaction could be a huge potential in planer's everday work if it is possible to use this specific ability of people for monitoring spatial phenomena. Their abilities in terms of sensing will result together through interaction with the user itself in the rise of new planning relevant sensor data. Furthermore, crowdsourcing integrates an entirely new mode of participation in processes of urban discussion for geospatial data gathering" (Exner et al., 2011).

3.2 Noise reduction in spatial planning

Environmental noise may be defined as unwanted sound that is caused by emissions from traffic (roads, air traffic corridors and railways), industrial sites and recreational infrastructures, which may cause both annoyance and damage to health. It is to be considered as one of the main local environmental problems in industrialized countries. Noise in the environment or community seriously affects people, interfering with daily activities at school, work and home and during leisure time. Furthermore environmental noise causes an increasing number of complaints from the public.

Generally, action to reduce environmental noise has had a lower priority than that taken to address other environmental problems such as air and water pollution. However, it has been estimated that around 20 percent of the European Union's population or close on 80 million people suffer from noise levels that are considered to be unacceptable – i.e. that many or most people become annoyed, that sleep is disturbed and that serious long-term health effects like increase of hypertension are to be feared. The European Union calls these 'black areas'. An additional 170 million citizens are living in so-called 'grey areas' – these are areas where the noise levels are such to cause serious annoyance during the daytime – but no serious health damages. Only 150 million Europeans live in 'white areas' that are not seriously affected by environmental noise (EU-WG-AEN, 2003). These are mostly rural areas or privileged places in urban areas.

The reduction of environmental noise is subject to two important restrictions. The first is that spatial systems or infrastructures are to be assessed, not the sources of sound emissions like cars or aircrafts. Therefore, environmental noise assessment and mitigation is not concerned with technical questions, such as constructing cars in a way that makes them quieter, but rather with the question of infrastructure planning and its impact on residential and leisure areas. The second major restriction is that there are some kinds of noise that may not be assessed in the environmental context – the most important one being neighborhood noise, which is a question of architecture, of social behaviour and of legislation, but not of spatial planning – although there are some connections to planning (Rumberg, 2009). A recent goal of noise mitigation according to the European Union Environmental Noise Directive is to protect quiet areas against an increase in noise. Especially in densely populated cities urban parks and green spaces are of great importance. The designation and protection of quiet areas is thus a contribution to maintaining a high quality of life in the cities.

3.3 Emotional Mapping (based on skin conductance and skin temperature)

The human-being has ever been in the focus of any planning consideration. Thus, it is only logical to determine him as sensor and source of individual data concerning its environment. How does a person sense its actual surroundings and how can these impressions and emotions be measured objectively? Recently, a multitude of researchers (psychologists, neuron-scientists, medical scientists, computer scientists, etc.) occupy themselves with these questions. They work in the field of "Affective Sciences" on emotions and their influence on human behaviour and society (NFS Affective Sciences, 2011). The immediate transferability to space is quite obvious. In this context, two main criteria to identify unaffected emotions, which are triggered by the surroundings, have turned out:

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- Affective emotions have to be recorded in real-time and for every instant to identify particular on-site situations
- The measurement must not hinder or disturb the individual to avoid the collecting of cognitiv influenced emotions

Considerable research in the field of classical emotion research and the Affective Sciences shows consistently that emotional reactions come along with changes in the activity of the autonomic nervous system. These internal reactions are reflected in specific physiological parameters (e.g. skin conductance and skin temperature) (Kreibig, 2010), which are classified as vital data of the individual. Methodical with regards to content, the recording and analysis of this vital data is called psychophysiological monitoring. "Recent technological developments, such as a sensor wristband, now allow the recording of these parameters outside a lab, even without limiting a test person's mobility. A wrist-sensor like that is therefore the ideal instrument to record emotional stress reactions one encounters while moving through urban space [...](Bergner et al., 2011, p.249)." One possible approach, in case of outdoor measurements, is the identifying of mental load (stress) with the help of physiological indicators. Stress can be understood as a product of anger and fear - highly negative emotions. The analysis of stress moments especially helps to identify deficits in the urban environment. All these facts favour the usage of psychophysiological monitoring coupled with ambulatory assessment (wearable computers) for real-time studies in space. The combination with the field "Monitoring and spatial Sensing" offers completely new perspectives for the spatial awareness and performance of encompassing spatial analyses. This approach was already pursued in several project studies. First test series were done in the emomap-project (Zeile, 2010). Furthermore the so-called EmBaGIS (Emotional Barrier-GIS)-studies were conducted in the context of urban spatial barriers for handicapped people (Bergner et al., 2011).

4 REPERTOIRE OF METHODS

To capture spatial relevant data, different kinds of methods are combined into an overall approach. Focal point is the comparison of noise measurements and psychophysiological data, which brings the principle of humans as a sensor in the classical consideration of spatial planning data collection.

4.1 Noise measurements

A key method for the assessment of noise load and its effects is noise mapping. Noise mapping is the representation of acoustic data in a cartographical format and the assessment of noise exposure in the context of public health and quality-of-life in a multi-level modelling process. Its benefits are the visualization of acoustic data and, by combination, of the information with a geographical information system (GIS) enabling the correlation of different datasets. Thus population density can be related to noise exposure to generate information about the number of people exposed to noise levels above a certain criteria level. In general, the purpose of noise mapping is to give an accurate statement of sound levels in a location, to provide noise trend data, to establish exposure levels of a population for risk estimation purposes, to identify pollution hotspots and relatively quiet areas for the definition of priorities, to yield information as to the effectiveness of management schemes and to inform as well the public as decision makers (Rumberg, 2009).

To effectively cope with noise problems in spatial planning a quantitative and informative basis-of-discussion is required. Environmental noise in general is not constant over the time but is normally showing a complex time structure. So the instantaneous sound level is no sufficient description for environmental noise, and long-term-descriptors – such a average sound levels, weighted average sound levels such as LDEN (a 24-h hour average level in which evening and night time is weighted) and peak (or maximum) sound levels and NATs (number above a defined threshold) – are complemented. The effects of noise on humans highly depend on this time structure. Strong noise peaks appearing at low background levels are particularly disturbing while generally higher, but constant levels (e.g. near to highways) are perceived less intensely. In comparison to that, other collected data to measure noise exposure and its effects on human beings is generally poor - and data on noise effects is often difficult to compare due to very different measurement and assessment methods.

Generally noise data may be achieved by measurement or prediction. In the majority of cases prediction models based on complex emission and propagation algorithms (e.g. ISO 9613) are used for noise mapping in larger areas and for long-term-description. For these cases noise prediction software (e.g. CadnaA, Lima

and SoundPlan) is available. For short-term-monitoring in specific locations measuring the instantaneous sound levels using noise level recorders is more suitable.

4.2 Psychophysiological Monitoring

The recording and observation of changing body functions (physiology) are part of the psychophysiological monitoring, which shows individual emotions localized in real-time. This research focuses on negative emotional reactions, which can be classified as "stress"-reactions. A negative experience is given, if the skin conductibility increases and shortly afterwards, the skin temperature drops (Bergner, 2011). The following graphical curves illustrate this process (Fig. 1).

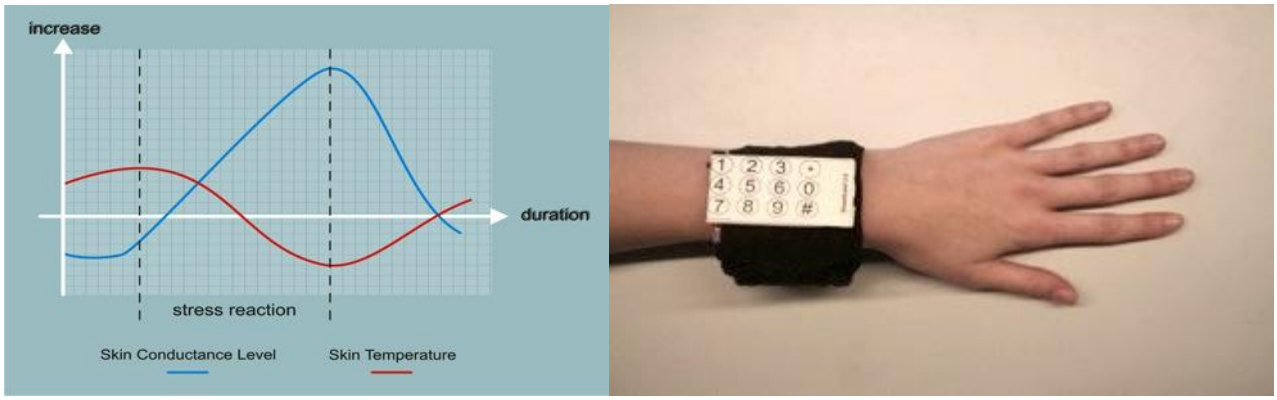

Fig. 1: Stress reaction & SMART-Band (Own source)

It is obvious that the qualitative visual analysis of the physiological data is rather time-consuming. To shorten this procedure, the mathematical function of the mentioned parameters is simplified with the first derivation. Hereby, the slope values of the curves can be used for statistical analysis. The method of using scoring points (increase in skin conductibility = Scoring +1; decrease in skin temperature = -1) was already used in studies before (Bergner et al., 2011). With the help of a sensor wristband (SMART-Band by www.bodymonitor.de) the changing body functions are measured and recorded. This wristband was developed by GESIS, the Leibnitz-Institute for Social Science in Mannheim (Papastefanou, 2009).

5 STUDY "SENSING THE CITY"

The aim of this study was to identify urban retreat and recreational areas against the background of the European Union Environmental Noise Directive with the help of psychophysiological measurements. The idea behind was, that in a city can exist qualitative retreat areas with a high recreational potential, caused by good urban design, although the areas could not be classified as a retreat area by the European Union Environmental Noise Directive. One example for this phenomenon is the fact, that people have the impression that the subjective quality of sojourn is even high on a loud street, if a fountain is located on the street and people can hear the sound of the fountain splashes.

5.1 Study Set-up

During the study, the following parameters were modelled /measured:

- Noise pollution (quantitative modelling with immission control software for location determination)
- Noise pollution (quantitative & qualitative measurement with noise level recorder)
- Subjective perception by using SMART-Bands (and alternative SenseWear devices), recorded through skin conductance level and skin temperature
- Additional geotagging of impressions via RADAR SENSING App via KML
- Traditional 5 level ICBEN-questionnaire (International commission on biological effects of noise), which described the perception of noise pollution.

The test persons (n=18) were a group of students from the local university. Ten were male and eight female with an average age of 25,4 years (m=27; w=23,5). They had the excercise to concentrate on reading a book in the different areas over a time span of 30 minutes.

The test persons were equipped with:

- SMART-Bands for measuring physiological data
- SenseWear upper arm bands for measuring physiological data
- Neck Cameras to identify the individual audio-visual impressions
- Smartphones (with the installed tagging RADAR SENSING App)

Before the setting up the study, first step was the analysis of the city of Kaiserslautern to identify potential areas with high suitability for quiet recreation. The test persons filled in their standardized ICBEN questionnaires on noise pollution, where they wrote down, if they had the impression at this place to be considered a relaxed situation. Following the phase of data collection with Sensewear-Band and SMART-Band in which the subjective physiological responses were measured in fact of rapidly changing situations of noise. Simultaneously, the local sound signals were recorded and measured.

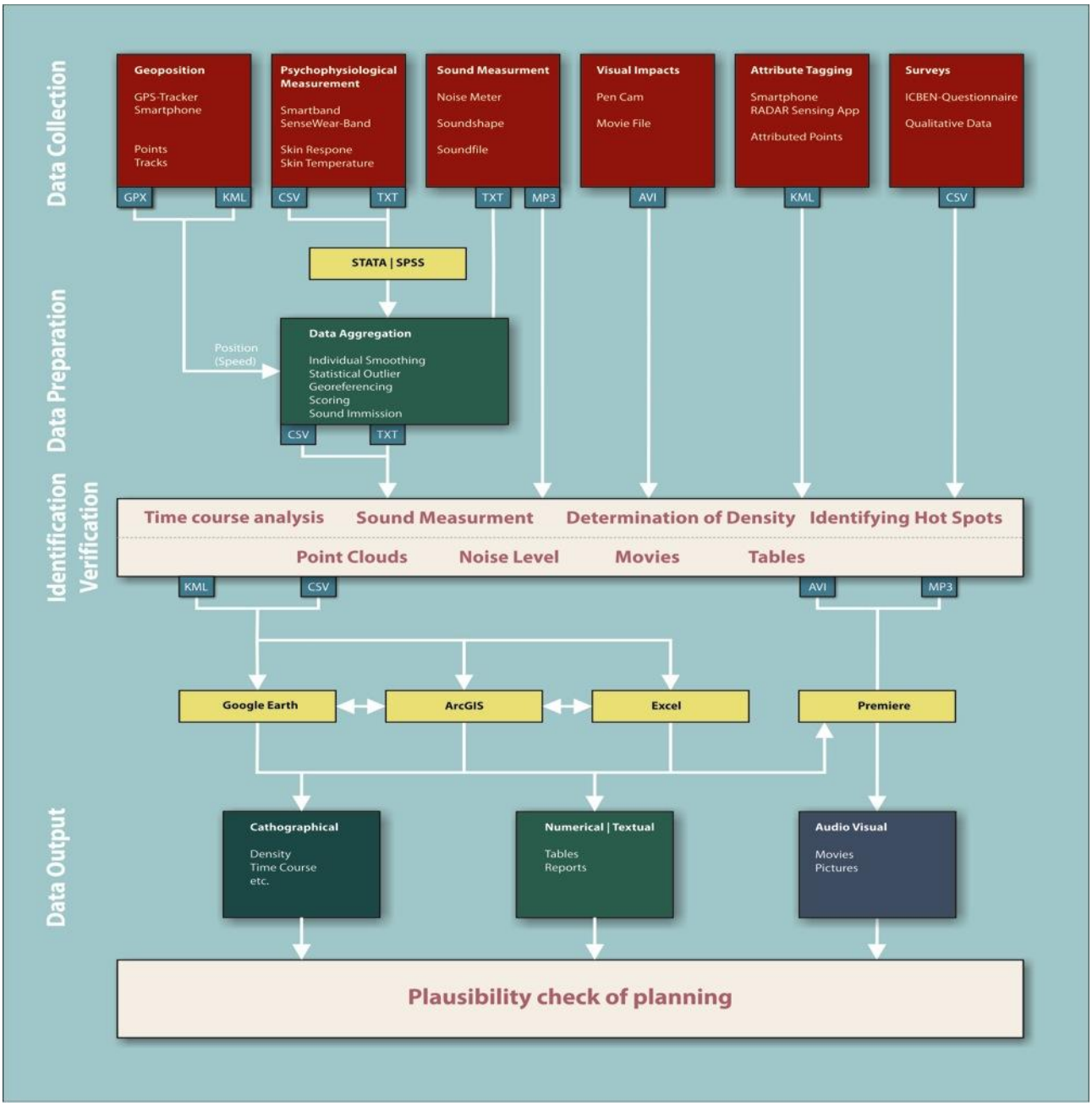

Fig. 2: Study-workflow (Own source)

In order to validate the hypothesis of the connection between different noise levels and the emotions of the test volunteers, four characteristic study locations were identified in the city centre of Kaiserslautern. All four locations have specific characteristics and noise levels:

- Location Volkspark: bigger inner city park, which is mostly calm and has a high potential for recreational purpose – test bed for the visualizations in this paper
- Location Fackelrondell/Stadtplatane: inner city area in an area with an intense surrounding traffic, recreation purpose just for a short-time stay possible
- Location Stadtpark-Straße (street side): inner city area in an area surrounded with medium intense traffic, although the park is mostly calm, the sidelines are strongly influencing by traffic noise.
- Location Stadtpark-Kern (centre): inner city area in an area surrounded with medium intense traffic, the measurement was collected in the calmer centre of the park.

The comparison of the noise levels on an afternoon over the period of a 30 minutes time span reflects the various specifics of all four test beds. It could be seen, that the level on the "Stadtplatane" with an intensive traffic is in average much higher than all other levels. The "Volkspark" for example has a stable level, which was just interrupted by two specific situations, a playing child and a passing lawn mower. Both measurements in the "Stadtpark" also showed differences because of the traffic, though the distance between both measuring sites are less than 100 meters.

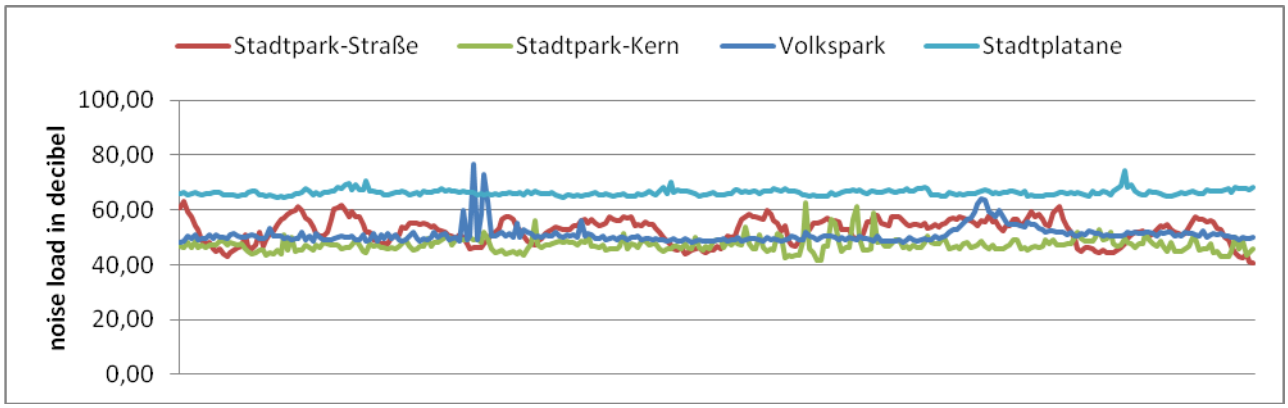

Fig. 3: Comparison of the noise levels from the 4 study locations (Own figure, based on work of Diehl, Michel and Keller for the study project Sensing the City, 2012)

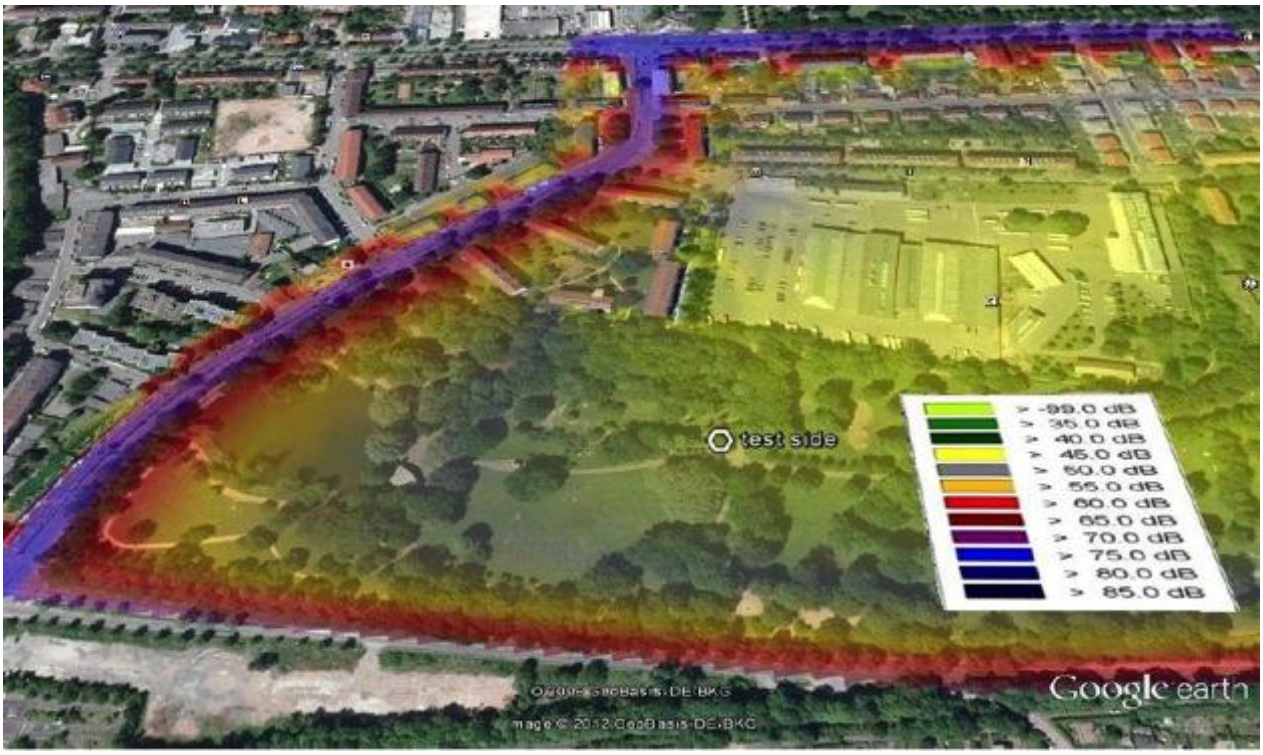

Fig. 5: Test side "Volkspark" (Own source, noise map produced with CadnaA)

Deeper insights of the study in terms of visualisation were given with the results of the test study of the area "Volkspark". The measurement site is directly in the middle of the park and has a comparatively low noise

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level. The test bed and the noise distribution could be seen in the following figure. Due to the calm environment, this spot brings the best circumstances for analysing the reaction of the test person on specific noise incidents.

5.2 Findings and visualization

Emotional mapping is a new field of study for noise effect research in gerneal as well as for the impact of the research in this topic. With this new set of technologies, it will be easier to prove assumptions about the correlation between noise load and subjective well-being. This approach is shown by a combination of quantitative and qualitative analysis. The results of the test persons show a correlation between both entities. The following picture illustrates the decibel level and the number of stress reactions in a time-series chart. The correlation between two specific events (a passing lawn mower and a playing child) could be seen clearly.

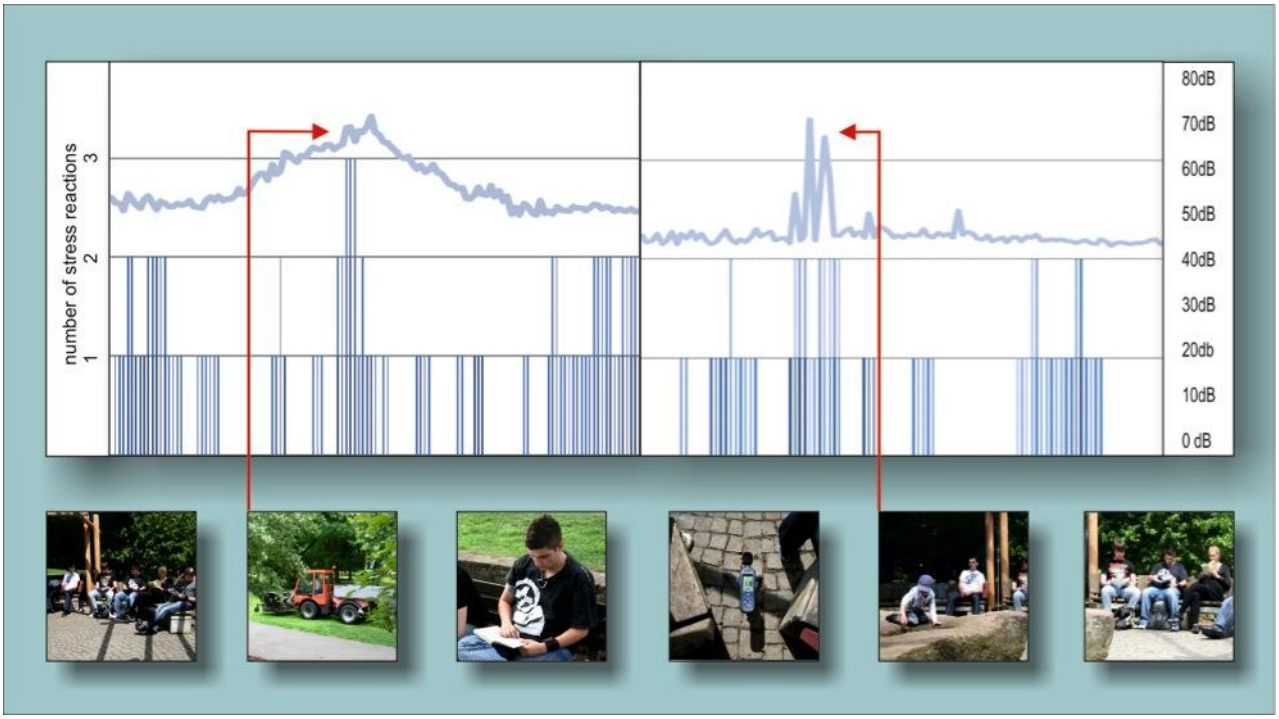

Fig. 4: Qualitative analysis of noise at the location “Volkspark” (Own figure, based on work of Diehl, Michel and Keller for the study project “Sensing the City”, 2012)

The possibility to integrate georeferenced measurement data into Google Earth shows a further potential of this method. The subsequent figure shows an example for a visualisation of emotional data of three test persons during a passing lawn mover. As it can be seen in figure 4 as well, a raising noise level induces a raising stress moment. This raising skin conductibility during stress responses could be visualized with localized vertically moving bullets on a scale as it could be seen in figure 5, which could be considered as a localized “pulse” for the volunteer.

Fig. 5: Different stress emotions of the locations “Volkspark” during a crossing lawn mower (compare figure 3) (Own figure, produced with gpsvisualizer.com, 2012)

6 CONCLUSION

The logical combination of new technical monitoring methods and people centric surveys opens completely new perspectives to capture humans' environment. The knowledge of the perception and feelings of the urban population provides for an improvement of "spatial awareness". In case of recreational benefits of urban green areas, some interesting findings have been outlined. First indications are found that there is correlation between high noise amplitudes and stress of the participants in the study set up. A constant high noise level however is covering people's perceptions of the actual local surroundings and leads to fewer and lower stress reactions. Taken as a whole, in the study is shown that besides the noise level, some other influencing factors on the well-being could be detected (for example awareness of movement around, presence of other people, odors, light, etc.) Hence, the methods to sense urban space have to be extended to determine spatial awareness. The interdependency of the environment and the subjective well-being is obvious and could not be described only with a few selected influencing factors. The approach to combine environmental data with the vital data of people therefore is still a new field of research, which has many advantages in contrast to classical methods of data collection, analysis and their comprehension and could be seen as a scientific enrichment.

One further research task lies in maturing technology and method. The used SMART-Band is presently in the state of prototype. So, there are small deficits in the usability and the data structure. Currently, a next generation of SMART-Bands will be developed, including a new sensor generation for delivering much more reliable data sets. Hence, an automation of the data analysis process is needed. Real-time processing by "the push of a button" is a desirable aim to reduce the dependency on the actually mainly manually analysis.

Furthermore, the consideration of the data at hand was based on static measurement locations and there has to be an enrichment of the emotional data with the use of GPS-data in order to see a pepole's emotions during their movement through urban areas. This topic is going to be considered in our upcoming research project "Sensing in green areas". Another field of research will be the qualitative analysis, in order to find out, which spatial circumstances could lead into which correlating body reactions. In this context, it is necessary to create a comprehensive and synchronized consideration of the various data flows. There will be further insights for classifications of "good" and "bad" stress situations and the different specific personal levels of the physical activity for example. Besides the measured implicit values of the test person, there could be as well an additional examination of own estimations of subjective well-being. That could be measured either in ordinary questionnaires or via special mobile phone questionnaires. More information for this will be provided in the conference paper "A New Urban Sensing and Monitoring Approach: Tagging the City with the RADAR SENSING-App". People are able to use this software to attach locations in the urban environment with either positive, negative or neutral remarks and to tag various values like cleanliness, sojourn quality, urban design/architecture, social environment, accessibility, lighting, seating or for example traffic. As an overall conclusion, these new methods could bring new insights for planners in order to detect time-space-patterns in urban environments and will be a new field of research in the future.

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🏆 *reviewed paper*

Sharing is Caring – Will Users Comply with the Current Smart City Approach?

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1 ABOUT THE NATURE OF 'SHARING'

'Sharing' refers to the voluntary act of giving something out that belongs to one self with good intentions. The term sharing belongs to the definition category of separation; such as 'to keep' and to 'to give' belong. In contrast, 'to share out' or 'to steal' belong to a different category, since the subject is a different one: usually, one does not own the items. In turn, if one keeps or gives items, they are usually part of one's assets or fortune and therefore, are self-referring.

'To give' can be further fragmented into two terms: (1) 'to give a gift' and (2) 'to exchange' (Lempart 2008). (1) Known in social sciences as the gift economy, it is the habit of exchanging goods and services without formal agreement about it. Depending on cultural circumstances, giver and receiver are connected through social indebtedness or other forms of social interaction (Mauss 1968). The concept of quid pro quo as well as barter trade and money exchange are not in place (yet) and therefore, is considered the forerunner of (2) exchange. In a perfect economic world, commodity exchange is handled with either money or with other commodities with no space left for personal feelings of feeling indebted. Balanced reciprocity can be characterized by the equivalence of tit-for-that, whereas in a negative reciprocity one exchange partner wants more than he is willing to give (Sahlins 1972).

Following the concept of Belk (2007: 128), "sharing is the third form of distribution", which differs from the commodity exchange as from the gift economy. Belk argues, that a few things can only be shared instead of traded or given. He takes positive sharing experiences such as a sunset, communication, as well as negative ones like "[…] guilt, shame, and proceeds of a crime in which we participate".

Subjects of sharing

When 'sharing', two or more people enjoy the benefits or costs that derive from possessing a thing. They forgo the label of mine and yours and define it as ours instead. Our sharing may be exclusive for just our use or include others in the use. One lends, allocates or pools resources and authorizes its use; usually for a prescribed amount of time. Renting out an apartment, leasing a car as well as theft or illegal trespassing are not considered sharing, since they either belong to an exchange or stealing. And of course, people share a language, cultural habits and heritage, but this happens more on an incidental than on an intended and conscious level (Belk 2007).

Looking at tangible goods, people share apartments, car rides or XXL popcorn at the cinema, whose duration is determined. In contrast, we all share architecture or famous landmarks, which will not become less even if 1000 other individuals look at it. On an intangible level, executive boards share power and responsibility. The open innovation scene is characterized by sharing knowledge, ideas and implementation time.

2 INCENTIVES & BARRIERS TO SHARE

When writing about 'sharing' incentives, it makes sense to distinguish between intangible and tangible goods. Open innovation and in particular, the internet made it possible to retain the good while giving it away (Weiner 1992); resulting in some sort of 'cheap altruism' (Coyne 2005). In this paper, the focus is on an infrastructural environment and therefore, will not be considered further in this paper.

The incentive to share tangibles was originally to offer unconditional hospitality to strangers and those in need. Nowadays, communal sharing can be found primarily in the immediate family with direct allocation of resources (Fiske 1991). Another incentive could be to be able to afford goods one would not have the resources for; in other words: leverage a lifestyle beyond individual possibilities (Belk 2007). This applies for time-share vacation homes, collectively shared cars or boats and other goods that might not appeal to a tight budget. A nice lifestyle example in this context is the online subscription model, where on can rent designer dresses and then return them when not needed anymore. When donating money to a charity or pick up friends' stuff on the way from somewhere, we feed our self-image of being a good person and helpful. Another option might be that one feels he has to give something back to society since he has been lucky in his life. As discussed above, the keeping-while-giving concept can be extended in the sense that one borrows

a driller and is expected to return it when not used anymore (Belk 2007). As Foster (1969) pointed out, the 'unlimited good' makes us believe that there is an unlimited supply of goods. Belk (2007) comes up with the example of a child admiring our collected shells on a beach and we give them to the kid without thinking about it twice. The potential determination of supply seems to indicate a decline to share; unless the good would turn bad. This may be a non-refundable ticket to a concert one is not able to go to or food leftovers that would become non-eatable the next day.

Obstacles to sharing involve many aspects, however, all of them need some sort of possession as a base. As defined above, sharing requires ownership that enables us to share with others. The feeling of possession and attachment toward our things make us less inclined to share (Belk 1992, 2007). "To the extent that we feel a possession is a part of our extended self, we are more likely to wish to retain it" (Belk 2007: 131 and as cited: Belk 1988; Kleine, Kleine and Allen 1995). Belk (2007) defines another impediment to sharing; materialism, defined as the value a person gives its possessions. "Materialists believe that possessions are the key source of happiness or unhappiness in life" (Belk 2007: 131). Despite the fact that materialism is not associated with positive values, study participants sought for a higher salary, a faster car, a bigger house and other materialistic issues (Ger and Belk 1999). Coming back to the shell example mentioned above, limited resources or the belief that resources are fixed are probably a widespread reason not to share. As far as intangibles are concerned, intellectual property rights and their competitive advantage is a major reason not to share. Hence, the coca-cola formula is still well protected as are a lot of pharmaceutical mixtures.

3 URBAN MOBILITY & SHARING

- Short introduction into individual and public transport within the framework of 'sharing'
- Exploration of multimodal transportation within the framework of 'sharing'
- STATUS: data collection

4 EMPIRIC APPROACH & DATA

- 10-15 expert interviews from various sectors (urban mobility, automotive, city planner, human factors…)
- In-situ research across different cultures and "mobility circumstances"
- STATUS: data collection

5 CONCLUSION & OUTLOOK

- The theoretical and field research undertaken so far indicate a potential gap between current user behavior and required future user behavior however, more in-depth analysis needed
- STATUS: following data collection

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🏆 *reviewed paper*

Sicherheit im demographischen Wandel

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1 ABSTRACT

Berechnungen zum demographischen Wandel zeigen, dass die Bevölkerung in Deutschland und in den einzelnen Bundesländern mittel- bis langfristig (Zeithorizont 2020/2050) von Alterung und Schrumpfung betroffen sein wird. Oftmals werden in Bezug auf zu erwartende Schrumpfungsprozesse Themenfelder wie Wohnungsmarkt und soziale sowie technische Infrastrukturen betrachtet. Zur infrastrukturellen Grundversorgung zählt jedoch auch die Sicherheit, die sich mit dem Schutz vor Kriminalität [1] und Verkehrsunfallgefahren befasst, und damit auch bedeutsam für die Lebens- und Standortqualität der ansässigen Bevölkerung und von Unternehmen ist.

Als Folge der möglichen Bevölkerungsentwicklung ist auch mit Auswirkungen auf die Sicherheit zu rechnen. Gerade in ländlichen Regionen kann die verringerte Bevölkerungs- und Siedlungsdichte zu einer erhöhten, subjektiv empfundenen Unsicherheit der (verbliebenen) Bevölkerung führen. Beispielsweise können bestimmte Bereiche in den Städten und Dörfern von der Bevölkerung zunehmend als unsicher bzw. als „Angsträume“[2] empfunden und deshalb eher gemieden werden, obwohl diese Räume i.S. der Kriminalitätsbelastung möglicherweise keine besonderen Gefährdungen aufweisen.

In der wissenschaftlichen Diskussion besteht Einigkeit darüber, dass mit der Alterung und der damit in Verbindung stehenden Bevölkerungsschrumpfung die technischen und sozialen Tragfähigkeitsgrenzen von Infrastrukturen in Teilen unterschritten werden (können). Es besteht die Gefahr der Stilllegung von Infrastrukturen aufgrund sinkender Auslastung und Wirtschaftlichkeit. Für bestimmte, dünn besiedelte Gebiete wird dabei eine Rücknahme der Versorgung aus der Fläche prognostiziert („Anpassung durch Reduzierung“). Dabei ist auch davon auszugehen, dass Sicherheitsressourcen der öffentlichen Hand eingespart, mindestens jedoch optimiert werden müssen. Dennoch wird auch bei geringer werdender Bevölkerungs- und Siedlungsdichte ein Anspruch auf Erhalt von Mindestsicherheitsstandards in der Fläche notwendig sein, um zum einen die objektive Sicherheit der Bevölkerung in allen Teilräumen eines Landes/ einer Region zu gewährleisten und das subjektive Sicherheitsgefühl [3] der Bevölkerung zu berücksichtigen. Zum anderen kann die Sicherheitsinfrastruktur auch dazu beitragen, den Verlust von Standortattraktivität und damit die Herausbildung einer negativen „Abwärtsspirale“ in diesen Räumen zu verhindern. Anpassungen, Neuausrichtungen und technologische Systeminnovationen zur öffentlichen Sicherheit sind somit unumgänglich.

Im Rahmen des Beitrages sollen die querschnittsorientierte Problematik der Anpassung der sicherheitsbezogenen Infrastruktur im Zuge der Alterung und Schrumpfung der Bevölkerung aufgezeigt und beispielhaft baulich-räumliche, sicherheits-organisatorische sowie technologische Maßnahmen, die einen Beitrag zur zukünftigen Sicherheit der Bevölkerung leisten können, dargestellt werden.

[1] Als Kriminalität können die Taten, die im physischen sowie im virtuellen (Stichwort „Internet-/ Cyberkriminalität“) Raum stattfinden, zusammengefasst werden. Im Rahmen des Beitrages wird die im physischen Raum vorkommende Kriminalität betrachtet; das Thema „Internet-/ Cybersicherheit“ wird hierbei vorwiegend ausgeklammert.

[2] Als „Angsträume“ können Bereiche gekennzeichnet werden, die aufgrund ihrer Baustruktur, Lage oder Nutzung von der Bevölkerung nach Möglichkeit gemieden werden. Beispiele dafür sind: monofunktional strukturierte Räume, die zu bestimmten Tageszeiten kaum genutzt werden; Grünflächen, die ausschließlich als Abstandsflächen dienen und wenig gepflegt werden; Unterführungen, die nicht oder nur kaum einsehbar sind sowie insgesamt schlecht ausgeleuchtete Bereiche; Haltestellen und Wartebereiche; Parkplätze und Tiefgaragen, die unübersichtlich und zu bestimmten Zeiten wenig genutzt werden; etc.

[3] Der Begriff ‚Subjektives Sicherheitsgefühl’ bezeichnet die Einschätzung des Einzelnen seiner Sicherheit oder – aus umgekehrten Blickwinkel – der Gefahr, dass seine Rechtsgüter beeinträchtigt werden.“ Schewe, Christoph S. (2006): Subjektives Sicherheitsgefühl, Seite 322, in: Lange, Hans-Jürgen (Hrsg.) (2006): Wörterbuch zur Inneren Sicherheit, Wiesbaden, 322 – 325. Somit ist die subjektive klar von der objektiven Sicherheit abgrenzbar, die statistisch (z.B. Polizeiliche Kriminalstatistik) darstellbar ist.

2 EINLEITUNG

Im Rahmen des folgenden Beitrages sollen die Bestimmungsfaktoren des demographischen Wandels (Alterung und Schrumpfung der Bevölkerung) umrissen und mögliche Auswirkungen auf die öffentliche Sicherheit, insbesondere in alternden und schrumpfenden Räumen, dargelegt werden. Um auch zukünftig eine an das subjektive Sicherheitsgefühl der Bevölkerung angepasste Sicherheitsvorsorge [4] durch die Träger von Sicherheit [5] erbringen zu können, erscheint eine ergebnisoffene Überprüfung und Anpassung der bestehenden Standards der Sicherheitsvorsorge unumgänglich.

Der Artikel soll zudem mögliche Anpassungen, Neuausrichtungen und technologische Systeminnovationen zur öffentlichen Sicherheit, die einen wirksamen Beitrag zur Erhöhung des subjektiven Sicherheitsgefühls der Bevölkerung leisten können, in baulich-räumlicher, sicherheits-organisatorischer sowie technologischer Hinsicht an die geänderten Rahmenbedingungen aufzeigen. Damit soll auch ein Denkanstoß für die Akteure der sicherheitsbezogenen Infrastruktur gegeben und für die Thematik des Anpassungsbedarfes der Sicherheitsvorsorge in der (Fach-)Öffentlichkeit sensibiliert werden.

3 SICHERHEIT ALS BESTANDTEIL DER DASEINSVORSORGE UND AUFGABE DER RÄUMLICHEN PLANUNG

3.1 Sicherheit als Bestandteil der Daseinssorge

Die Schaffung und Erhaltung der öffentlichen Sicherheit als Aufgabe des Staates kann neben weiteren wesentlichen Gütern und Leistungen der Daseinsvorsorge (Verkehrswesen, Ver- und Entsorgung, Bildungs- und Kultureinrichtungen, Krankenversorgung, etc.) als Bestandteil der infrastrukturellen Grundversorgung charakterisiert werden, welche die Bevölkerung vor Kriminalität und Verkehrsunfallgefahren schützen soll. Somit ermöglicht die Prävention vor Kriminalität und Verkehrsunfallgefahren erst eine dauerhafte Siedlungstätigkeit und stellt einen bedeutsamen Faktor für die Lebensqualität der Bevölkerung und einen Standortfaktor für Ansiedlung und Standortvorsorge von Unternehmen–gerade vor dem zunehmenden Wettbewerb der Kommunen und Regionen um Einwohner und Steuereinnahmen–dar.

3.2 Sicherheit als Aufgabe der räumlichen Planung

Kriminalprävention, welche „die Gesamtheit aller staatlichen und privaten Bemühungen zur Verhütung von Straftaten (umfasst)“ [6] wird nicht nur von den Polizeibehörden, sondern auch durch die Kommunen u.a. im Rahmen der räumlichen Planung durch Teilbeiträge zur vorbeugenden Bekämpfung bzw. Vermeidung von Kriminalitätsgefahren umgesetzt. Durch geeignete stadtplanerische und städtebauliche Maßnahmen, wie beispielsweise durch die Anwendung der Mischung städtebaulicher Funktionen, sollen Tatgelegenheitsstrukturen im öffentlichen Raum verringert sowie der Entstehung von „Angsträumen“ vorgebeugt werden. Daneben bestehen seit längerem verschiedene Konzepte, die eine stärkere Einbindung von kriminalpräventiven Maßnahmen in die räumliche Planung zum Ziel haben und hauptsächlich auf der Block- bzw. Gebäudemaßstabsebene ansetzen. Dazu zählen die Konzepte „Defensible space“, „Crime prevention through environmental design“ (CPTED) bzw. dessen europäische Variante „Designing out crime“ (DOC) sowie die Europäische Vornorm ENV 14383-2 (Vorbeugende Kriminalitätsbekämpfung–Stadt- und Gebäudeplanung). Obwohl diese Konzepte einen Beitrag zur Erhöhung des subjektiven Sicherheitsgefühls der Bevölkerung leisten können, werden sie bisher nur in wenigen Kommunen umgesetzt.

In der gesetzlich normierten, förmlichen Bauleitplanung werden–zumindest in Ansätzen–auch Aspekte der Sicherheit behandelt: So besagt u.a. § 1 Abs. 6 Nr. 1 BauGB [7], dass die Sicherheit der Wohn- und

[4] Der Begriff Sicherheitsvorsorge kann nicht ausschließlich auf polizeiliche Aufgaben bezogen werden. Im hier verstandenen Sinne wird Sicherheitsvorsorge als Prävention vor Kriminalität und Verkehrsunfallgefahren definiert.

[5] Als Träger von Sicherheit werden vorrangig die Polizeibehörden betrachtet, wenngleich in der Praxis beispielsweise Kommunen, Private oder eine Kombination dieser („Sicherheitskooperationen“) mit dem Aspekt der Sicherheit betraut sind. Aus diesem Grund werden die unter Abschnitt 5 benannten Ideen und deren Umsetzung zur Anpassung der Sicherheitsinfrastruturen an die geänderten Rahmenbedingungen nicht nur als zentrale Aufgabe der Polizeibehörden aufgefasst, sondern auch darüber hinausgehend als Erfordernis der Kommunen und weiterer Partner verstanden.

[6] Krevert, Peter (2006): Kriminalprävention, S. 165, in: Lange, Hans-Jürgen (Hrsg.) (2006): Wörterbuch zur Inneren Sicherheit. Wiesbaden, S. 165 – 169.

[7] Baugesetzbuch (BauGB) in der Fassung der Bekanntmachung vom 23. September 2004 (BGBl. I S. 2414), das zuletzt durch Artikel 1 des Gesetzes vom 22. Juli 2011 (BGBl. I S. 1509) geändert worden ist.

Arbeitsbevölkerung bei der Aufstellung der Bauleitpläne zu berücksichtigen ist. Zwar bezieht sich der genannte Paragraph ausdrücklich auf den Aspekt der Sicherung einer menschenwürdigen Umwelt (insbesondere Beachtung des Immissionsschutzes)–zumal der Begriff der Sicherheit im Baugesetzbuch auch nicht näher definiert wird. Vertreter der Planungspraxis sind jedoch der Auffasssung, dass der „(…) verwendete Begriff der Sicherheit kriminalpräventive Aspekte auch nicht aus(schließt)–genauso wie er zum Beispiel unter objektiven Gefährdungsgesichtspunkten frauenspezifische Belange oder unter dem Aspekt der Barrierefreiheit Belange behinderter Menschen beinhaltet.“ [8] Somit sollte der Aspekt der Kriminalprävention in der Stadtplanung berücksichtigt werden. [9] Als Mangel wird aus der Praxis jedoch immer wieder beklagt, dass die für die Sicherheit zuständigen Polizeibehörden in Rheinland-Pfalz nicht als Träger öffentlicher Belange in der Bauleitplanung als verpflichtend anzuhörende Stellen beteiligt werden. [10]

4 DEMOGRAPHISCHER WANDEL UND MÖGLICHE AUSWIRKUNGEN IN BEZUG AUF DIE SICHERHEIT

4.1 Demographischer Wandel am Beispiel Rheinland-Pfalz

Verschiedene Berechnungen [11] zum demographischen Wandel besagen, dass die (erwerbsfähige) Bevölkerung in Deutschland und in den einzelnen Bundesländern, wenn auch in unterschiedlichem Maße, mittel- bis langfristig (Zeithorizont 2020 bis 2050) altern und schrumpfen wird. Zwar beinhalten Bevölkerungsvorausberechnungen keine verbindlichen Daten und Ziele, sondern verdeutlichen lediglich die generell möglichen Entwicklungstendenzen. Die grundsätzlichen Aussagen sollten aber aufgrund ihrer weitreichenden Folgen von Politik und Verwaltung beachtet werden. Als Beispiel sei an dieser Stelle auf das im Südwesten Deutschlands gelegene und in weiten Teilen ländlich, d.h. durch eine geringe Bevölkerungs- und Siedlungsdichte, geprägte Bundesland Rheinland-Pfalz verwiesen. Die Bevölkerungsvorausberechnung für Rheinland-Pfalz [12] beinhaltet in ihrer „mittleren Variante“ [13] für den Zeitraum von 2006 bis 2020 einen Rückgang der Bevölkerung um ca. 128.000 Personen (-3,2%) auf rund 3,9 Mio. Einwohner. Gleichzeitig wird eine erhebliche Alterung der Einwohner des Landes erwartet: So wird der Anteil der jungen Menschen (Bevölkerung unter 20 Jahren) in diesem Zeitraum um -17,2% abnehmen, währenddessen die Zahl der älteren Menschen (Bevölkerung 65 Jahre und älter) +11,1% sowie die sehr alter Menschen („Hochbetagte“: Bevölkerung über 80 Jahre) um +43,6% zunehmen wird. Bis zum Jahr 2050 wird sich die Entwicklung der Alterung und Schrumpfung der Bevölkerung voraussichtlich noch verstärkt fortsetzen. So wird die Einwohnerzahl um ca. 603.000 Personen auf rund 3,45 Mio. (-14,9%) bei gleichzeitiger weiter

[8] Schowe, Christian (2004): Kriminalprävention in der Stadtplanung, Kriminalprävention als Verfahren – Wie kann eine „Verträglichkeitsprüfung“ zur Schaffung sicherer Wohngebiete in der kommunalen Stadtplanung Platz finden?, S. 50, in: Niedersächsisches Ministerium für Soziales, Frauen, Familie und Gesundheit (Hrsg.) (2004): Sicherheit planen und gestalten, Realisierung der städtebaulichen und wohnungswirtschaftlichen Kriminalprävention durch Leitbilder und Verfahren, Dokumentation eines Werkstattgesprächs am 11. Februar 2004, Hannover, S. 50 – 57.

[9] Vgl. ebenda.

[10] . Ministerium der Finanzen Rheinland-Pfalz (2005): Beteiligung der Behörden und sonstigen Träger öffentlicher Belange an der Bauleitplanung, Rundschreiben des Ministeriums der Finanzen vom 09. Dezember 2005 (3205-4531), Mainz, S. 14ff.

[11] Vgl. u.a.: Statistisches Bundesamt (Hrsg.) (2009): Bevölkerung Deutschlands bis 2060, 12. koordinierte Bevölkerungsvorausberechnung, Begleitmaterial zur Pressekonferenz am 18. November 2009 in Berlin, Wiesbaden und Statistisches Landesamt Rheinland-Pfalz (2007): Rheinland-Pfalz 2050, zweite regionalisierte Bevölkerungsvorausberechnung (Basisjahr 2006), statistische Analysen Nr. 7, 2007, Bad Ems.

[12] Eigene Berechnungen auf Grundlage von: Statistisches Landesamt Rheinland-Pfalz (2007): Rheinland-Pfalz 2050, zweite regionalisierte Bevölkerungsvorausberechnung (Basisjahr 2006), statistische Analysen Nr. 7, 2007, Bad Ems, S. 134.

[13] Der zweiten regionalisierten Bevölkerungsvorausberechnung für das Land Rheinland-Pfalz liegen drei Modellvarianten zugrunde: Die untere, die mittlere und die obere Variante. Für diese drei Varianten werden gemeinsame Annahmen getroffen: Die Geburtenrate steigt von derzeit 1,32 auf 1,4 Kinder je gebärfähiger Frau bis zum Jahr 2010 und bleibt bis zum Jahr 2050 konstant. Die Lebenserwartung nimmt bei Frauen von 81,6 auf 88,2 Jahre und bei Männern von 76,5 auf 83,6 Jahre zu. Die Varianten unterschieden sich nur hinsichtlich der Annahmen zum Wanderungsgeschehen: Bei der mittleren Variante steigt der jährliche Wanderungsüberschuss im Jahr 2007 auf 5.000 Personen und bleibt danach bis zum Jahr 2050 konstant. Vgl. Statistisches Landesamt Rheinland-Pfalz (2007): Rheinland-Pfalz 2050, zweite regionalisierte Bevölkerungsvorausberechnung (Basisjahr 2006), statistische Analysen Nr. 7, 2007, Bad Ems, S. 73ff.

voranschreitender Alterung zurückgehen. Dabei wird ein Rückgang junger Menschen um -34,5%, eine Zunahme älterer Personen um +38,2% sowie sehr alter Menschen um +145,0 % berechnet.

Zudem verlaufen die skizzierten demographischen Entwicklungen in Deutschland und Rheinland-Pfalz bedingt durch Binnen- und Außenwanderungsprozesse regional sehr unterschiedlich und erzeugen dadurch unterschiedliche Wirkungen sowie demographisch bedingte Betroffenheiten. So sind parallele Schrumpfungs- und Wachstumsprozesse sowie Alterungsprozesse, wenn auch in unterschiedlicher Dynamik und Intensität, festzustellen: während die Metropolregionen in Deutschland auch zukünftig noch von einem Bevölkerungszuwachs profitieren können, werden insbesondere periphere ländliche Räume (mit Strukturschwächen) in Ost- aber mittlerweile auch in Westdeutschland [14] (z.B. Teile des Saarlandes und von Rheinland-Pfalz) von dem Bevölkerungsrückgang deutlich geprägt. Neben dem demographischen Wandel sind zudem auch Veränderungen der gesellschaftlichen bzw. sozio-ökonomischen Struktur (soziale Segregation, Vereinsamung, Abnahme der Haushaltsgrößen, Beschäftigungsstrukturen, etc.) zukünftig verstärkt zu erwarten.

In der wissenschaftlichen Diskussion wird davon ausgegangen, dass aufgrund der beschriebenen Entwicklung Tragfähigkeitsgrenzen sozialer und technischer Infrastrukturen in demographischen „Verliererräumen“ unterschritten werden (können). [15] So wird beispielsweise für die Region Westpfalz als eine der fünf Planungsregionen des Landes Rheinland-Pfalz zukünftig für weite Bereiche von überdurchschnittlichen bzw. deutlich überdurchschnittlichen technischen und sozialen Tragfähigkeitsproblemen der Infrastrukturausstattung ausgegangen. [16] Dabei besteht bei Unterschreitung der Funktionsfähigkeitsschwelle die Gefahr eines Systemausfalls bzw. einer Stilllegung der Infrastrukturen aufgrund mangelnder Auslastung und daraus folgender Wirtschaftlichkeit. Dies kann zu einem Rückzug der Infrastrukturversorgung in der Fläche („Anpassung durch Reduzierung“) in dünn besiedelten Gebieten führen. Oftmals werden in Bezug auf Schrumpfungsprozesse jedoch nur ausgewählte Dimensionen, wie die Themenfelder Wohnungsmarkt sowie soziale und technische Infrastrukturen, betrachtet. Es ist jedoch davon auszugehen, dass sich aufgrund des demographischen Wandels auch Auswirkungen auf die Gewährleistung der öffentlichen Sicherheit als Teil der infrastrukturellen Grundversorgung ergeben werden.

4.2 Mögliche Auswirkungen des demographischen Wandel auf die öffentliche Sicherheit

So sind einhergehend mit dem demographischen Wandel veränderte Kriminalitäts- und Verkehrsunfallentwicklungen anzunehmen [17] [18] , die bis zur Entstehung von „kontrollfreien“ Räumen in zunehmend dünnbesiedelten Regionen zur Begehung von Straftaten für bestimmte Tätergruppen reichen können. Denkbar ist beispielsweise auch, dass durch den Bevölkerungsrückgang die polizeilich registrierten Straftaten sowie die Anzahl der Tatverdächtigen abnehmen könnten. Aufgrund der Veränderung der Bevölkerungszusammensetzung ist zusätzlich mit einem veränderten Täterverhalten sowie, je nachdem, ob demographische Faktoren dominierend für die Entwicklung der Fallzahlen sind, leichten Verschiebungen der Deliktarten zu rechnen. Währenddessen Jugend-, Diebstahls- und Aggressions-/ Gewaltdelikte durch den Rückgang der jungen Bevölkerung voraussichtlich eher zurückgehen könnten, wäre eine Ausdehnung von Vermögens-, Fälschungs- und Betrugsdelikten durch die Zunahme der älteren Bevölkerung denkbar. Zudem besteht die Gefahr, dass Straftaten gegenüber alten und pflegebedürftigen Menschen in der institutionalisierten Pflege aber auch im häuslichen Umfeld, beispielsweise aufgrund von Überforderung,

[14] Vgl. Bundesministerium des Innern (2011) (Hrsg.): Demografiebericht, Bericht der Bundesregierung zur demografischen Lage und künftigen Entwicklung des Landes, Kurzfassung, Berlin, S. 3.
[15] Vgl. dazu: Bundesamt für Bauwesen und Raumordnung (BBR) (2005): Raumordnungsbericht 2005, Berichte Band 21, Bonn.
[16] Vgl. a.a.O., S. 110.
[17] Vgl. Spiess, Gerhard (2009): Demografischer Wandel und altersspezifische Kriminalität, Projektion der Entwicklung bis 2050, in: Naderi, Robert (Hrsg.) (2009): Auswirkungen demographischer Entwicklungen auf Sicherheitsfragen, Vorträge aus dem gleichnamigen Workshop vom 19./ 20. November 2007 im Bundesinstitut für Bevölkerungsforschung, Materialien zur Bevölkerungswissenschaft, Heft 128, Wiesbaden, S. 35 – 56.
[18] Vgl. Laubenthal, Klaus (2005): Phänomenologie der Alterskriminalität, in: forum kriminalprävention, Zeitschrift der Stiftung Deutsches Forum für Kriminalprävention, Ausgabe 3/ 2005, S. 5 – 7.

zunehmen könnten. [19] Darüber hinaus ist zu befürchten, dass sich durch die erhebliche Alterung der Bevölkerung Änderungen im Verkehrsunfallgeschehen ergeben könnten. Beispielsweise könnten Verkehrsunfälle mit aktiver und passiver Beteiligung älterer Verkehrsteilnehmer, z.B. in Folge von vermindertem Reaktionsvermögen im Straßenverkehr, zunehmen.

Für diese möglichen Entwicklungen bleibt zu vermuten, dass gerade in peripheren ländlichen Regionen eine verringerte Bevölkerungs- und Siedlungsdichte voraussichtlich zu einem erhöhten subjektiven Unsicherheitsgefühl der (verbliebenen) Bevölkerung führt und dadurch bestimmte Gebiete in den Städten und Dörfern von der Bevölkerung zunehmend als unsicher bzw. als „Angsträume" empfunden und deshalb gemieden werden könnten („Rückzugsverhalten" bis hin zur Verödung öffentlicher Räume), obwohl diese Räume i.S. der Kriminalitätsbelastung möglicherweise keine besonderen Gefährdungen aufweisen. Somit könnten aufgrund der demographischen Entwicklung subjektive Anforderungen an die öffentliche Sicherheit ansteigen.

Neben der demographischen Entwicklung beeinflussen jedoch auch weitere nicht vorhersagbare wirtschaftliche [20], gesellschaftliche [21], politische, rechtliche und technische Entwicklungen, welche Schwankungen im zeitlichen Bezug unterworfen sind, die zukünftige Kriminalitäts- und Verkehrsunfallentwicklung in Bezug auf Tatgelegenheiten, -begehungsweisen und Kriminalitäts- bzw. Verkehrsunfallschwerpunkte, etc. Als Beispiel sei an dieser Stelle die Internet-/ Cyberkriminalität genannt. Erst durch die rasante Ausbreitung und zivile Nutzung des Internets seit Mitte der 1990er Jahre konnte eine bis dato unbekannte Form der Kriminalität entstehen, auf die sich die Akteure der öffentlichen Sicherheit, beispielsweise durch die Erarbeitung angepasster Präventionsangebote, einstellen mussten. Eine weitere Herausforderung für die Gewährleistung der öffentlichen Sicherheit stellt ferner der zunehmend eingeschränkte finanzielle Handlungsspielraum der öffentlichen Haushalte aufgrund steigender Schuldlasten sowie sinkender Steuereinnahmen dar, der zukünftig voraussichtlich auch Auswirkungen auf die Sicherheitsvorsorge, beispielsweise in Form von Strukturreformen der Polizeibehörden, haben wird.

Zwar stellen die getroffenen Aussagen zu den möglichen Veränderungen des Kriminalitäts- und Verkehrsunfallgeschehens lediglich eine Extrapolation der bisherigen Entwicklung unter Berücksichtigung vorausberechneter demographischer Veränderungen dar, woraus sich mögliche Trends ableiten lassen können. Dennoch ist davon auszugehen, dass eine verringerte Bevölkerungs- und Siedlungsdichte auch strukturelle Auswirkungen auf die zukünftige Kriminalitäts- und Verkehrsunfallentwicklung hat und sich dadurch ein hoher Handlungsbedarf dazu ergibt, die Sicherheit im öffentlichen Raum zu gewährleisten. Die Veränderungen der zukünftigen Bevölkerungsentwicklung in Deutschland und Rheinland-Pfalz sind im Grundsatz hinreichend thematisiert, in Modellrechnungen erfasst sowie im Allgemeinen wissenschaftlich und praktisch erörtert. Zudem bestehen zahlreiche Untersuchungen zu möglichen Auswirkungen des demographischen Wandels auf ausgewählte Themenbereiche der öffentlichen Daseinsvorsorge. Beispielsweise wurden im Rahmen des Aktionsprogramms „Modellvorhaben der Raumordnung" (MORO) des Bundesinstitutes für Bau-, Stadt- und Raumforschung (BBSR) innerhalb des Themenschwerpunktes „Infrastruktur und demographischer Wandel" im MORO-Forschungsfeld „Masterplan Daseinsvorsorge– Regionale Anpassungsstrategien" die Auswirkungen des demographischen Wandels auf verschiedene Infrastrukturen anhand von Modellregionen untersucht und dafür angepasste Handlungsstrategien entwickelt.

[19] Vgl. dazu auch: Bundesministerium für Familie, Senioren, Frauen und Jugend (Hrsg.) (2012): Kriminalitäts- und Gewalterfahrungen im Leben älterer Menschen, Zusammenfassung wesentlicher Ergebnisse einer Studie zu Gefährungen älterer und pflegebedürftiger Menschen, Berlin.

[20] So ist ein Zusammenhang zwischen der Kriminalitätsrate und dem wirtschaftlichen Ungleichgewicht in der Bevölkerung feststellbar. Neben einer steigenden Arbeitslosenquote kann gleichfalls, wenn auch zeitverzögert, der steigende materielle Wohlstand einer Gesellschaft zu einem Ansteigen der Kriminalität führen. Vgl dazu: Landeskriminalamt Nordrhein-Westfalen (LKA Nordrhein-Westfalen) (2006): Trends der Kriminalität in NRW, eine Zeitreihenanalyse unter Berücksichtigung demographischer und ökonomischer Entwicklungen, kriminalistisch-kriminologische Forschungsstelle, Forschungsberichte Nr. 3/ 2006, Düsseldorf, S. 26.

[21] So könnte ein zahlenmäßig messbarer Anstieg der Kriminalitätsrate auch auf ein geändertes Anzeigeverhalten der Bevölkerung (z.B. bei Bagatelldelikten) zurückzuführen sein und damit auf eine Verschiebung des sogenannten Dunkelfeldes (den Strafverfolgungsbehörden unbekannte Delikte) zugunsten des Hellfeldes (den Strafverfolgungsbehörden gemeldete Delikte) der Kriminalität hinweisen.

[22] Im Gegensatz dazu fehlen bislang noch Untersuchungen und Konzepte, welche die Varianten in den Bevölkerungsveränderungen und die daraus folgenden Konsequenzen für die Sicherheit hinreichend thematisieren und Handlungsempfehlungen zur zukünftigen Gewährleistung der Sicherheit der Bevölkerung–auch im Hinblick auf die Definition von neuen Sicherheitsstandards–aussprechen.

5 ANPASSUNGSBEDARF DER SICHERHEITSVORSORGE UND HANDLUNGSMÖGLICHKEITEN

5.1 Anpassungsbedarf der Sicherheitsvorsorge

Wie obenstehend dargelegt, besteht ein Anpassungsbedarf der sicherheitsrelevanten Infrastruktur, um auf die möglichen Veränderungen des Kriminalitäts- und Verkehrsunfallgeschehens bedingt durch die demographischen Wandlungsprozesse sowie auf etwaig auftretende Kürzungen der Finanzmittel für die Sicherheitsinfrastrukturen ausreichend reagieren zu können. [23] Trotz der voraussichtlich auftretenden Änderungen bei der Kriminalitäts- und Verkehrsunfallentwicklung wird zukünftig kein wesentlich geringerer Bedarf an sicherheitsbezogenen Leistungen der Daseinsvorsorge als bisher bestehen, denn auch bei einer geringer werdenden Bevölkerungs- und Siedlungsdichte wird ein Anspruch auf Erhalt von Mindestsicherheitsstandards in der Fläche notwendig sein, um die objektive Sicherheit der Bevölkerung in allen Teilräumen eines Landes/ einer Region zu gewährleisten sowie um das subjektive Sicherheitsgefühl der Bevölkerung zu berücksichtigen und damit eine dauerhafte Siedlungstätigkeit in diesen Räumen auch weiterhin zu ermöglichen.

Anpassung der Daseinsvorsorge wird im Allgemeinen charakterisiert als „Verkleinerung, Angebotsumstrukturierung, räumliche und eventuell personelle Flexibilisierung, oder auch die Suche nach neuen Trägerschaften und Allianzen“ [24] und umfasst im hier verstandenen Sinne verschiedene strategisch und operativ wirkende Maßnahmenbündel im Spannungsfeld von Vorsorge, Durchführung und Nachsorge. Dafür werden im Folgenden für die Themenfelder „baulich-räumlich“, „sicherheits-organisatorisch“ sowie „technologisch“ mögliche Ansätze und Ideen skizziert, die eine neuartige Verknüpfung der Ebenen Regional-/ Stadtplanung und Sicherheitsvorsorge in Verbindung mit technologischen Aspekten darstellen.

5.2 Handlungsmöglichkeiten in baulich-räumlicher Hinsicht

Als mögliche baulich-räumliche Maßnahmen zur zukünftigen Gewährleistung der Sicherheit der Bevölkerung, die im Wesentlichen eine strategische, vorsorgende Wirkung entfalten, sollten die bestehenden kriminalpräventiven Konzepte in der planerischen Praxis (vgl. dazu Abschnitt 3.2) auf ihre derzeitige Anwendung und Wirksamkeit hin evaluiert und abgeschätzt werden, ob diese auch zukünftig unter geänderten Rahmenbedingungen zu einer wirksamen Prävention der Bevölkerung beitragen können. Ggf. resultiert aus dieser Überprüfung ein Weiterentwicklungsbedarf, der gemeinsam von den Polizeibehörden und der Planungspraxis in anwendungsnahen Projekten entwickelt werden sollte.

Da eine Abhängigkeit zwischen dem subjektiven Sicherheitsgefühl der Bevölkerung und den räumlichen Gegebenheiten besteht und es, wie schon erwähnt, anzunehmen ist, dass zukünftig eine verringerte Bevölkerungs- und Siedlungsdichte zu einem verstärkten Unsicherheitsgefühl der Bevölkerung führen kann, sollte es verstärkt im Selbstverständnis der Planungswissenschaft und -praxis liegen, die Entstehung möglicher Tatgelegenheitsstrukturen bzw. „Angsträume“ im öffentlichen Raum stärker als bisher vorsorgend zu vermeiden bzw. bestehende durch geeignete planerische Maßnahmen (objektiv) zu beseitigen. Für die

[22] Vgl dazu: Bundesinstitut für Bau-, Stadt- und Raumforschung (BBSR) (2009a): Masterplan Daseinsvorsorge – Regionale Anpassungsstrategien, MORO-Informationen 4/ 1 – 02/ 2009, Bonn und Bundesinstitut für Bau-, Stadt- und Raumforschung (BBSR) (2009b): Masterplan Daseinsvorsorge – Regionale Anpassungsstrategien, MORO-Informationen 4/ 2 – 11/ 2009, Bonn.

[23] Zwar werden sich aus den demographischen Änderungen zukünftig unterschiedliche Herausforderungen in Bezug auf die Prävention vor Kriminalität und Verkehrsunfallgefahren ergeben, die jeweils angepasste Strategien und Maßnahmen der zuständigen Akteure in der Praxis erfordern; dennoch werden im Rahmen des Beitrages beide Themenbereiche zusammen behandelt, um in einem ersten Schritt für die möglicherweise auftretenden Herausforderungen zu sensibilisieren.

[24] Kocks, Martina (2006): Lokale und regionale Infrastrukturplanung, S. 98, in: Bertelsmann Stiftung (Hrsg.) (2006): Wegweiser Demographischer Wandel 2020, Analysen und Handlungskonzepte für Städte und Gemeinden, Gütersloh, S. 97 – 105.

Identifikation solcher Räume ist die Verknüpfung mit empirischen Studien, wie Bevölkerungsbefragungen, sinnvoll und denkbar. Darüber hinaus ist auch zukünftig ein verstärktes Augenmerk auf die Umgestaltung von Verkehrsunfallschwerpunkten, d.h. die effizientere Planung und Ausführung von Verkehrsanlagen als Beitrag zur passiven Verkehrssicherheit und zur Prävention von Unfällen, von Seiten der (Verkehrs-)Planung zu legen.

5.3 Handlungsmöglichkeiten in sicherheits-organisatorischer Hinsicht

Aufgrund der geänderten Rahmenbedingungen (demographischer Wandel und zukünftig veränderte Kriminalitäts- und Verkehrsunfallentwicklung) sollten in erster Linie eine zukünftige Arbeitsteilung staatlicher, kommunaler und privater Sicherheitsorganisationen definiert, analysiert und bewertet werden. Aufgabe der Polizeibehörden wäre es demnach, die bestehenden Organisationsstrukturen kritisch zu überprüfen und die Frage zu beantworten, ob mit den bestehenden Strukturen auch zukünftig eine angemessene Gewährleistung der Sicherheit der Bevölkerung, gerade auch in peripheren ländlichen Räumen, möglich ist. Dazu würde auch gehören, über eine interne Umstrukturierung der polizeilichen Organisationsstrukturen und die Umnutzung bestehender Kapazitäten sowie die Optimierung der räumlichen Verteilung und Erreichbarkeit der jeweiligen Dienststellen, die jedoch ggf. auch eine Vergrößerung der Einzugsbereiche bewirken könnten, i.S. eines vorsorgenden Strategieansatzes nachzudenken. Die Ermittlung ausgewogener Standortentscheidungen und die Definition neuer organisatorischer Zuschnitte unter Berücksichtigung einer veränderten Arbeitsteilung könnte dabei durch Geographische Informationssysteme (GIS) wirksam unterstützt werden.

Es ist auch daran zu denken, die Präventionsarbeit stärker an den demographischen Entwicklungen ausrzurichten und beispielsweise Präventionsstrategien für eine alternde Gesellschaft zu entwickeln. Da die Gefahr der Opferwerdung von Senioren aufgrund der im Alter auftretenden Kompetenzeinbußen bei gleichzeitig oftmals im Verhältnis zur realen Gefahr übersteigertem Unsicherheitsempfinden gegeben ist, bedarf es Präventionsmaßnahmen, die gezielt auf verschiedene mögliche Tatbereiche (sozialer Nahraum, Internet, etc.) sowie auf die aktive und passive Teilnahme am Verkehrsgeschehen abzielen. Aber nicht nur speziell für die ältere Bevölkerung, sondern auch für die verbliebende Bevölkerung in peripheren ländlichen Gebieten, die besonders von Alterung und Schrumpfung betroffen sind, sollten angepasste Präventionsangebote entwickelt und gemeinsam mit Akteuren aus dem sozialen Bereich (Schulen, Beratungsstellen, etc.) vermittelt werden.

Durch die verstärkte Kooperation der Polizeibehörden mit Kommunen und Privaten („Sicherheits-/ Ordnungspartnerschaften“) [25] und eine insgesamt stärkere Institutionalisierung der schon jetzt in einer Vielzahl der Kommunen vorhandenen kriminalpräventiven Räte und Gremien würde auch das Ziel einer strategischen Verstärkung der bürgernahen Polizeiarbeit („Community Policing“ [26]) verfolgt werden können, was letzendlich auch einen Beitrag zur Steigerung des subjektiven Sicherheitsgefühls der Bevölkerung leisten könnte.

5.4 Handlungsmöglichkeiten in technologischer Hinsicht

Bezüglich des zielgerichteten und operativen Einsatzes sowie der Weiterentwicklung von technologischen Maßnahmen sollten die Sicherheitsorganisationen gemeinsam mit Forschungsinstitutionen und Unternehmen aus der IT-Branche zusammenarbeiten. Dazu sollten angepasst an die (Alltags-)Bedarfe der staatlichen, kommunalen und privaten Einrichtungen entsprechende Anwendungen zur Qualitätssicherung sowie

-steigerung derer Arbeit unter geänderten Rahmenbedingungen entwickelt werden. So wäre durchaus denkbar, im Polizeibereich Technologien zur Einsatz- und Fahndungsunterstützung anzuwenden. Neben der Übermittlung von aktuellen Lagedaten (täter-, gebäude- und umfeldbezogen) an die Einsatzkräfte sowie an weitere Institutionen der nicht-polizeilichen Gefahrenabwehr (Feuerwehr, Rettungdienste) bei (Großschadens-)Ereignissen, die eine schnelle Reaktion der Sicherheitsbehörden erfordern (z.B.

[25] Vgl. dazu: Schümchen, Werner (2006): Ordnungspartnerschaften, in: Lange, Hans-Jürgen (Hrsg.) (2006): Wörterbuch zur Inneren Sicherheit, Wiesbaden, S. 207 – 209.

[26] „Community Policing“ ist ein aus den USA stammendes Konzept der Kriminalprävention auf kommunaler Ebene, welches die ganzheitliche Schaffung eines Kooperationsverbundes von Polizei, Kommune und Bürger zum Ziel hat. Vgl. van Ooyen, Robert Christian (2006): Community Policing, in: Lange, Hans-Jürgen (Hrsg.) (2006): Wörterbuch zur Inneren Sicherheit, Wiesbaden, S. 44 – 48.

Banküberfälle, Einbrüche, Amokläufe), durch Augmented Reality-Techniken könnte beispielsweise eine leistungsfähige Hardware-Infrastruktur in den Dienststellen zur optimierten (Fahndungs-)Routenberechnung bei Einsätzen angewandt werden. Zudem könnte die flächenhafte Einführung von interaktiven Navigationsgeräten und Streifenwagen für die Einsatzkräfte geprüft werden.

Aber auch für die (Prozessoptimierung der) Aufklärung von Verkehrsunfällen könnten technologische Maßnahmen zum Einsatz kommen. Neben der Absperrung und Verkehrsunfallaufnahme, welche die Begutachtung und Vermessung des Unfallortes sowie die Vernehmung von Betroffenen und Zeugen beinhaltet, erfolgt die eigentliche Sachbearbeitung in der zuständigen Dienststelle. Der Einsatz von technologischen Maßnahmen im Verkehrsunfallaufnahmeprozess, beispielsweise die 3D-Ausmessung des Unfallortes sowie die direkte Informationsübermittlung an die Dienststelle (z.B. Führerscheindaten, Zeugenaussagen), könnte eine verbesserte Arbeitsteilung mit den Dienststellen sowie eine insgesamt einfachere, schnellere und gerichtsfeste Aufklärung von Verkehrsunfällen ermöglichen.

Darüber hinaus könnten technologische Maßnahmen, die einen wirksamen Beitrag zur Steigerung der subjektiven Sicherheit der Bevölkerung liefern können, in der sozialen Lebenswelt der Bevölkerung angewandt werden. Dazu zählt beispielsweise der Einsatz von Alltagstechnik (z.B. Smartphones) in verschiedenen räumlichen Gegebenheiten (Wohnung, direktes Wohnumfeld, öffentliche Straßen und Plätze, öffentlicher Personennahverkehr), die sich von intelligenten Alarmierungssystemen für den Notruf über die personalisierte Steuerung der Straßenbeleuchtung bis hin zum Einsatz akustischer Signale in (vermeintlichen) „Angsträumen“ zur Abschreckung erstrecken könnten.

Bei all diesen Maßnahmen muss jedoch im Vorfeld der Anwendung die Frage nach Ausgestaltung und Einbindung der Technologien in bestehende Arbeitsabläufe geklärt werden, um diese von den Sicherheitsorganisationen und der Bevölkerung (im Notfall) praktisch handhabbaren zu können und um Akzeptanz–gerade auch im Hinblick auf verschiedene Alters- und Nutzergruppen–für deren Einsatz zu erlangen.

6 FAZIT UND AUSBLICK

Um die in diesem Beitrag sowie die in der Literatur getätigten Aussagen bezüglich der möglichen zukünftigen Kriminalitäts- und Verkehrsunfallentwickung zu verifizieren, ist es erforderlich, in praxisbezogenen Forschungsprojekten und Modellvorhaben in vom demographischen Wandel besonders betroffenen Modellregionen Szenarien zu erstellen, die es ermöglichen, offene wissenschaftliche und praktische Fragen zu beantworten. Zum einen bedarf es näherer Informationen zum Zusammenhang zwischen dem demographischen, ökonomischen und gesellschaftlichen Wandel und den voraussichtlichen Folgen auf die Kriminalitäts- und Verkehrsunfallentwicklung auf verschiedenen räumlichen Ebenen (Bund, Land, Region). Dabei wäre auch zu klären, ob zukünftig mit einer signifikanten Änderung der derzeitigen Kriminalitäts- und Verkehrsunfallbelastung der Bevölkerung zu rechnen ist. Zum anderen wäre zu untersuchen, wie sich dieser Wandel auf das subjektive Sicherheitsgefühl der Bevölkerung, gerade auch in peripheren ländlichen Räumen, konkret auswirken könnte.

Aus den Forschungsergebnissen könnten neben den hier im Beitrag skizzierten ersten Ideen weitere kurz- bis mittelfristig umsetzbare baulich-räumliche, sicherheits-organisatorische sowie technologische Maßnahmen zur strategischen und operativen Anpassung der sicherheitsbezogenen Infrastruktur abgeleitet werden. Dazu gehören auch Aussagen zu Ausstattungsmerkmalen und Erreichbarkeiten der sicherheitsrelevanten Infrastruktur. Die Erkenntnisse könnten zudem Ansatzpunkte für mögliche Strukturreformen der Sicherheitsorganisationen darstellen und sollten in querschnittsorientierten Handlungskonzepten einer zukünftigen Sicherheitsvorsorge (in alternden und schrumpfenden Räumen) münden. Dadurch könnte gleichfalls der Verlust von Standortattraktivität sowie die Herausbildung einer negativen „Abwärtsspirale“ in vom demographischen Wandel besonders betroffenen Räumen verhindert, mindestens jedoch abgemildert werden. Voraussetzung dafür ist jedoch, dass die entwickelten Konzepte Akzeptanz in Politik, Verwaltung und Öffentlichkeit finden. Während der Umsetzung der Maßnahmen und Handlungskonzepte sollte zudem eine kontinuierliche Evaluation stattfinden, um ggf. daraus Schlussfolgerungen für eine weitere strategische und operative Anpassung der Sicherheitsinfrastrukturen an praktische Herausforderungen zu ziehen.

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🏆 *reviewed paper*

Social and Spatial Behaviour in Shared Spaces

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1 ABSTRACT

Many European cities implement shared spaces or other mixed traffic concepts in order to revitalize city centers and provide alternatives to car-centric road designs. The main idea is to treat all modes of traffic equally and encourage social interaction between road users with the prospect of cooperation over egoism. Furthermore a higher attractiveness of a road for people requires a careful traffic behavior, increased safety and lower speeds and a more attractive urban environment overall. Little research has been done how and if the new road design can also help pedestrians and bicyclists to reclaim previously car-dominated spaces.

The analyses of existing implementations can support planners by objectively showing the effect on traffic behavior. In this paper the traffic situation at the Sonnenfelsplatz in Graz (Austria) is compared before and after it has been redesigned from a complex roundabout to a shared space. The traffic flow in the investigated area is about 1.000 motorized vehicles, up to 600 bicyclists and 3.000 pedestrians in the peak hour (before reconstruction). This location has been chosen because of the diversity of traffic modes and the high traffic volume in general. Therefore, the trajectories of pedestrians, bicyclists and cars have been recorded and analyzed. Among the compared characteristics are: The spatial distribution of road users, the consistency in speed and travel times, length of paths as well as safety aspects.

Given this extensive evaluation and the lack of an existing simulation model, we also describe the requirements for developing a simulation model. A trustworthy simulation could help architects and city planners to decide if and in which configuration a shared space zone could improve an urban area. A catalog of requirements from urban planners' perspective is created and discussed.

2 INTRODUCTION

The concept of designing public roads, junctions and spaces as so called Shared Spaces is increasingly popular in recent years and is seen as a chance to reduce the car-dominance in cities throughout Europe. In shared space designs, the segregation between motorized and non-motorized traffic is removed, creating an integrated space without traffic signs or signals, curbs and road markings. Instead, traffic flows are controlled by social interactions and supported by infrastructure measures like colored roadsurfaces and the thoughtful placement of road furniture. Due to this lack of legally binding elements like pedestrian crossings, people are said to be more safety-conscious and to pay more attention to the behavior of other people (Hamilton - Baillie, 2007).

There is ongoing debate about the merits and practicality of shared space: (Hamilton - Baillie, 2007) and (Clarke, 2006), mostly show the positive factors like reduced crash statistics or average speeds. Especially when it comes to opinion-based results, the situation is not as clear anymore. Especially the elderly and disabled people feel less safe in shared spaces (Gerlach et al., 2008). Given this discrepancy between hard facts like crash statistics and public opinion, this paper wants to research the missing link in between: How has people's actual behavior in a shared space changed after a reconstruction.

Therefore, a semi-automated annotation tool was developed (Schönauer et al., 2012a) which allows fast and accurate annotations of bicycles, cars and pedestrians in a highly frequented crossing. Video footage has been recorded at the Sonnenfelsplatz in Graz, Austria before and after a reconstruction using shared space principles from a complex roundabout (see Fig. 1).

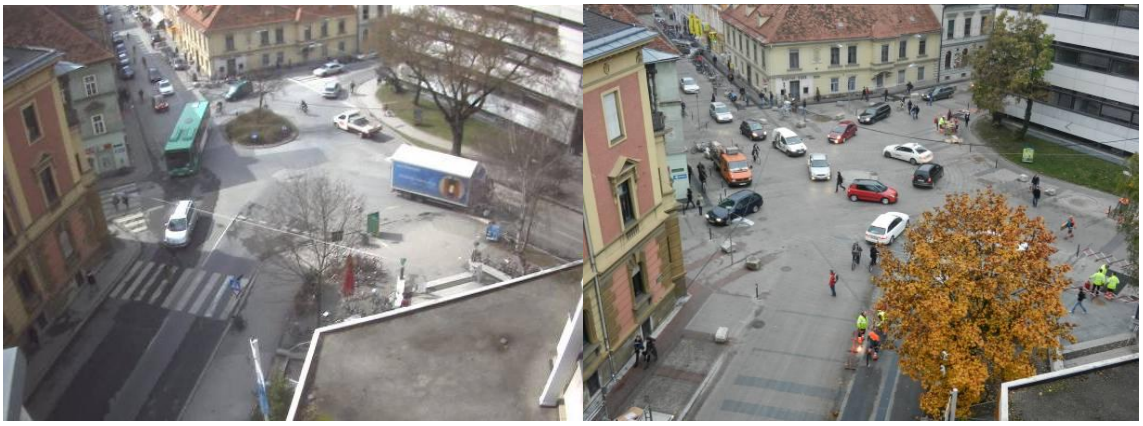

Fig. 1: Sonnenfelsplatz. LEFT: Before the reconstruction. RIGHT: After the reconstruction as a shared space.

The resulting movement trajectories of pedestrians and vehicles form the data base for further traffic flow analysis, spatial distribution of speed and interaction characteristics. The results of this analysis provide two fundamental benefits:

- The before and after comparison identifies potential benefits and drawbacks of the new road design.
- The analysis of the spatial distribution of the after data yields empirical information for civil engineers and is the basis for reliable traffic simulations.

The spatial distribution is especially interesting, as it builds the data base how the new space is actually used. The long-term goal is to link people's behavior directly to the influence of certain design elements like street furniture or trees. Therefore, after the spatial analysis, we conclude our work with discussing the requirements from urban planners' perspectives.

2.1 Related Works

With the growing number of already constructed and planned shared spaces, more research deals with the effects of the various design elements on the behavior of pedestrians and cars. Especially the UK has a wide range of reports on the design of shared spaces (Department for Transport, 2011) which act as guidelines for transportation planers and researchers the safety effects of a handful of converted shared spaces throughout Europe (Reid et al., 2009). The report summarizes the results of an appraisal stage in which available evidence on the performance of Shared Space has been collated and reviewed. It also includes a literature review by examining the most often characteristics of shared spaces. Among those are: Economic activity and property values, flows of users across the street, opinions of users, use of facilities such as seating and proportion of pedestrians moving freely. Especially the last property is a fundamental idea of shared space, but Reid acknowledges there is little data available. We try to fill this gap by analyzing the pedestrian paths using trajectories obtained from annotated video footage.

Many of the other properties are often examined by opinion polls. E.g. (Kaparias et al., 2011) describes a stated-preference study which queries specific elements of a shared space (like pedestrian density, vehicle density, speed of verhicles, …) which affect the willingness of drivers to actually share the space with pedestrians in a shared space.

Actual change in behavior by doing video analysis has been researched by (Bliek, 2010) by comparing the probability of cars stopping at intersections of conventional roads to the probability at redesigned shared spaces in Montreal. Two shared space crossings were compared to two reference crossings with similar properties of size and traffic volume. It was observed that drivers are more likely to give way to pedestrians on the shared spaces than on the conventional crossings.

(Karndacharuk et al., 2011) provides an extensive data aquisition and analysis of behavior in three streets in New Zealand which have been converted to shared spaces. Their performance indicators include: Dwell times, activities (eating, chatting, …), retail ocupancy rates in the area, speed reductions for cars and overall crash history. At the time of this writing, however, only the „before" period has been captured and analyzed, the data of the „after" period will only be fully analyzed in late 2012.

The conclusion of literature research indicates that there is not a well-defined set of optimization attributes which fits for every shared space. Depending on the surrounding and intention of the shared space, sometimes it could be beneficial to increase the dwell times of pedestrians, while in other situations the main objective could be the reduction of the travel times of pedestrians. The only recurring objective is, however, that shared spaces should encourage shared usage of the space instead of retaining the old behavior on a newly designed road. This is also the main research objective of this work.

3 BEHAVIOR ANALYSIS

As we have explained previously, Shared Space is rather a design guideline with multiple different ways of interpretation instead of a ready-to-use design which is implemented the same way in all projects. Thus we must acclaim that our findings are not necessarily transferable to any other Shared Space – it can, however, be used as the basis for verifying and refining existing guidelines.

3.1 Data Collection

Data has been collected at the Sonnenfelsplatz in Graz before and after the reconstruction to a Shared Space. In 2009 a classical traffic survey was conducted (Koop. Sonnenfelsplatz, 2009) counting the vehicular flow and the number of pedestrian crossings. It shows a pedestrians crossing count of about 3.000/h , a total daily traffic volume of up to 1.500 cars/h and a cycle rate of 12% (including a marginal part of motorbikes). Table 1 gives the number of counted traffic participants and the time of survey.

		Traffic survey 2009	Video analysis: Roundabout 2010	Video analysis: Shared Space 2011
DATE	**weekday, date**	Thursday, 15.10.2009	Tuesday, 23.03.2010	Thursday, 27.10.2011 / Friday, 28.10.2011
	time	06:00 - 20:00	12:53 - 12:57	10:38-12:42 (12:40 – 12:42)
COUNT	**pedestrians**	between **510** and **860** P./h at every crossing (12:00-13:00)	55	75(43)
	cycles (including motorbikes)	between **26** and **240** incoming single track vehicles at every bypass (12:00-13:00)	53	99(23)
	cars, busses, trucks	**941** between 12:00 - 13:00 **(15162** in 14h)	49	115(43)

Table 1: Road traffic survey and Data Collection Overview.

For this paper the movement trajectories of pedestrians and vehicles have been generated by tracking the objects in video footage and transforming the trajectories to world coordinates. Semi-automated tracking is used to obtain the data (Schönauer et al., 2012a). Fig. 2 shows an screenshot of the data annotation process in the video pictures.

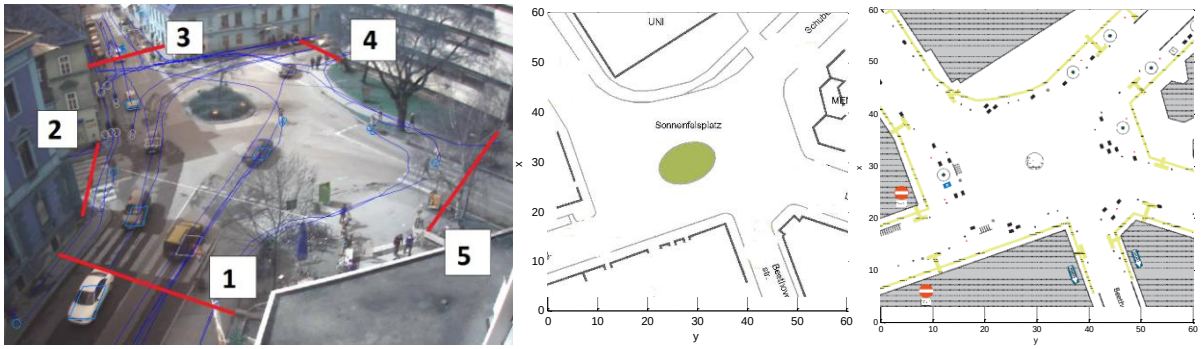

Fig. 2: LEFT: Screenshot of the pedestrian and vehicle tracking at the Sonnenfelsplatz in 2010, showing the measurement lines (red) and its numbers. MIDDLE: Scheme of the original design. RIGHT: Scheme of the new design

Road users are classified into pedestrians, bicycles and cars and tracked during their time inside the origin/destination measurement lines. The analysis focuses on two comparable scenes of a duration of several minutes in both the roundabout in 2010 and the Shared Space in 2011. The intersection of a trajectory with two of the five measurement lines (indicated with red lines in Fig.2) assigns the origin/destination to every track. In the further steps these trajectories are analyzed regarding spatial behavior, speeds and interaction properties.

3.2 Space usage

The willingness to share the available road space between traffic modes is a major aim of the Shared Space concept. This chapter qualitatively shows for each mode the spatial distribution change of the chosen paths. Before the reconstruction, the individual choice was narrowly constrained. On the left side of Fig.3 it is

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shown that pedestrians (red) cross the road in the area of the crosswalks. Bikes (green) and cars (black) follow the regulations to circle the central traffic island. Overtaking maneuvers of bicycles can be observed within the roundabout.

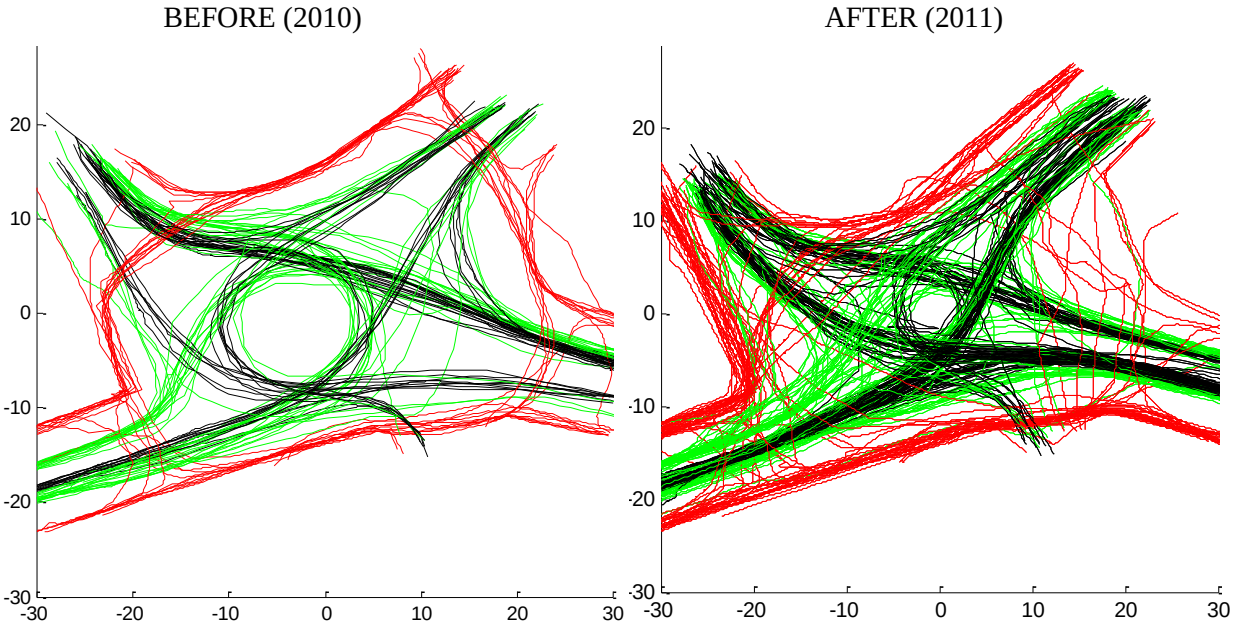

Fig. 3: Trajectories of pedestrians and vehicles. LEFT: Roundabout in 2010 (before). RIGHT: Shared Space in 2011 (after).

After the reconstruction several changes in the walking behavior can be observed. Pedestrians crossing the road are now using shorter paths closer to the squares center (Fig.3, right hand side). A higher variety in individual path choice can be observed, especially in crossing the road.

In the new design a slightly elevated island forms the center of the square, causing a white spot in the trajectories (Fig.3, right hand side). However, the islands' dimensions have been reduced from 8m x 11m to about 3m x 3m. Due to the smaller island the driving radii have also changed: At low turning angles (going "straight") the radii increased - at "U turns" the radii in cars and bikes trajectories decreased.

The trajectories in Fig.3 imply two phenomena in the redesign reducing path length and the travel time:

- A shift of the pedestrian crossings to the square's center.
- Changes in the driving radii of vehicles.

Travel time, average speeds and path length were calculated for each cell in the origin/destination (O/D) matrix. The empirical weight (number of samples in this mode and O/D relation) was considered in cumulating the results for each mode. The classification into O/D releation generates small groups of trajectories for most of the links and the statistical significance shows that the standard deviation error is refusing the tests. Higher sample sizes could provide a better statistical validity. To overcome the lack of data the next approaches do not split the trajectory sample into O/D relations.

3.3 Speed distribution

For the investigation of the speeds additionally to the path in world coordinate’s accurate timestamps for each single point are required. Therefore the camera encodes the timestamps in each single video frame in real time and errors caused by frame drops and deviating frame rates can be identified and taken into account. For a better comparison the whole trajectories were resampled to 0.1 second intervals which corresponds a frame rate of 10 frames per seconds using a linear interpolation algorithm.

The speeds are calculated for each segment in a trajectory using two neighbouring points and timestamps. For the computation of the speed distributions, the speed values are smoothed using moving average over the last two values. This was necessary to reduce jitter resulting from the annotation on discrete pixel positions in the video frames getting transformed to real world coordinates.

In Figure 4 the speed distributions for each mode separately are shown from left to right and for comparison between the roundabout with the Shared Space configuration one upon the other.

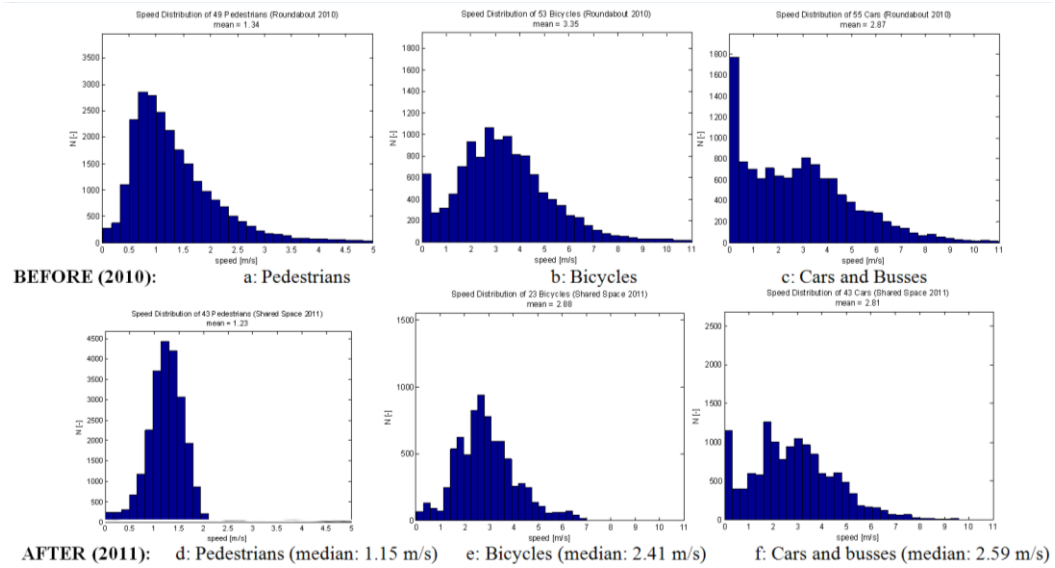

Fig. 4: Histograms of speeds before and after the reconstruction.

Inspecting the shape of the distributions in Shared Space for all modes they are narrower indicating a more constant speed and less stop and go behaviour compared to the roundabout. The mean speeds decrease in Shared Space as well as the speeds maximums. This could be an indication that people in the roundabout make short runs to pass the street before the vehicles arrive. The desired speeds within pedestrian crowds are Gaussian distributed with a mean value of approximately 1.34 m/s and a standard deviation of about 0.26 m/s (Henderson, 1971). The mean speed fits perfectly with the observed pedestrians in 2010, the distributions in the observations show standard deviations of 0.79 (before) and 0.37 (after).

The walking speeds in the Shared Space are lower but due to the shorter routes the total travel times decreases. For the cars the main difference is shown in much lower peaks in the Shared Space at lower speeds indicating less waiting times and a more continuous flow. In the following the spatial distribution of the speeds is investigated.

3.4 Speed maps

Driving and Walking speeds are major traffic performance and safety indicators. To show its spatial distribution the modal speeds are calculated for a cell grid of a grid size of 1m x 1m. Based on the generated grid speeds an estimator algorithm provides continous calculation of speeds in the map. The result is shown in Fig. 5.

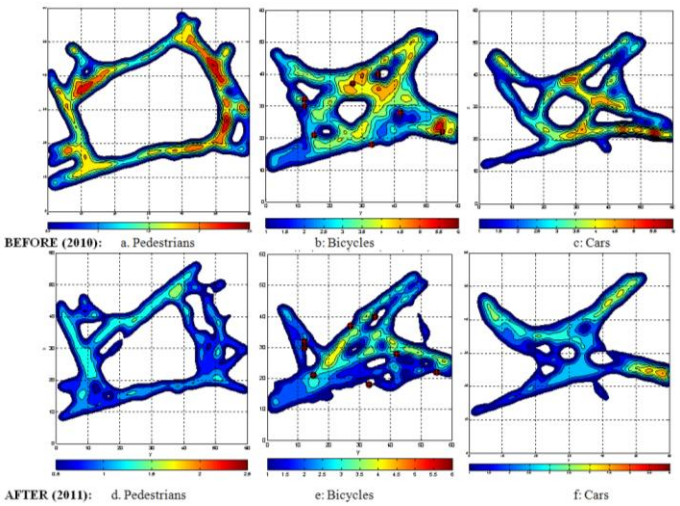

Fig. 5: Modal map of estimated speeds, based on cell grid speeds, all speeds in m/s. TOP: 2010. BOTTOM: 2011.

In the pedestrian class the main change is the shift to a more homogeneous speed level, especially the crossings of the roads are done in steady speed, which correlates with the findings in chapter 3.4. While

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bicycles' speed levels generally has dropped, their maximum speeds lie close to the center of the square. Reasons could be the higher awareness or the reduced space and a higher number of obstacles for bicyclists.

Car traffic speeds went down, especially in the area of interactions with all other modes the average speed level clearly sunk. In Fig.5b and Fig.5e the registered accidents in which bicyclists were injured between 2006 and 2008 (Koop. Sonnenfelsplatz, 2009) are marked by an red cross in a black filled circle (only in the central column). The comparison to 2011 shows that within all this spots the average speed sunk significantly. No accidents including pedestrian injuries have been recorded. At the time of submission no accidents in the redesigned scheme have been reported.

3.5 Safety aspects

Safety studies focuses often focus on the interaction between and within motorized and non-motorized traffic, as well as the conformity to traffic control regulations. Traffic safety analysis has traditionally relied on historical collision data. However, the shortcomings with this approach are the rare and random occurrence of collisions and its poor availability of data. Traffic conflicts are more frequent than traffic collisions. The first concept of road traffic conflict techniques (TCTs) was proposed by Perkins and Harris (1967) and involve observing and evaluating the frequency and severity of traffic conflicts at an intersection by a team of trained observers. Ismail et al. (2010) use indicators of time as objective and quantitative measure of the severity of conflicts.

This paper wants to outline the impact of speed and distance between traffic participants. We define a new indicator, including relative speed, and distance in time and space of a pair consisting of a non motorized road user and a car. It is calculated as the quotient of the squared relative speed and the distance between the object. Side constrains are the maximum distance of 5m and a time difference of maximum 3 seconds. To offer a spatial analysis we calculate for each 1m x 1m cell in the survey spot the median of the elements:

$$C_{xy} = \frac{1}{n * i * j} \sum_{\alpha=1}^{i} \sum_{\beta=1}^{j} \sum_{n=1}^{length(traj_i)} \frac{\left|(\vec{v}_\alpha - \vec{v}_\beta)\right|^2}{d_{\alpha\beta}}$$

,

where Cxy gives the relative squared speed by distance quotient for the cell at x,y. The vectors vα, vβ are the speed vectors of the bike (respectively pedestrian) α and the car β which are at a distance dα,β. A total number of i x j couples of i bikes (resp. pedestrians) and j cars are considered. The choice of data couples is constrained by distance in space (<1m) and time (<0.5s)

This indicator offers a simplistic approach to identify the spatial distribution of safety relevant variables. Fig. 6. shows the indicator Cxy calculated for 2010 and 2011, for pedestrians/cars and bikes/cars.

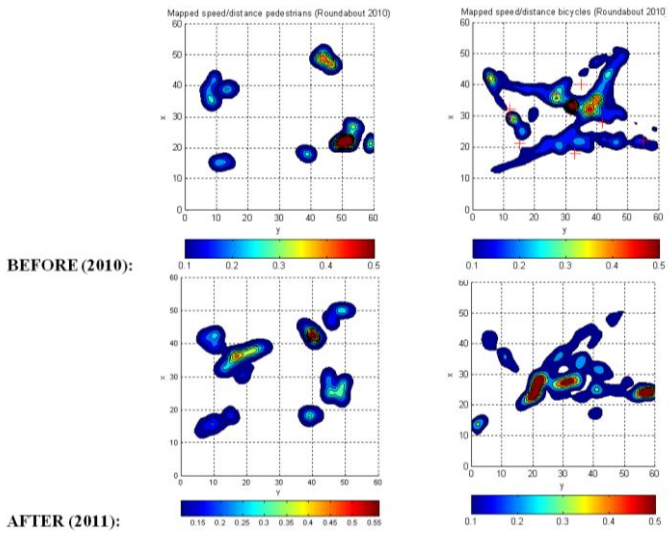

Fig. 5: Indicator Cxy based on cell grid speeds [m/s]. TOP LEFT: Pedestrian/Cars in 2010. TOP RIGTH: Bikes/Cars in 2010 (red markings for accidents during 2006-2008). BOTTOM LEFT: Pedestrian/Cars in 2011. BOTTOM RIGTH: Bikes/Cars in 2011.

The higher values represent spots where pairs of non-motorized road users and cars meet at higher speeds and lower distances. The comparison of BEFORE and AFTER shows that the hot spots moved and for bikes got even concentrated. Considering the lower driving speeds an explanation could be the smaller vehicle driving space and the smaller distances between vehicles. There is no scientific evidence to directly conclude to accident probabilities. Nevertheless hot spot areas are close to the occurred accidents in 2006 to 2008 (indicated in red crosses in the Fig.5, top right). Nevertheless the method has to improved including conflict classifications to generate prediction qualities. One major finding is that the total sum of all cells went down by about 10%.

4 APPLICABILITY IN THE PLANNING PHASE

Shared Space is a so far seldom implemented design concept that makes it difficult to point to existing examples. Furthermore, examples of Shared Space differ from each other because of the big variety of local conditions, design elements and traffic mixes. This makes it extremely difficult to show the effects of a planned Shared Space with the presently available tools. Different topography, complex traffic situations and a wide variety of design elements are a great challenge for planners.

The behavior analysis from Chapter 3 gives the confirmation that the intended goal of remixing the traffic at the Sonnenfelsplatz did happen. However, it is still hard to conclude which specific elements helped to achieve the effects – making it difficult to assess the impact of potential future Shared Space projects. Therefore, we suggest creating a realistic Shared Space simulation which could help in the planning phase for future projects. A simulation model allows the planners to test the effects of different design elements before they are built. It could help during the concept phase by

- addressing capacity concerns,
- determining potential bottlenecks and
- improving safety and comfort

It also would be suitable to illustrate the traffic flow in a planned Shared Space to citizens, politicians and stakeholders. The persons concerned should get a clear view, how the new design would work.

4.1 Planning requirements for the simulation

The difficulty lies in the identification and proper modeling of various design elements. Several design elements and traffic characteristics must be taken into account for an appropriate simulation. Also different road users have various characteristics and differ in traffic behavior and must therefore be simulated separately. The final important requirement is modeling the correct origin-destination relations as the space usage might change completely with additional offers like benches or other places to stay.

4.1.1 Types of road users

The foremost question is to decide which type of road users must be present in any Shared Space simulation to be helpful at all:

- Motorized vehicles, pedestrians and bicyclists are widespread in Shared Space. Private motorized vehicles should be treated separately in three classes: passenger cars, motor-bikes and heavy vehicles.
- Public transport occurs not in every Shared Space area. But if it does, it is very important, that it can be simulated, especially when the stations are located close to the investigated area and congestions caused by i.e. bus stops reach back in the shared space area.
- Persons in wheel-chairs and blind people are not wide spread, but call for a special approach not only in the simulation but in planning generally.
- Other road users were found to be not so important for the simulation. Such as emergency vehicles are so seldom, that their priority for the simulation is lowest.

4.1.2 Design elements

Different design elements affect traffic behavior in different ways. Road users stay away from poles, hedges and trees. Seats are obstacles as well, but also points of interest. Curbs, grassed areas and trees have a

separating and a guiding effect on traffic behavior. Different colors of the sidewalk influence traffic behavior in a softer way. The structure of the surface influences the chosen route through an area or to a destination. Points of interest like shops and seats attract the road users.

Given the vast number of different design elements outlined above, these determining factors call for an accurate analysis of effects of design elements on the traffic behavior and the interaction between the road users.

4.1.3 Origin and destination points

The most common origin and destination points for all road users are at the borders of the planning area where they enter or exit the shared space. Within the area different road users have different points of interest, which attract them. Important points for vehicles in general are parking facilities. Cyclists do not use cycle stands only but also poles for parking. Stations of public transport are origin and destination for vehicles and for passengers as well. Entrances are the primary origins and destination of residents. Shops and restaurants are origin and destination points for pedestrians and cyclists. Some elements as shop windows attract people. They are origin and destination and invite people to stay for a while.

4.1.4 Prioritization

The great number of design elements and the various traffic mixes makes it necessary to identify the most relevant factors, which should be included in the simulation. The criterions for the assortment are occurrence, relevance and the data availability. These criterions are applied to the road users, to the design elements and to the origin-destination relations:

- The occurrence describes the frequency of different road users and design elements in existing Shared Space areas. If a certain type appears often, it is important that it is represented in the simulation. The absence of seldom types is acceptable.
- The relevance takes the effects of a certain element into account. Some different elements influence the traffic flow in a similar way. Such elements can be simulated as one.
- The data availability was treated for a pragmatic reason. Even if an element occurs often and affects the traffic flow it cannot be simulated if there is not enough information about it available.

These criterions are categorized in three classes for every type of road user, for design elements and for different origin-destination relations. The single criterions are aggregated to the criterion priority. The priority stands for the importance of an element to be represented in the simulation model and often depends on cultural peculiarities. For the analyzed area in Austria, following the above criteria the priorities of road users are cars, bicycles and pedestrians. The most important design elements at the Sonnenfelsplatz are obstacles like pollards, benches, greens and side areas where pedestrians feel safe.

4.2 Outlook

Given the extensive behavior analysis and analysis of planning requirements, the first steps towards a generic simulation framework suited for Shared Space planners have been done in (Schönauer & Schrom-Feiertag, 2010), (Schönauer et al., 2012b) and applied to two fundamentally different locations in Austria. Future research work deals with the effects of more design elements like benches or different road surface materials.

5 CONCLUSION

We have shown an approach to validate the effectiveness of a shared space implementation in an environment with highly diverse traffic modes. Especially at times of little traffic, the usage of the available space has changed and not only pedestrians but also cars use more abbreviations, leading to shorter paths and lowered travel time. Against our expectations, the travel times of bicycles did increase slightly though. Possible causal explanations could offer the lower turning radii and the higher conflict potential in the centre of the square. Statistical shortcomings in the analyze can't be excluded completely and further investigation is needed.

The paper shows the spatial distribution of path choice, resulting in a clearly wider variety in walking and driving positions. The distribution of speeds shows a lower mean and a higher homogeneity for all modes. Finally a new approach is applied to show the spatial distribution of quotients of relative speeds and distance

of pairs of non motorized road users and a cars. The result shows shifts in location and intensity of the "hot spots". The comparison with locations of historical accident is done. To conduct valid correlations or even do accident predictions more research is needed.

Furthermore, we have given an overview of the requirements of transport planners in Shared Space projects. This helps towards creating reusable design guidelines and later even a simulation model. However, there is still a missing piece in linking specific design elements to the behavior of people. This paper gives specific guidelines for the analysis of people's behavior in shared spaces. Using these analysis techniques the effects of placing certain design elements can be validated by comparing the trajectories in an before and after study.

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Socio-Technical Assisted Neighborhoods

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1 ABSTRACT

In a joint project, engineers and sociologist develop a technical and social assistance system providing functions in the domains of comfort, safety, health and communication to enable older adults to live independently as long as possible in their familiar domicile. In the course of the project, apartments of older tenants in an existing housing stock are equipped with an Ambient Assisted Living (AAL) system. Next to technology, social integration plays an important part in the project. First results show that after a few months already the socio-technical system may encourage the involvement of the elderly into the residential district and help to avoid loneliness. Further research has to show to which extent the system also contributes to the domains of safety and security, as well as health.

2 INTRODUCTION

In aging societies, most elderly people wish to stay in their self-chosen-environment as long as possible, even if they experience a growing loss in quality of life and health problems. At the same time, the traditional system of care for older adults ceases and the costs for professional care constantly grow.

There are various approaches to reach the goal of living an independent daily life in the familiar domicile despite these conditions. Some of these approaches include technical solutions, such as wheel chair lifts, remote controlled shutters, in-house emergency call stations or door cameras. Others embrace alterations to the home, such as enlarging doors or mounting hand rails in the bathroom. Some of the mentioned solutions are already widely spread and may help an elderly person to move more easily within the home or enhance the feeling of safety and security. However, they are often limited to the home and only cover certain aspects of aging, e.g. constrained movement, which does not apply to every elderly person by far. Other aspects such as loneliness or the need of low-threshold assistance for housework or grocery shopping are left aside. As a consequence, new concepts, including social and technical solutions, have to be developed.

The mobilization of social communities in neighborhoods currently receives significant attention from policy and decision makers in the field of social planning and in the housing industry. Vibrant neighborhoods are expected to enhance the quality of life of senior citizen as well as their ability to live an independent daily life. For an active neighborhood it is often necessary for it to be supported and guided–for example by active individuals, community centers of municipalities or nonprofit clubs or by a community facility of the landlord.

Since August 2010, engineers and sociologist at the University of Kaiserslautern, Germany work together with different partners in the field of social service, technicians, and a cooperative building society in a joint project [1] ("Technisch-soziales Assistenzsystem für Komfort, Sicherheit, Gesundheit und Kommunikation im innerstätischen Quartier–TSA)" on the development of an assistance system for independent living for senior citizens living in an urban area.

3 THE TSA PROJECT

The purpose of the TSA-system is to assist senior citizen in daily life by providing functions in the domains of comfort, safety, health and communication and by promoting their social integration with the help of an active neighborhood community and involvement into the residential district. The project comprises a technical and a social part, which intertwine [Schelisch 2011].

[1] The project is funded by the German Federal Ministry of Education and Research (BMBF) as part of the initiative "Altersgerechte Assistenzsysteme für ein gesundes und unabhängiges Leben – AAL" and takes place between August 2010 and July 2013.

3.1 The Technical Concept

One aim of the project is to equip several apartments of elderly tenants in existing housing stocks with an Ambient Assisted Living (AAL) system. In this case, ambient means a technological environment which is intelligent, but not necessarily noticeable, and adapts to the daily lives of users. AAL systems may include networks of various switches, sensors, and actuators, and also special equipment such as video cameras, emergency assistance systems, and central control terminals. AAL is seen as a promising contribution in helping to live independently and safely in the familiar domicile. But until now it is not clear which technological concepts and which single devices are of use for elderly people and are accepted at the same time. Apart from pilot projects AAL-technology is not prevalent in senior households. Therefore, one objective of the practical project is to directly involve the target group into the development process of an Ambient Assisted Living system.

The ambient technology in the TSA project consists of different wireless home automation components, such as motion detectors, door and window reed contacts, remote controlled lights, a door camera, and other home automation devices. The core integration element of the technical system is a touch screen computer based unit named “PAUL” (Personal Assistive Unit for Living), developed by the University of Kaiserslautern and CIBEK technology + trading GmbH [Schelisch/Spellerberg 2009]. PAUL enables the user to control the home automation equipment, use different features in the fields of media and entertainment (e.g. news, radio, internet access to certain webpages, photo album, calendar of events, alarm clock) and communication (e.g. video telephony, virtual bill-board) and also comprises an ambient emergency detection system [Floeck/Litz 2009; Rodner et al. 2011].

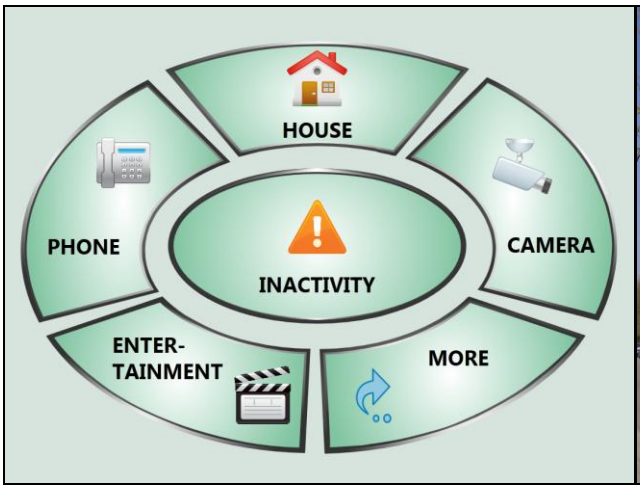

Fig. 1: Entrance Screen of PAUL. Fig. 2: Housing Stock of the GBS in Speyer, Germany.

In a previous project, most technical features and their usability for the elderly were tested over a period of three years in a newly constructed building [Spellerberg 2010]. In contrast, the apartments in the TSA project are equipped with wireless components for the most part, which allow an installation without constructional changes.

Between summer 2011 and spring 2012 ten out of 20 targeted apartments in the German cities of Speyer (Gemeinnützige Baugenossenschaft Speyer, GBS) and Kaiserslautern (Deutsches Rotes Kreuz, Kreisverband Kaiserslautern) were equipped with a PAUL each. All apartments are situated in different buildings, which were built in the 1920s and 1960s for the most part. As the development of the TSA system is an iterative process and the direct involvement of the target group into the development process of the technology is relevant in this project, not all functions were installed right from the start. At first, all home automation devices (besides the door camera) and in the fields of entertainment and media were installed, functions in the field of communication were added about four months later. A first testing phase of the ambient emergency detection system will be started soon. Other functions will follow within the year 2012. Although remote controlled shutters are not part of the initial technical concept, the participating households in Speyer have the possibility to upgrade their apartment with electric shutters for a low monthly fee (six Euros per shutter) and operate them via PAUL. Four out of eight participating households have already made use of this possibility.

3.2 The Social Concept

The social part of the assistance system consists of establishing and maintaining social contacts in the neighborhood and the integration of general and special services from facilities nearby. At this point, the local neighborhood club plays an important connecting role. The neighborhood club was founded in 1999 and is managed by a social worker. The club offers coffee parties, seasonal events, readings, cooking sessions, as well as promotion of neighborly help, assisted grocery shopping, and so on. Especially elderly people make use of consultation. The club also acts as a multiplier for tenants interested in participating in the project.

One aim of the TSA-project is to enable the participants to order domestic support services and other additional services from their district with the help of PAUL. These services may include services of the landlord (repairs), the local neighborhood club (promotion of neighborly help, assisted grocery shopping), a nearby nursing home (warm meals, laundry service, and procurement of other services), the German Red Cross (ambulatory care, social services, housekeeping service), doctors, hairdressers and other facilities nearby. The requests for these services are to be posted by the participants directly via PAUL's touch screen (development by CIBEK) or by a video telephone connection to a concierge. In the TSA project the concierge is situated at the nearby nursing home (Speyer) and the German Red Cross (Kaiserslautern), respectively. The concierge will then forward the request to a service provider, which preferably is located close to the participants dwelling. This service will presumably be launched in summer 2012.

3.3 Sociological Research

In order to evaluate the requirements, experiences and acceptance of the assistance system and determine the perspective of the users, the project is supervised by sociological research. To gather feedback, the participants were interviewed ahead of participation and will be questioned several times during the project duration. At regular meetings in the facilities of the local neighborhood club, organized by the sociologists, the participants of the TSA project exchange experiences and discuss how the concept may be developed further. The information about which functions work and are regularly used and which cause problems or are less used are directly taken into account for the ongoing development of PAUL and the TSA system.

In addition, a written survey of tenants of the GBS aged 60 and older (n = 171) was conducted to find out more about the general acceptance of AAL technology, the willingness to pay for the installation of certain devices in the field of home automation and health technology and to assess the needs of service offers requested via PAUL [Schelisch/Spellerberg 2012].

3.4 The Participants

Suited for participating in the TSA project are all tenants of the two participating landlords aged 60 and up (exceptions are possible). Because PAUL is designed to be self-explanatory, the participants do not need to have any special skills. Tenants with little or no technological competence so far are also welcome. The participation, including the use of all technical devices and a 24-hour home emergency call service, is free of charge.

Currently, ten tenants in Speyer (eight households) and two tenants in Kaiserslautern (two households) participate in the project. The eight female and four male participants are aged between 52 and 86 years. The average age is 72. Only four of them, including the three youngest, have ever used a computer, only two have internet access at home. Three (female) participants can be considered as technophile. The state of health was quantified by their personal rating: except for a younger man, all participants have medical issues, including one woman having multiple sclerosis and two who fell down several times already and are not able to leave their apartments alone. Five of the twelve participants show a confident interest in participating; six others seem to participate mostly because family members (children or partners) wish them to do so. Yet another person shows an interest in participating, but only because of the health functions of PAUL.

3.5 Results so far

The results of the quantitative study show a relatively high level of acceptance to use AAL-technology at home from the perspective of potential users, especially in the fields of safety and health. However, a market potential for the tested techniques may not necessarily derive from the statements on the acceptance of use. Seniors are often very reluctant in the use of technology, even if they have very positive attitudes [Meyer et

al. 2001]. They often mean the need of the devices for “others”, while they would not use them in their own home. This was also attested in the acquisition of new participants. In the beginning, the acquisition of new participating households was very difficult. Often people were generally interested in participating, but rejected for various reasons, e.g. if the partner (mostly husbands) had no interest or if they felt not to be “old enough”, although their age fit well to the project. However, after several months, the project has spread. As many of the participants willingly provide information to family members, neighbors, and friends about the functions PAUL has to offer, current prospects are for the most part acquaintances of persons already participating. Other interested tenants are recruited by the local neighborhood club. Without the local neighborhood club and its support as a local first port of call, the acquisition of new participants would not work.

In spring of 2011 oral interviews were conducted with the first seven participating households [2] of the TSA project in the framework of the sociological research. The participants were asked to comment on 24 different service offers (e.g. delivery of groceries, hairdresser service at home, repair services and home cleaning) and to indicate whether they use these services at present or would like to use one or more of them. Overall, it is found that the interviewees have a positive attitude towards the proposed service offerings, and would make use of professional help, but only in case the support cannot be covered by family members or other acquaintances. Most interviewees emphasized that they would only make use of the services if there is an urgent need. Furthermore, financial reasons also play a crucial role in the actual acceptance of support services. The interviewees want to keep living independently as long as possible, even though it becomes cumbersome for them. Furthermore, they turn down outside help in order to stay "busy" or feel "fit”. The projected possibility to order these services via PAUL was valued positively by a total of six of the eight interviewees.

Although a comprehensive survey about the use of the different functions of PAUL is only scheduled for summer 2012, one can already get an idea about the use of PAUL by the participants. Talks and discussions with the participants show different levels of acquisition. While some use PAUL on a daily basis and try out new functions by themselves, others only look at PAUL from time to time and wait for the ambient emergency detection system to be launched and for the door camera to be installed. For the latter persons, only functions in the field of health and security are important .[3] Participants, who use PAUL very often, also mention more suggestions for improvement. Desired improvements mentioned by the participants in the TSA project include a better navigation of the internet access, a desired possibility to exchange written messages and pictures to other PAUL users, as well as individual changes of saved radio frequencies and websites. All mentioned suggestions for PAUL belong to the fields of entertainment and communication.

Even though PAUL is designed to be used without instruction also by people with no or little computer literacy, earlier results in a similar project in Kaiserslautern indicate that PAUL might not be suitable for people suffering from dementia. Even a previously self-evident use of PAUL can be "unlearned".

It is aspired that the TSA system enables the elderly to become connected to other people in the neighborhood and thus enforce face-to-face contacts. For two months now, the participants can contact other users, a contact person at the local neighborhood club, technical support and relatives via PAUL using video telephony (Skype). However, only few participants use this function on a regular basis so far. They use their common telephones instead. Nevertheless, one can already state that PAUL has a connecting effect, despite the fact, that the practical part of the project has started just recently: The participants enjoy the regular project meetings to which they bring home made cake. They sometimes also meet additionally without the sociologists and developers to exchange their experiences with PAUL and show functions others have not tried yet. Some offer mutual assistance, e.g. accompany to the supermarket, chauffeur to various places, and check if everything is in order. Also, some of the participants became more active in the neighborhood club. Already, new friendships were formed.

[2] The survey was conducted using semi-structured interviews and an additional short standardized questionnaire. Six tenants of the GBS and two tenants of the German Red Cross (DRK Kreisverband Kaiserslautern) were interviewed at that time. The five women and three men were between 60 and 86 years old, there was one couple.

[3] One aspect of the survey will be whether and to which extent the voluntariness to participate in the project has an impact on the use of PAUL.

4 SUMMARY AND PERSPECTIVE

The integration of organizations, services and companies in the urban neighborhood form a central aspect of care in old age. Neighborhoods are revitalized and the local economy is strengthened. However, AAL concepts which include a comprehensive range of services have to be considered critically in regard to the acceptance in practice. Our surveys have shown that ordering services with the help of AAL technology might not play a role (yet), because the elderly prefer support from family members rather than professional help and would only accept these services in urgent need and require a bond of trust. Whether and to what extent this can be proved or disproved in the longer term, we hope to show with further research as part of the TSA project.

Although the project is only mid-way through, and not all projected functions have been implemented yet, one can already state that PAUL does his job well as a high tech housemate. Those who do not show fear of contact, enjoy using PAUL. Potential users emphasize its functions in the fields of safety and health; once used, functions in the field of comfort, entertainment and communication are yet as important. As soon as the door camera and the ambient emergency detection system will be installed, further research has to show to which extent the system also contributes to the domains of safety, security and health. First results show that the project design may help to foster neighborly friendships and thus avoid loneliness of senior citizens. Here, talking about PAUL is as important as talking via PAUL.

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"Spaces-In-Between" – Reweaving the City along its Inner Edges

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1 INTRODUCTION

The continually growing urbanisation inevitably leads to densification of the existing urban fabric in cities worldwide. Land resource for new buildings, especially residential, has become scarce, therefore risen in prices. Residents in well-established neighbourhoods usually object to densification. Higher demand for outdoor activities has increased the pressure on existing open spaces. Therefore, it is essential to locate and secure new open space resources as found in abundance along transportation corridors, due to previous generous land acquisitions in the course of building infrastructure. In the 1950s and 1960s traffic planners allocated these corridors preferably in topographically advantageous locations, i.e valleys between hills. Today, more environmentally friendly modes of transportation further upgrade these longitudinal stretches of land, which now present an unprecedented and highly valuable resource for the residents in inner-city locations. Furthermore, the corridors should be transformed from a dividing barrier to a permeable open space. The sites should be planned with community participation in order to accommodate different needs in a changing society and increase identification with the neighborhoods. This participation process will contribute to mutual understanding of the residents' diversity in the process of re-mixing the city.

The "reweaving process"will be investigated by exploring 3 practical examples from 1994 until 2011. The design proposals were developed bottom-up with active community participation in the case of L.A., interactive and based on a thorough investigation of community needs in the two cases in Vienna.

In future, as an accompaniment to further urbanisation and densification of the existing urban fabric, more open space has to be allocated. The infrastructure corridors present a unique opportunity for this land aquisition for the benefit of the citizens. On one hand, these corridors were conceived generously with future growth in mind - which will not happen any more, as street widening projects have become highly unpopular. On the other hand, infrastructure needs and mobility concepts are currently changing rapidly: parallel train tracks are reduced in width, streets are used more efficiently and multi-modal. The space that can be gained by these future transformations should be used for the benefit of the citizens to create longitudinal corridors of green open space. A special case is traffic infrastructure adjacent to rivers which doubles the barrier effect for the neighboring communities. The generous width of these corridors present opportunities for creative solutions to rearrange the traffic flow and improve river accessibility as well as connectivity for the separated sides of the communities.

2 THE GLENDALE FREEWAY IN LOS ANGELES

The finely grained communities of Echo Park and Silver Lake, prominently located about a mile from downtown L.A. and graced by the natural beauty of the hilly landscape and two lakes, have been divided by the I-2 Freeway since the 1960s. This case study shows the potential of its partial removal.

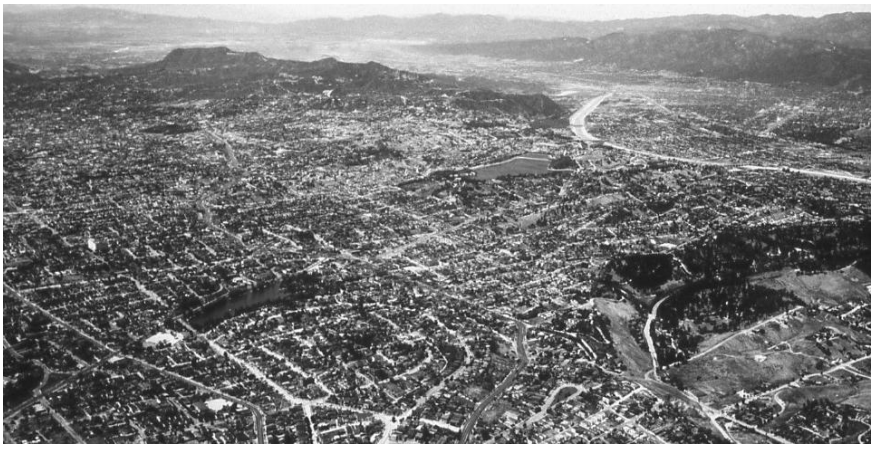

Fig. 1: Echo Park and Silverlake shown on a historical aerial photo in the 1950s

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This was a time when traffic planners showed little sensibility to the needs of local residents. In spite of massive protests against the necessary evictions in the path of the I-2, freeway construction continued until even CALTRANS, the California Transportation Agency, and local government could no longer ignore the community uproar. The evicted home-owners were given insufficient compensation for their lost property which did not allow them to buy new homes and often led to subsequent poverty. The remaining residents on the edge of the freeway suffered from a severe devaluation of their property due to the negative environmental impacts.

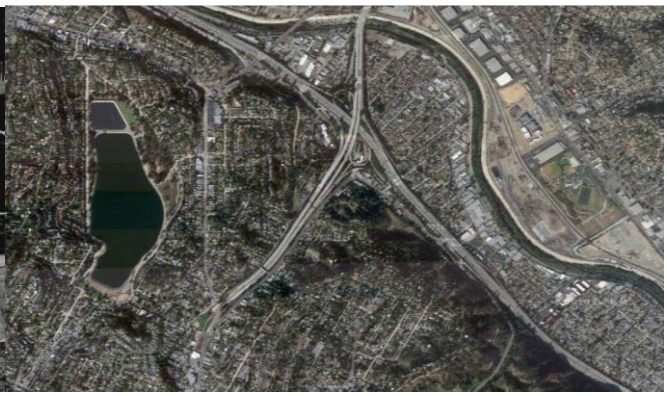

Fig. 2 left: the construction process of the Glendale Freeway Fig.3 right: Echo Park / Silverlake 2011

Fig.4 left map showing the land owned by CALTRANS adjacent to the freeway, right map shows in red the proposed section of the I-2 freeway to be removed

In the mid 1960s CALTRANS halted the I-2 Freeway construction and built an off-ramp onto Glendale Boulevard that was intended for temporary use until protests would hopefully subside. On the contrary, community groups have stayed alert until the present day and became one of the most active in all of Los Angeles.

Fig. 5: The End of the Glendale Freeway in 1990 – a steep off-ramp merges onto Glendale Boulevard towards Downtown L.A. Dangerous and unattractive underpaths are the only safe crossing passages for pedestrians.

Since traffic planers had secured much wider swaths of land than actually needed, the freeway was accompanied by now publicly owned vacant land. A visionary project, developed by the author at GSAUP-UCLA, to remove the controversial off-ramp and realign the traffic flow in order to secure open space for local benefit (community-gardens, a connecting plaza bridge ect.) was welcomed enthusiastically by the community groups. Their support eventually awakened politicians to the potential of the area and inspired them to finance further in-depth planning. As a consequence Gruen Associates and Tillner were commissioned by the LADOT (Los Angeles Department of Transportation) to develop the "Glendale Corridor Plan", a planning document which was awarded the AIPA (American Institute of Planning) Award in 1994. The intention ofthe plan was to increase public transport ridership, allocate space for HOV lanes, reduce traffic lanes for individual drivers and allocate green open space.

Today, the off-ramp still exists, but some improvements were implemented on the adjacent land, since the "Space-In-Between" next to the ramp has been reused as a sports-field. Pedestrian safety has been improved by the installment of additional traffic lights to slow down through-traffic and enable pedestrians to cross the street safely. But the majority of the ambitious plans could not be implemented due to continuous conflicts of interest between CALTRANS, the advocate for individual drivers, and LADOT, the advocate for additional high capacity public transportation corridors and the community groups that favored a more radical reduction of through traffic based on the Tillner plan. Ongoing discussions in the community still consider a more visionary and environmentally ambitious solution. Currently, the Echo Park community has organized an internet forum to improve the situation and increase the safety for pedestrians. The potential to regain the right of way for public transportation and create a "green boulevard" is still intact. Hope remains, the current community efforts will lead to a rethinking at the level of transportation planning and finally to a successful redesign.

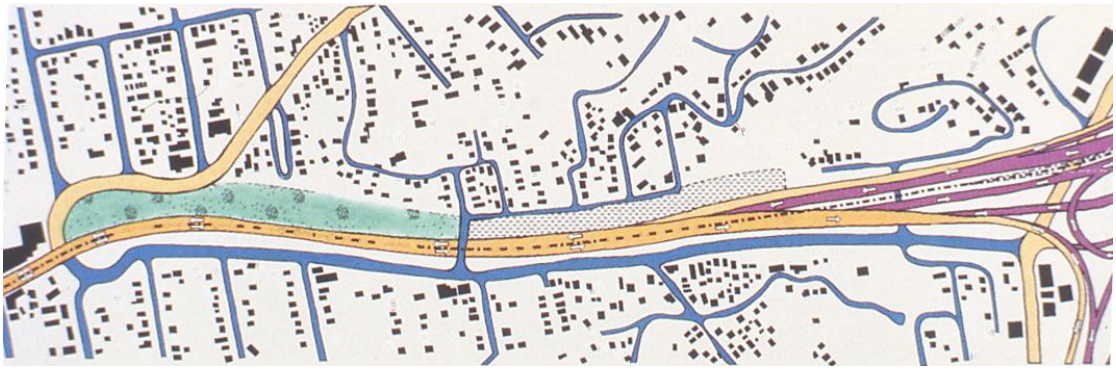

Fig. 6: The potential transformation of the last mile of the I-2 Freeway into a green boulevard

3 THE VIENNA GÜRTEL BOULEVARD

In the 1950s and 1960s, the popularity of automobile traffic led to an enormous increase of cars travelling on Vienna's streets. The formerly tree-lined Gürtel Boulevard had reached capacity. Green space was reduced for the sake of street widening, asphalt replaced grass and soon the viaduct had become an isolated island in the center of an eight lane inner city highway. The increase in car traffic led to the further decay of the area: the building stock fell in disrepair and a red light-district spread along the Gürtel street and the connecting roads. The negative image of the whole Gürtel neighborhood led to further erosion and devaluation of the area and the adjacent properties. Negative press in numerous articles criticizing the traffic nightmare, environmental pollution and the social degradation of the red light district, was lamented. The Gürtel area was given up as a "hopeless" case.

3.1 Situation at the beginning of the URBION project in 1995

With over 85,000 vehicles/day, the Vienna Gürtel forms the transportation backbone for an area extending six kilometers with ten municipal districts bordering its busy lanes.

Looking at Vienna's demographic distribution, a possible concept for the western Gürtel emerged. Although the core urban structure of the city is organised along radial-concentric lines, the highest residential density is in the western Gürtel neighbourhoods. Accordingly, the Gürtel could function as a new linear urban "centre" that features a high-performance means of transport, i.e. the Stadtbahn. Instead, in 1995 the neglected western Gürtel assumed the unfavourable traits common to the urban periphery or an access/exit highway: dilapidated buildings, high traffic density, few retail shops or commercial and industrial sites. Thus, the western Gürtel found itself in the paradoxical situation of an inner-city fringe. The Stadtbahn viaduct was no longer a connecting (as in Wagner's concept), but rather a separating element. The explosiveness of this problem was palpable if one examined the failing neighbourhood development and stunted commercial dynamics. What was happening in the western Gürtel areas was in fact a form of commercial blight, exacerbated by increasing motorisation., as seen in Fig. 9.

Fig. 7: The western part of the Vienna Gürtel, highlighted the area selected for urban intervention in the EU-URBAN program

3.2 The main objectives of the URBION project

After numerous and inconclusive planning projects in the 1980s that had proposed expensive infrastructure investments, i.e. tunnels and road reconstruction projects, the City decided against these plans and searched for a novel and more sensitive approach with a different focus. As a consequence, Silja Tillner, who had specialized on similar projects in Los Angeles, was commissioned by the planning department to develop a Gürtel urban design study. The city planners realized that measures taken on the basis of long-term and cost-intensive so-called "hard" location factors, i.e. improving the urban infrastructure, are only one facet. However, measures taken on the basis of so-called "soft" location factors are also important. This refers to the results of Tillner's study in 1994 which included a strategy of image transposition and visual improvement of the Gürtel by means of small-scale, urbanistically active functions in the fields of culture and entertainment. Having acknowledged this, the direction given by the client, the City of Vienna, was to concentrate the planning and urban design on these "soft" factors.

3.3 The URBION Gürtel Financing – EU Funding

In 1994 the City of Vienna applied for EU grants from the community initiative, URBAN, which was set up to aid the improvement of living conditions in problem zones in major European cities. The "1994 Gürtel Urban Design Study" was included in the application.

In 1995 EU grants from the community initiative, URBAN, for the City of Vienna funding mechanism, "URBAN-Wien Gürtel Plus", were approved. As an area with high levels of unemployment, poverty and poor housing conditions the urban districts on either side of the Gürtel, were registered as a "problem urban area". The City of Vienna presented an improvement concept which complied with the principles of "sustainability" and "private-public partnership" and included a total of 60 projects and initiatives to improve the building fabric, attract new small businesses, promote cultural initiatives, social advice centres and improvements to the infrastructure. Silja Tillner was responsible for the URBION component.

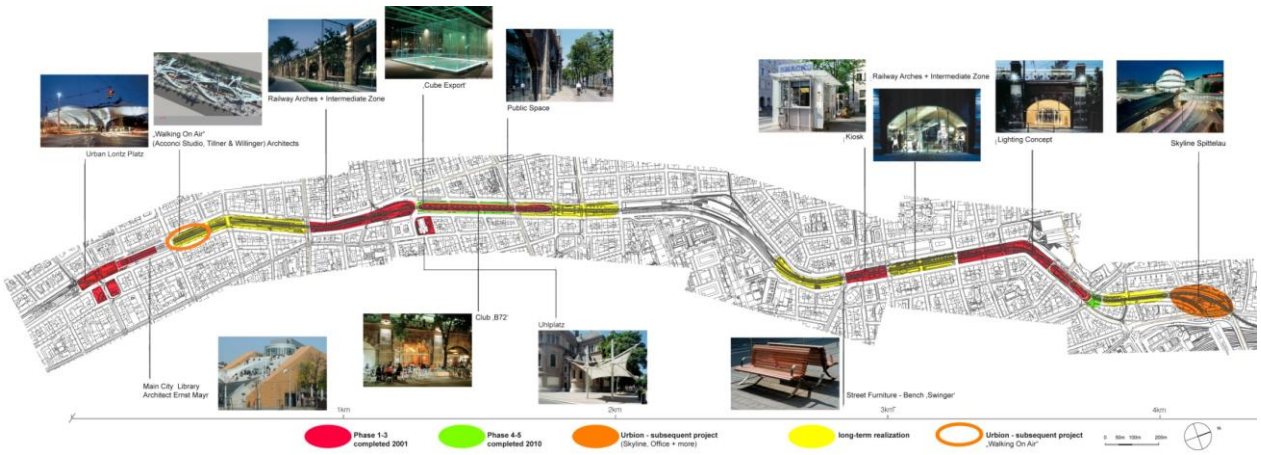

Fig. 8: The Vienna Gürtel map of phased intervention with location and image of implemented projects

3.4 The URBION Gürtel Planning Concept

In 1995 the Vienna Westgürtel, a 6km long and 70m wide 8-lane highway separating the inner from the outer city districts, had become a physical and social barrier. As a consequence, the neighborhoods adjacent to the Gürtel deteriorated, environmental pollution and the red-light district contributed to the negative image. A train viaduct dominated the median of the highway. The percentage of public open space per resident was the lowest in Vienna while many buildings accommodated large immigrant families in overcrowded apartments. This situation qualified the area for EU- co-financing in the URBAN program and was named "URBION", an urban revitalization project with phased small-scale interventions that were responsive to existing conditions. The strategy was on one hand to build on existing strengths, on the other hand to utilize derelict open space and vacant arches. One key problem was the absence of safe pedestrian paths parallel to the subway line and insufficient possibilities for street-crossing. Eliminating deficits was a major goal, i.e. functional defects of the area between the arches and the Gürtel traffic lanes hampered the improvement of this zone. For example, in addition to insufficient lighting of the pedestrian paths and cycling tracks, the use of substantial parts of this zone as partly illegal parking lots massively impeded its rehabilitation as seen in Figure 9.

Fig. 9: The Vienna Gürtel in 1995 before Urban Intervention: left image shows abundance of underutilized space on the edge of the traffic artery due to paving of former streetcar tracks, photo on the right illustrates the occupation of sidewalks for illegal parking.

At the core of the URBION Gürtel concept by architect Silja Tillner was not only the question of how to deal with the architectural heritage of Otto Wagner but above all, how to address the forced co-existence of public space and high traffic loads. By opening the Gürtel median strip and endowing it with a transparent design and connective architecture, the area re-emerged as a space that once again links the outer and inner Gürtel; an area that no longer functions as a barrier, but rather as a meeting-place. An "image transposition" strategy was undertaken to counteract prevalent negative psychological associations of the Gürtel. Fundamental to this strategy was the general improvement of the Gürtel median strip and in particular, populating the "Stadtbahn" arches with cultural and entertainment facilities, restaurants and pubs. The Gürtel Study developed a comprehensive set of measures for a new, low-cost design of the median strip that would respect existing structures and could be implemented in consecutive phases, as seen in map Figure 8.

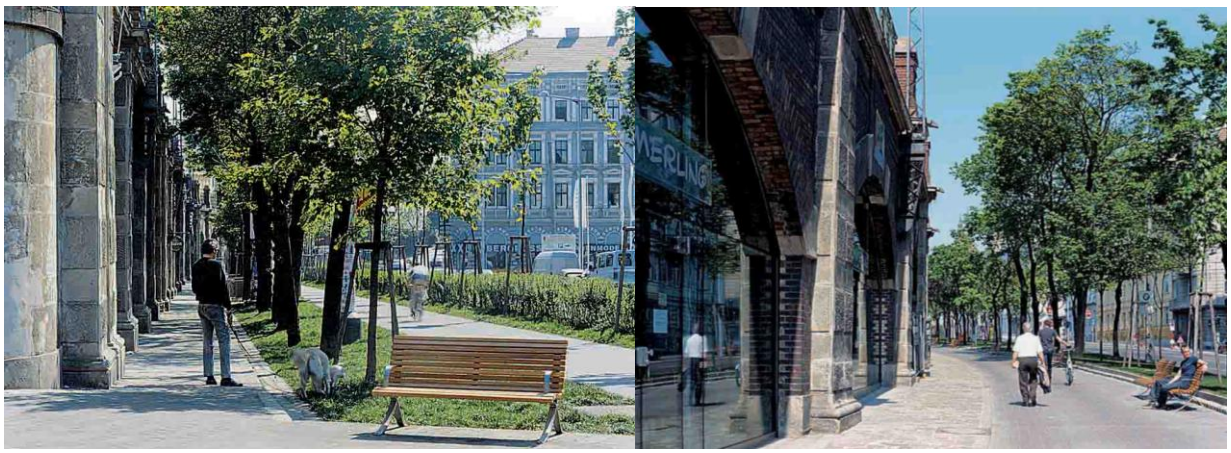

Fig. 10: The Vienna Gürtel in 2000 after Urban Intervention: left image shows the transformation into green open space, a bike-path and promenade, photo on the right illustrates the successful reconquering of public space for pedestrians and the revitalization of the arches.

3.5 Redesign of the Gürtel Open Space – Planning Strategies and Implementation

Redesign of the Gürtel median strip: In certain sections of the Gürtel median strip, public space was redesigned to create attractive open spaces for the residents of the adjacent districts, many of them immigrants. Another goal was to safeguard suitable frame conditions for the commercial success of the numerous private investors in the Stadtbahn arches. Primary objectives for the redesign of these Gürtel sections included both improved pedestrian paths and cycling tracks, additional possibilities to cross the Gürtel and the wish to create attractive open-air zones (e.g. street cafés). A continuous promenade, intensively greened, was established along the Stadtbahn arches by eliminating the side-lane and prohibiting the parking spaces. The improvement of the tree stock by planting new trees and introducing a new automatic irrigation system; enlargement and rehabilitation of green spaces accompanied by a reduction of hard, non-permeable surfaces.

The improvement of pedestrian and bicycle traffic was achieved by providing continuous paths on the median strip along the Stadtbahn arches as well as more possibilities to cross the Gürtel.

An attenuation of the barrier effect of the Gürtel was a major design goal. All newly leased Stadtbahn arches were to be opened up and provided with uniformly glazed façades.

All Gürtel bridges formerly closed with storage space were to be opened up.

A coherent and unifying "look" of the Gürtel median strip was to be achieved by means of a continuous lighting system, newly glazed Stadtbahn arch façades, the installation and design of kiosks as well as urban furniture. The open space was transformed to accommodate newly designed bike paths, pedestrian areas with generous landscaping, squares and parks. The arches were filled with new activity. Image transformation was the key to the success of URBION.

3.6 The present situation and future vision

Today, the barrier effect has been reduced and the districts have been reconnected through the common center, the attractive open space and the active life in the Stadtbahn arches, which have become popular meeting points. Nevertheless, the task has not been completed, because connectivity has been improved only in these sections of the Gürtel that were selected for URBION. These represent only 15 % of the total length of the western Gürtel. In the other areas vacant or underutilized arches and neglected open spaces used for commuter parking dominate the appearance. These deserted open spaces are void of street-life and prevent the reweaving of the city fabric.

In the future, change in travel modes and more environmentally conscientious commuting offer opportunities for a new approach to traffic planning and an open space strategy that favours the pedestrians, cyclists and recreation of the residents over the automobile.

4 THE VIENNA VALLEY

4.1 History and present situation

The Vienna Valley, extending 14 kilometers from the western city limit from the retention basins to the east where the river "Wien" flows into the Danube Canal, offers an interesting cross section of various Viennese urban landscapes, linked by the river, accompanied by an important traffic infrastructure.

Along its length the urban context of the Wiental (River Wien Valley) shows a number of different characteristics, from the scattered development, commercial areas and extensive green spaces in the west followed by a gradual, but at places very abrupt, development to the densely developed inner city areas.

In the course of history the Wiental has developed from a natural river into a regulated urban watercourse and from the mid-20th century onwards, thanks to the intensive development of road and rail connections, it became the most important traffic artery leading into the city from the west.

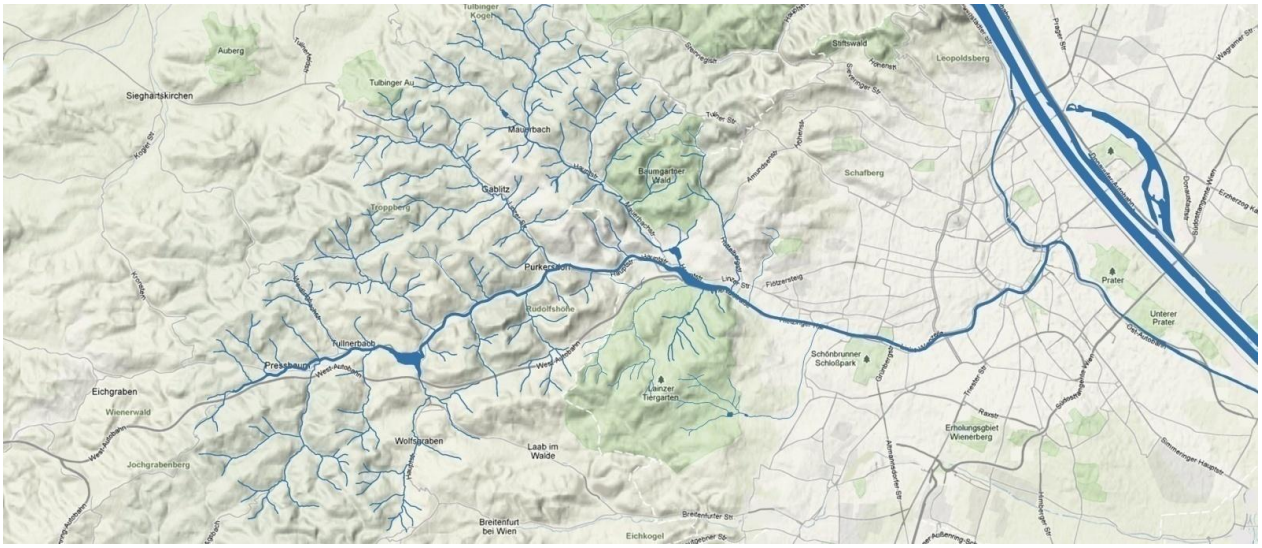

Fig. 11: The Vienna Valley with the river Vienna in its current watercourse

4.2 Planning Study

As part of Vienna's urban development a structure grew up that exhibits highly diverse qualities, deficits and potentials and was identified as one of 13 target areas for urban planning within the framework of STEP05 of the Viennese Urban Development programme. A planning study was commissioned by the City of Vienna, Tillner & Willinger architects collaborated with Auböck & Karasz landscape architects to analyse the current urban situation of the Wiental and, in a comprehensive catalogue of measures, presented proposals for the design of one of the important focal points in Vienna's future as a city.

In historical terms the transformation from a natural river to a regulated watercourse, or the planning of a monumental boulevard from Karlsplatz to Schönbrunn, which Otto Wagner carried out in part by culverting the River Wien in the area of the Naschmarkt, represent important measures that have had a lasting impact on the appearance of the city of Vienna.

Hydrology: To understand the characteristics of the River Wien within Vienna's city boundaries it is necessary to take a regional view of the water economy, especially as regards the flooding caused by heavy rainfall. During a downpour a substantial amount of the surface water in the inner city is led into the River Wien and this can lead to the water level rising by more than a metre within minutes. This fact imposes formidable limitations on urban design, especially as regards the possibility of accessing the river bed.

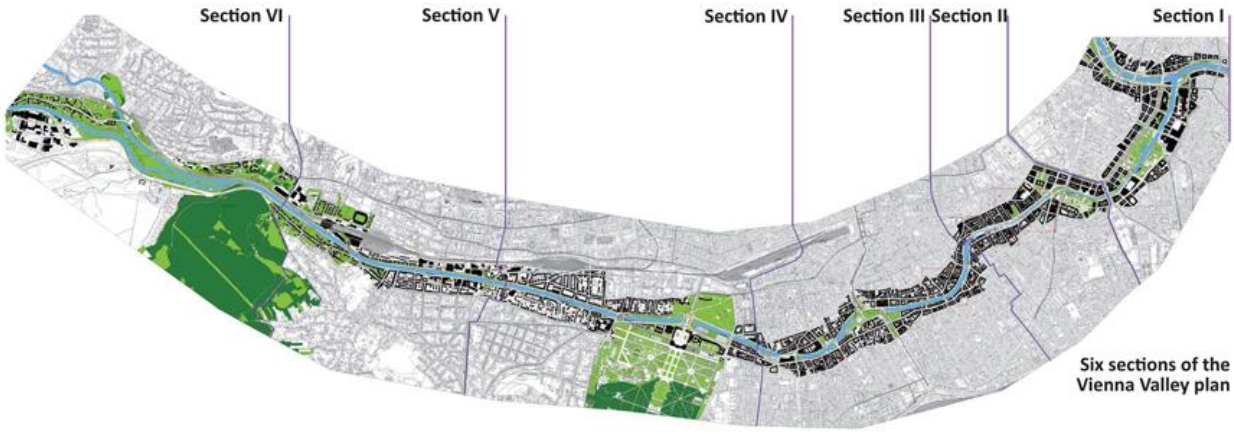

Fig. 12: The Vienna Valley in six sections

At first, a comprehensive planning analysis defined urban typologies and six characteristically similar sections of the Vienna River.

In order to define the most significant urban characteristics , the authors looked at the urban diversity and the development that increases in density towards the inner city, along with the consideration of the most important urban deficits and potential. On examination it is revealed that the urban planning deficits lie primarily in the severe separation of the northern areas of the city from the southern areas caused by the Wiental. Here the use of the Wiental as an axis for road and rail traffic plays a decisive role. The left-over areas and urban wasteland produced at many places by urban planning and the often visually unappealing transitions between individual urban components also represent a serious urban planning deficit.

The design guidelines are formulated by means of goals as well as specific measures.

Important urban design goals are strengthening the awareness of the Wiental and making its experience easier, improving its qualities as a place for recreation and leisure, creating cohesion between bordering urban districts, emphasising the linear identity of the Wiental while creating local identities within. Important measures in implementing the goals are emphasising existing attractors and urban qualities, creating connections and new green spaces, while upgrading left-over and wasteland areas and restructuring them, promoting bicycle and pedestrian traffic, increasing public safety by encouraging activity during all periods of the day.

4.3 Urban Planning Potential

Existing green areas or undeveloped areas that could be used as green spaces play a major role as does the network of bike and pedestrian paths which although well developed could be still further improved, or local accents and linear urban planning elements with a high level of urban quality that could be better integrated within the existing mesh of the city.

The targeted improvements to connectivity have a special focus on important routes, the connections of pedestrian and bike paths including those that need to be optimized, as well as the shortage of crossings over the River Wien.

Principal to the design concept is the general aesthetic improvement of the valley, making it more appealing for the use and recreation of the local residents, while enhancing the distinct urban identities of the different sections along the river.

Critical areas of intervention were selected: The plan identifies locations where existing public amenities can be maintained, brown-field sites regenerated, and new urban measures initiated. The project proposes the conversion of traffic areas into pedestrian zones, novel connections between the districts and the river embankments, and introduces green landscaping. The design of the edges at street level can be implemented in the short term offering a unique chance to upgrade an open space that leads right through the city and changing it from a peripheral zone to a spine. This new identity is to develop at the river banks. To make the river bed accessible flood protection measures would be necessary. On the basis of new technologies and intensive cooperation these could in the future transform this idea from a vision to reality.

13: The Vienna Valley in 2011 – potential for generating new open spaces

5 CONCLUSION AND FUTURE POTENTIAL

Traffic arteries have left scars in the urban grain, often creating "inner edges" that form physical and social barriers. "Space-In-Between" along streets and railways presents an opportunity to reweave the interrupted city fabric and secure urgently needed open spaces – new and environmentally conscientious uses have to be explored for these in the future: pedestrian and cyclists movement, recreation, urban farming, energy farming, ect. New modes of commuting and changing travel behaviour offer unprecedented opportunities to rethink these arteries of the cities.

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Städtebauliche Methodenentwicklung mit GeoWeb und Mobile Computing

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1 ABSTRACT

Untersuchung über die Fortentwicklung des städtebaulichen und raumplanerischen Methodenrepertoires angestoßen durch technologische Neuerungen im Internet.

Ziel des von der DFG von 2009 bis 2011 geförderten Forschungsvorhabens war es, das Potenzial an Veränderungen des städtebaulichen und raumplanerischen Methodenrepertoires im Zusammenhang mit der Herausbildung des GeoWebs im Internet und mobiler Computersysteme (Mobile Computing) auszuloten. Das Forschungsinteresse widmete sich diesen beiden technischen Entwicklungen in ihrer gegenseitigen Verzahnung. Dabei wurde der Frage nachgegangen, inwiefern und inwieweit die sich im Internet gegenwärtig herausbildenden geobezogenen Informations- und Kommunikationsplattformen zu neuen, für die räumliche Planung wesentlichen Veränderungen der wissenschaftlichen Planungsmethoden führen. Im Zuge der Forschung wurden auch Möglichkeiten zur Fortentwicklung der Planungsmethoden auf – dieser auch als GeoWeb bzw. „Web 3.0“ bezeichneten – Informations-Plattform aufgezeigt. Im zentralen Blickfeld des Interesses standen insbesondere mobile Erfassungs-, Kommunikations- und Rechnersysteme (smart devices).

Innerhalb des Forschungsprojektes wurden die Teilbereiche "Analyse des GeoWebs und des mobilen Computereinsatzes", „Sensorik für das Geoweb“, „Geowebmethoden für die städtebauliche Struktur- als auch Gestaltungsplanung“ sowie „GeoWeb-Methoden und Kommunikations-Plattformen in der Stadtplanung“, die in diesem Paper exemplarisch vorgestellt werden.

2 STAND DER FORSCHUNG

Der Geobezug des Internets wird von namhafter Seite, etwa im britischen News-Magazin Economist vom September 2007, metaphorisch bereits als „Web 3.0“ oder „Geoweb“ bezeichnet (The Economist, 2007). Die zunehmende Bedeutung des Geobezugs zeigt sich u. a. auch dadurch, dass die Browsingtechnologie als eine wesentliche Internet-Funktionalität mittlerweile eine Erweiterung auf räumlich lokalisierbare, geografische Objekte erfahren hat und deshalb „Geobrowsing“ genannt wird. Der Standard dazu, die „Geography Markup Language“ (GML), wurde vom Open Geospatial Consortium (OGC) im Jahre 2007 fixiert. Die „Keyhole Markup Language“ (KML), die Google Maps und Google Earth beschreibende Sprache, wurde im April 2008 zum offiziellen Standard der OGC bestimmt (Shankland, 2008).

Die Potenziale und das Funktionieren des GeoWebs stehen im engen Zusammenhang mit den verfügbaren Sensoren und der sogenannten Sensorik. Die Umwelt wird anhand von aufgenommenen Daten analysiert und in eine Information umgewandelt. Dementsprechend müssen, wenn der Untersuchungsgegenstand der Einsatz von Sensorik im GeoWeb ist, sowohl die körpereigene menschliche Wahrnehmung als auch die technischen Möglichkeiten zur Aufnahme und Analyse von Umweltreizen betrachtet werden. Denn jenseits der technischen Möglichkeiten und Ansätze existiert immer noch ein Messsystem zum Sammeln und Auswerten von Daten, das allen Technologien in seiner Gesamtheit überlegen ist: Der Mensch als „intelligenter Sensor“. Dementsprechend muss das menschliche Perzept, die menschliche Wahrnehmung, zuerst beleuchtet werden, da sie in vielen Dingen das real existierende Vorbild für moderne Sensortechniken darstellt. Dabei wird unterschieden in analoge und digitale Sensoren (Schiessle, 1992; Schanz, 2007), mobile und nichtmobile Sensoren (wie z. B. bei Petschek, 2007), Nah- und Fernsensoren (Stark, 2009), Remotesensoren sowie kollaborative Sensoren und Sensornetzwerke (Hof, 2007). Sensoren können so für Monitoringsysteme in der Raumplanung (Streich, 2005) innerhalb eines induktiven oder deduktiven Monitorings eingesetzt werden. Das sogenannte „Urban Sensing“ (Campbell et al., 2006; Lane et al., 2008) kann so für „Participatory Sensing“ Vorgänge (Burke et al., 2006) als kontinuierliches, städtisches Beobachtungssystem eingesetzt werden. Die Projekte des MIT SENSEable City Labs sind dabei richtungsweisend (Calabrese Ratti, 2006; Outram et al., 2010 und Kloeckl, 2011). Daneben werden auch vermehrt „Menschen als Sensoren“ zur Messung der aktuellen, persönlichen Befindlichkeit im Stadtraum eingesetzt (Nold, 2009). Im Bereich der Strukturplanung und der Anwendung von Desktop-GIS sind die

gängigen Methoden in kommerziellen als auch Open Source Bereich grundlegend bearbeitet (Mitchell et al., 2009; Bill, 2010). In der Domäne des Mobile Webs werden jedoch durch die Verwendung von GPS-Daten immer wieder Bezüge zu den Mental Maps von Lynch (Lynch, 1960) klar, auf denen viele der automatisiert aufgenommenen Elemente basieren. Die Visualisierung punktueller Information basiert auf dem Konzept der Heatmaps, die eine online gestützte und live verfügbare Form der klassischen „Point Density" Berechnung (Berry & White, 2002) darstellt. In der städtebaulichen Gestaltungsplanung haben vor allem Techniken der Augmented Reality (Azuma, 1997; Milgram, 1999) im Bereich der Open Source Desktop Anwendungen eine Renaissance dieser Methoden ausgelöst (Höhl, 2008). Die Verfügbarkeit auf Smartphones schließt diese Entwicklung mit ein. Erste Anwendungsszenarien für die „Augmented City" (Allbach et al., 2011) und den Einsatz als Tourismusinformationssysteme (Althoff et al., 2010) bestehen bereits. Daneben entstanden bildgestützte, internetfähige Methoden, die ganze Kollektionen von Bildern für die Planung bereitstellen können (Snavely et al., 2006).

3 FORSCHUNGSFELDER

3.1 Analyse des GeoWebs und des mobilen Computereinsatzes

Gegenstand dieser ersten zentralen Bearbeitungsphase des Forschungsprojektes war das GeoWeb im Sinne der Erweiterung des Internets mit Bezug auf räumlich-geografisch lokalisierbare Objekte. Das besondere Forschungsinteresse wurde dabei auf den Spezifika, wie man zu räumlich lokalisierbaren Objekten gelangt, diese etwa durch Methoden des Geotagging und der Georeferenzierung ins Internet einspeisen und für die Raumplanung nutzbar machen könnte, gerichtet.

In dieser ersten Phase wurde eine Begriffsanalyse durchgeführt, die die Besonderheiten des GeoWebs in Verbindung mit dem mobilen Computereinsatz analysiert. Insbesondere die Abgrenzung zum traditionellen Desktop GIS stand dabei im Mittelpunkt bzw. dessen Komplementarität. Alle in diesem Forschungsprojekt durchgeführten Untersuchungen haben die besondere Anwendbarkeit in diesem Umfeld des GeoWeb und des Mobile Webs gemein. Dementsprechend bauen alle weiteren Arbeitsschritte auf diesen Besonderheiten auf. Neben einer fundierten Literaturrecherche in diesem Bereich wurden sowohl die Hardware als auch die für den Bereich des GeoWebs und des Mobile Webs verfügbaren Softwareapplikationen, die sogenannten Apps, untersucht. Dabei wurde eine Analyse der allgemeinen Eigenschaften und der Potenziale des GeoWebs, eine Analyse der Organisations- bzw. Sprach-Standards des GeoWebs sowie eine Analyse des Stands und der Entwicklungstendenzen des mobilen Computereinsatzes, insbesondere im Bereich der PDAs und Smartphones, durchgeführt.

3.1.1 Ergebnis

Allgemein ist zu konstatieren, dass eine Evolution im Internet stattgefunden hat: Von der allgemeinen, hardwarekomponenten- basierten Zurverfügungstellung von Informationen im Internet, dem Web 1.0, über die Entwicklung des von Tim O'Reilly titulierten Web 2.0, dem sogenannten Mitmach-Netz bis hin zu dem jetzt entstehenden, geo- und ortsbasierten, mashup- fähigen Web 3.0. Neben der URL, über die die Informationen im Internet abrufbar sind, können Informationen zusätzlich einen Geobezug erhalten. Die Verknüpfung aller bisherigen Daten mit Geokoordinaten sowie deren jederzeitige Verfügbarkeit und Austauschmöglichkeit mit mobilen, handlichen Endgeräten kennzeichnet damit einen neuen großartigen evolutionären Schritt der Technik im Internet. Wenn auch einige Fachleute das sogenannte „Semantic Web" als die neue Revolution im Internet bezeichnen und mit „Web 3.0" etikettieren, so steht nach Meinung der Verfasser eben diese Verknüpfung von Geoinformation und virtueller Information für eine neue Entwicklungsstufe im Internet. Diese sollte, wenn überhaupt diese Begrifflichkeit benutzt wird, als Web 3.0 bezeichnet werden (nach Zeile, 2010 S.97).

Ein Vorreiter, Indikator und auch Brückenkopf dieser Entwicklung ist das für die räumliche Planung so wichtige Webmapping. Schwierig ist mittlerweile die Abgrenzung zwischen reinem Webmapping, Web 2.0-Diensten und Web 3.0-Werkzeugen, da viele der Techniken mittlerweile zusammengewachsen sind nach Zeile, 2010 S.97).

Die Definition des Geowebs kann dementsprechend wie folgt aussehen: Das GeoWeb ist eine Weiterentwicklung von kartenbasierten Diensten hin zu mashup-fähigen Kartendiensten, die sich in einem Art Baukastensystem mit immer anderen Diensten neu kombinieren lassen. Somit verändert das GeoWeb das

Sammeln von Geodaten und deren Analyse durch neue Technologien und beschreibt zusätzlich die grundsätzlichen Konzepte hinter der Neukombination durch die Mashup-Fähigkeit und deren Techniken (Batty et al., 2010).

Die Anwendbarkeit auf mobilen Endgeräten wurde in den Bereichen der städtebaulichen Struktur- und Gestaltungsplanung, des städtischen Sensorings und der GeoWeb-Methoden und Kommunikations-Plattformen in der Stadtplanung Untersucht. Als Testplattformen haben sich nach eingängiger Recherche die Betriebssysteme AndroidOS und iOS herauskristallisiert. Tablet PCs der neueren Generation wurden zwar angetestet, aufgrund der noch nicht ausgereiften technischen Entwicklung in diesem Stadium der Forschungsarbeit jedoch nur am Rande getestet. Als eine sehr offene, mit einer Vielzahl von frei verfügbaren Apps für den Planungsbereich und bedienerfreundliche Plattform stellte sich das AndroidOS heraus, auf das sich in großen Teilen in dieser Arbeit fokussiert wurde.

3.2 Sensorik für das GeoWeb

Die Potenziale und das Funktionieren des GeoWebs stehen im engen Zusammenhang mit den verfügbaren Sensoren und der sogenannten Sensorik. Diese wurden in diesem Abschnitt des Forschungsprojektes näher untersucht.

Die Umwelt wird anhand von aufgenommenen (Sensor-) Daten analysiert und in Informationen umgewandelt. Dementsprechend müssen, wenn der Untersuchungsgegenstand der Einsatz von Sensorik im GeoWeb ist, sowohl die körpereigene menschliche Wahrnehmung als auch die technischen Möglichkeiten zur Aufnahme und Analyse von Umweltreizen betrachtet werden. Denn jenseits der technischen Möglichkeiten existiert immer noch ein Messsystem zum Sammeln und Auswerten von Daten, das allen Technologien in seiner Gesamtheit überlegen ist: der Mensch als „intelligenter Sensor". Dementsprechend muss das menschliche Perzept, die menschliche Wahrnehmung, zuerst beleuchtet werden, da sie in vielen Dingen das real existierende Vorbild für moderne Sensortechniken darstellt.

Innerhalb dieses Arbeitspaketes des Forschungsvorhabens wurden folgende Fragestellungen überprüft: Wie finden die Sinneswahrnehmung und der Einsatz von Sensoren im Allgemeinen statt? Welche Methoden der Datenerfassung mit Sensoren sind verfügbar? Welche Modi des Sensor-Einsatzes sind bekannt? Welche Arten von Monitoringsystemen innerhalb der Stadtplanung sind denkbar? Welche Basissensoren werden für das GeoWeb benötigt? Wie können menschliche Sinne im GeoWeb abgebildet werden? Wie ist der Mensch in diesem Bereich als „intelligenter Sensor" einsetzbar? Wie ist der Zusammenhang von Sensoren in der Raum-Zeit-Dualität? Und welche Probleme treten im Kontext des Einsatzes von Sensoren mit dem Datenschutz auf? Daneben wurde anhand eines Projektes überprüft, ob Methoden aus dem ambulatorischen Assessment und des psychophysiologischen Monitorings Erkenntnisse zum barrierefreien Planen liefern können. Mithilfe von Sensorarmbändern wurde eine Messung mit der Zielgruppe von mobilitätseingeschränkten Personen durchgeführt. Dabei wurden ihr zurückgelegter Weg, ihre Hauttemperatur und ihr Hautwiderstandswerte aufgenommen, um deren Stressreaktionen auf bestimmte Hindernisse im Stadtraum zu ermitteln und dementsprechend der Stadtplanung wichtige Hinweise auf stadtplanerische Mängel zu geben (vgl. hierzu Bergner et al., 2011 u. Zeile et al., 2011).

3.2.1 Ergebnis

Der Bereich der Sensorik kann nach Abschluss der Arbeit in die schon in Kap. 2 erläuterte Systematik erfolgen: analogen und digitalen Sensoren, der mobilen und nichtmobilen Sensoren, Nah- und Fernsensoren, Remotesensoren sowie kollaborative Sensoren und Sensornetzwerke. Zusätzlich können Sensoren für Monitoringsystem in der Raumplanung (Streich 2005) innerhalb eines induktiven oder deduktiven Monitorings eingesetzt werden. Das sogenannte „Urban Sensing" (Campbell et al. 2006, Lane et al. 2008) kann so für „Participatory Sensing" Vorgänge (Burke et al. 2006) als kontinuierliches, städtisches Beobachtungssystem eingesetzt werden. Die Projekte des MIT SENSEable City Labs sind dabei richtungsweisend (Calabrese Ratti 2006, Outram et al. 2010 und Kloeckl 2011). Daneben werden auch zunehmend mehr „Menschen als Sensoren" eingesetzt. Dabei kann mithilfe von Sensorarmbändern die Messung der aktuellen, persönlichen Befindlichkeit im Stadtraum erfolgen (Nold 2009).

Das Prinzip der Menschen als Sensoren wurde innerhalb der Forschungsarbeit mit den Methoden des psychophysiologischen Monitorings (EmbaGIS) umgesetzt. Dabei konnten vor allem die Fehler der Experimente der BioMaps (Nold 2009) und der emomaps (Zeile 2010) beseitigt werden und eine neue

Methodik zur besseren Identifizierung von Stressbereichen innerhalb eines Stadtraumes erarbeitet werden. Mithilfe der neuen Methode konnten barriere-bedingte Sektoren der Stadt identifiziert werden (vgl. . Bergner et al., 2011 u. Zeile et al., 2011).

3.3 Methodenentwicklung in der Stadtplanung für das GeoWeb

Drei Eigenschaften sind es, auf denen das enorme methodische Potenzial der mobilen Kommunikationsgeräte mit Computerfunktion – Smartphones also- beruht. Sie sind klein, mobil und ortbar. In Kombination aller Eigenschaften erlauben diese Geräte völlig neue Konzepte innerhalb der räumlichen Planung.

Um die Potenziale von Smartphones innerhalb der räumlichen Planung zu erforschen, müssen verschiedene Techniken näher betrachtet werden. Neben den Verortungsmethoden, der Sensorik, der in Zukunft möglichen Nahfeldkommunikation und der QR-Codierung ist dies vor allem das Methodenrepertoire im GeoWeb und in geobasierten Netzwerken. Geobasierte soziale Netzwerke und das GeoWeb, - die Kombination von Web 2.0 und Web 3.0, eröffnen diese neue Form der räumlichen Planung.

Das Methodenrepertoire lässt sich ableiten aus den im Forschungsvorhaben durchgeführten Projekten. Um die einzelnen Methoden besser zu identifizieren, sind sie in diesem Abschnitt nochmals im Einzelnen erläutert. Eine Zusammenfassung der Methoden ist auch bei Streich (Streich 2011:235ff) zu finden. Nachfolgend ist dies aber zur besseren Verständlichkeit auch im Ergebnis in Kap. 2.3.3 zusammengefasst.

3.3.1 Ergebnis

Folgende Methoden zeichnen sich in Zukunft für den Einsatz in der räumlichen Planung ab (Streich 2011:235ff):

- Erfassung räumlicher Daten durch Geotagging- das Hinzufügen von räumlichen Informationen bzw. Attributen mit geografischen Koordinaten (Geotags), um zum Beispiel Standorte von Gebäuden oder Bepflanzungen direkt „vor Ort“ zur erfassen und in einem georeferenzierten Kartensystem zu archivieren und auszutauschen;
- Erfassung von räumlichen Daten im „crowdsourcing“- Prozess, bei dem die Organisation eines raumbezogenen Erfassungssystems mit derselben Technik wie eben beschrieben durch synchrone oder sequenzielle Aktivität einer Personengruppe zu einem städtebaulichen Thema erfolgt;
- Beobachtungen von Phänomenen im zeitlichen Verlauf- deduktives Monitoring als die Organisation eines im GeoWeb verankerten Beobachtungsprozesses durch eine Planungsinstitution mit Themen bzw. Phänomenen, die für die betreffende Planung als relevant erachtet werden;
- Beobachtung von Phänomen und dynamische Hinzufügung neuer Beobachtungsphänomene – induktives Monitoring, als die Organisation einer durch die Beobachter (z. B. Akteursgruppen) in Eigeninitiative ergänzbaren Palette von zu beobachtenden Phänomenen der räumlichen Planung im GeoWeb und mit geobasierten Netzwerken
- Analysemethoden, die alle GeoWebtechniken zur Durchführung von räumlichen Analysen wie Distanzberechnungen, Flächenberechnungen etc. verwenden;
- Organisation sozialer Aktivitäten im Planungskontext, bei denen die Nutzung von geobasierten sozialen Netzwerken zu Partizipationszwecken bis hin zu „Smartmob“-Aktivitäten, bei der eine spontane Selbststrukturierung einer sozialen Gruppe durch (mobile) Kommunikationsmedien stattfindet;
- Prognosen durch geobasierte „Prediction Market“-Methoden, bei denen Blogging- Plattformen (mit Geobezug) ausgewertet und als Grundlage für Prognoseeinschätzungen zu Hilfe genommen werden;
- Entwurfsarbeit mit „Augmented Reality“-Techniken, bei denen der zu realisierende Entwurf über mobile Applikationen vor Ort erlebbar gemacht wird;
- Erfolgskontrolle mit geobasierten Weblogs, bei denen Diskussionsforen zu gewissen Planungsaktivitäten ausgewertet werden, um daraus Aussagen zu Erfolg oder Misserfolg herzuleiten.

3.4 GeoWeb-Methoden für städtebauliche Strukturen

Methoden des Planentwurfs stehen im Zentrum der fachlichen Aktivitäten in der Stadt- und Raumplanung. Der Computereinsatz hat hier mittlerweile in großem Umfange und Stil durch GIS und CAD Einzug gehalten. Das GeoWeb bietet neue Optionen der Bearbeitung. Um diese zu nutzen, ist es erforderlich, die computergestützten Methoden entsprechend weiterzuentwickeln. Durch mobile Computersysteme bieten sich zudem Möglichkeiten, ortsunabhängig den Entwurf alleine oder im Team zu bearbeiten.

Die im Forschungsprojekt herangezogenen neuen Technologien des Internets – mobil, klein und geolokalisierbar – sind in der Tendenz dazu geeignet, eine Vielzahl von personenbezogenen Aktivitäten dynamisch zu koordinieren. So ist es vorstellbar, ein Monitoring-System aufzubauen, bei dem die auf ein bestimmtes Ziel ausgerichteten Aktivitäten von vielen verschiedenen Personen zusammengeführt werden. Jeder einzelne Akteur steuert im Rahmen des Monitorings individuelle Fälle bei.

Nach einer Untersuchung der für die städtebauliche Strukturplanung traditionellen Methoden wurden diese auf die Anwendbarkeit im GeoWeb hin untersucht. Dabei sollten folgende Fragestellungen im Einzelnen bearbeitet werden: Wie sind die für die Strukturplanung wichtigen Zeichenelemente wie Punkt, Linie und Fläche zu erfassen und zu organisieren? Des weiteren stellte sich die Frage, ob Mental Map (Lynch 1960) Prozesse im GeoWeb durchgeführt werden können und wie städtebauliche Themenkarten in das GeoWeb zu integrieren sind. Durch zwei Projekte, dem internetgestützten Flächenmonitoring am Beispiel der Gemeinde Altenglan und dem smartphonegestützten Touristeninformationssystem „Alexplore“ wurde die praktische Anwend-barkeit der Methoden überprüft.

3.4.1 Ergebnis

Die Aufnahme von punktuellen und linienhaften Strukturdaten geschieht bei mobilen Endgeräten über das automatisiert erstellte „Logfile“ im GPX- und meist auch im KMZ-Datenformat. Je nach gewählter App sind die Daten auch direkt auf einer Google Maps Oberfläche verfügbar und können auch in klassische Desktop-GIS-Programme übernommen werden. Sowohl bei der Aufnahme von Punkten- als auch Linienelementen eignet sich bei der Überlagerung vieler Datensätze nicht die Visualisierung in absoluter Form, sondern die Darstellung als sogenannte „Heatmaps“. Diese können hohe Dichten der Messwerte für den Benutzer anschaulicher darstellen. Über die Verknüpfung über soziale geobasierte Netzwerke sind diese nutzerbasierten „Hotspots“ einer Stadt über die Verwendung der Javascript Bibliothek „heatmap.js“ (Wied 2012) auch online abrufbar. Mithilfe von Online Services oder Open Source Software sind Punktelemente zu Linienelementen transformierbar, auch der umgekehrte Weg des Konvertierens ist möglich. Nicht funktioniert derzeit die automatische Aufnahme von Flächen über GPS-Logger, jedoch bieten einige Apps die Möglichkeit, zumindest Flächengrößen über Liniensegmente zu berechnen, oder Flächen manuell einzuzeichnen. Somit lässt sich auch nur teilweise der klassische Mental Map Prozess über das GPS-Tracking abbilden. Erste CAD-Programme sprechen die GPS-Schnittstelle an und könnten hier eine techinische Lück schließen. Trotzdem muss (immer noch) eine Kombination aus verschiedenen Apps im Planungsalltag zur Bestandsaufnahme und zur Anfertigung von Mental Maps benutzt werden. Dies zeigt sich auch bei der Integration von eigenen oder von Fremdanbietern zu Verfügung gestellten Themenkarten. Teilweise können Themenkarten über externe WMS- oder WFS-Dienste eingebunden werden, teilweise ist es allerdings sogar ein Problem, eine eigene, gescannte Karte zu georeferenzieren und darzustellen. Alle Möglichkeiten der verschiedenen Apps sind in einer Übersichtstabelle zusammengefasst. In den umsetzungsorientierten Beispielen wurden im Projekt Flächenmonitoring die Potenziale zur Ermittlung und communitybasierter Aufnahme von Flächenpotenzialen erfolgreich umgesetzt. Dabei wurde auf einen Workflow in einer Open Source Umgebung zurückgegriffen, der von Laien innerhalb einer kurzen Zeit erlernbar war, und somit für kleinere Kommunen ohne GIS-Ausstattung adaptierbar ist. Im Alexplore Projekt wurden die Potenziale von crowdsourcing basierten Informationen über die Touristendestination Alexandria untersucht, die den Benutzern die Möglichkeit bietet, eigene Hotspots in der Stadt mithilfe der Google Maps API zu verorten. Gleichzeitig sind auch Bereiche mit einem Wohlfühlfaktor klassifizierbar, die dann live allen Benutzern wieder als Kartendienst mobil als auch auf Desktop PCs zur Verfügung zu stellen (vgl. Körnig-Pich et al. 2010).

Die für die Planung und im Einsatz von GIS- und CAD-Programmen wichtigen Zeichenelemente wie Punkt- und Liniensegmenten sind im GeoWeb problemlos sogar automatisiert über GPS-Logger abbildbar. Die Erstellung von Flächen ist momentan nur manuell möglich. Der Austausch der Daten erfolgt meist über die

GPX- oder KML-Schnittstelle, sodass der aufgenommene Datensatz anschließend entweder direkt auf dem Mobile Client oder desktopbasiert zur Bearbeitung bereitliegt. Dies geschieht teilweise automatisiert. Aufgrund dieser Einschränkung ist die Erstellung von Mental Maps nur halb-automatisch realisierbar. Andererseits können unter Zuhilfenahme der Point Densitiy Berechnungsmethode sogenannte Heatmaps erstellt werden, die die Dichten von Beobachtungsgegenständen im Raum visualisieren. Weiterhin ist es mittlerweile auch möglich, thematische Karten entweder über die WMS- oder WFS-Schnittstelle einzubinden sowie auch die eigen erstellten Planwerke in Form von georeferenzierten Bildern darzustellen. Alle Funktionalitäten innerhalb einer App sind derzeit noch nicht verfügbar.

3.5 GeoWeb-Methoden für die städtebauliche Gestaltung

Städtebauliche Gestaltungsaspekte gehören zum zentralen Gegenstandsbereich der räumlichen Planung. In diesem Forschungsprojekt geht es um die Fragestellung, mit welchen Methoden und Werkzeugen stadtgestalterische Prozesse im GeoWeb und Mobile Web abgebildet werden können.

Um die für das Forschungsprojekt relevanten Methoden zu ermitteln, wurden zuerst die Grundlagen zu Raum und Gestalt sowie die gängigen Methoden der Gestalterfassung und Gestaltbewertung ermittelt. Gestaltprozesse sind durch das Fortschreiten der digitalen Visualisierungs- und Simulationstechniken heute anders zu handhaben als noch vor 20 Jahren. Zudem sind Ansätze im klassischen desktopbasierten Augmented Reality Verfahren (Höhl 2008) zwar als Grundlage zu verwenden, jedoch wurden mobile Web-Methoden bis dato nicht umfassend für den Einsatz in Planung betrachtet. Dementsprechend wurden in einem anschließenden Schritt die Möglichkeiten der fotografischen Erfassungsmethoden im GeoWeb, neue visuelle Simulationsverfahren – besonders im mobilen Augmented Reality-Bereich untersucht. In einem abschließenden Schritt wurden die Erkenntnisse in dem Projekt „Baukulturmonitoring“ praktisch angewandt. Zusätzlich wurden Szenarien im Augmented Reality Umfeld prototypisch definiert, wie und mit welchen Werkzeugen die Umsetzung der „Augmented City“ gelingen könnte.

3.5.1 Ergebnis

Städtebauliche Gestaltungsprozesse sind über Modelle zu kommunizieren. Dabei ist es im Kommunikationsprozess wichtig, dass bei allen am Planungsprozess beteiligten Akteuren die Erkenntnis vorhanden ist, dass das Bild, der Film oder eine sonstige Präsentationsform der zukünftigen Entwicklung immer nur modellhaften Charakter aufweist, und dass die tatsächliche Planungsumsetzung später eventuell anders aussehen wird als das kommunizierte Modell. Als Diskussionsgrundlage sind diese Modelle jedoch ein wichtiges Instrument, um möglichst viele Gruppen in den Prozess mit einzubeziehen. 3D-Stadtmodelle und die Integration von virtuellen Neuplanungen in diese Modelle liefern einen Zugewinn an Transparenz. Zusätzlich entsteht in den planenden Disziplinen ein großes Wissen, wie diese Modelle erstellt werden und vor allem, wie mit diesen über Echtzeitvisualisierungssysteme oder Virtual Earth Systeme die Planungsintention einer Vielzahl an Personen vermittelt werden können. Die Dokumentation von baulichen Zuständen kann mittlerweile über Online Foto-Communities als auch über interaktive Fotokollektionen mit relativer, modellinterner Georeferenzierung erfolgen. Dies erleichtert zum einen stark Bestandsaufnahmeprozesse als auch die Katalogisierung von Bauwerken innerhalb der Baukultur-Diskussion. Neben den schon erwähnten Virtual Reality Methoden können planerische Arbeitsprozesse auch dazu verwendet werden, Inhalte für (Mobile) Augmented Reality Applikationen zu erstellen. Die Einsatzfelder und die jeweiligen auf den Smartphones zu Verfügung stehenden Apps wurden dementsprechend untersucht. Mithilfe dieser Apps können dann Szenarien wie die Überlagerung von historischen Informationen („talking places“), Messwerte, 2D-Karten-Informationen, 3D-Bauten und auch Formen der Partizipation mithilfe von Augmented Reality Tags in Social Communities umgesetzt werden (vgl. hierzu auch Memmel Groß, 2011 und Allbach et al., 2011). Im Rahmen des Baukulturmonitorings hat sich der Methodenmix aus Foto-Communities, die dynamische Visualisierung von Veränderungsprozessen mithilfe von Google Earth, die Durchführung von Social Community basierenden Befragungen sowie die Visualisierung von Neubauprojekten mit Augmented Reality Applikationen als sinnvoll erwiesen. Zusätzlich ist es sinnvoll, Objekte der Baukultur zentral auf einer Plattform zu speichern, bzw. mithilfe dieser Plattform auch Bürger zu aktivieren, eigene Inhalte einzuspielen und zu verorten, wie es im MACE-Projekt (Zeile Memmel 2010) durchgeführt worden ist.

3.6 GeoWeb-Methoden und Kommunikations-Plattformen in der Stadtplanung

In der Stadtplanung ist Kommunikation eine zentrale Instanz. Sie dient dem Informationsaustausch, ist wesentlicher Teil von Partizipation und spielt eine wichtige Rolle bei der Konsensfindung für Planungsentscheidungen, aber auch für die Vermittlung von stadtbezogenen Informationen zum Beispiel für den Tourismusbereich.

Der Umbruch von der Informationsgesellschaft in die Wissensgesellschaft ist im vollen Gange. Dementsprechend sollten auch die planenden Disziplinen diese neuen Wege der Kommunikation bestreiten. Neben dem Speichern von Bildern, Texten, Videos und Audiodateien im Netz entstehen neue Formen des Informationszugangs und der Informationsbeschaffung. Stichworte sind hierbei das „GeoWeb-Blogging", das „Mobile Tagging", „Near Field Communication" und „QR-Codes" sowie die Möglichkeit, diese Techniken miteinander zu verknüpfen. Ziel ist es, alle Techniken miteinander zu einem Informationssystem zu verknüpfen (vgl. Althoff et al., 2010).

Die oben genannten Techniken wurden innerhalb eines Tourismus-Projektes untersucht und umgesetzt. Es sollte ein mobiles Touristeninformationssystem, das an verschiedenen Standorten zusätzliche Informationen in Form von Kurzfilmen mithilfe der QR-Technologie plattformunabhängig dem Besucher zu Verfügung steht.

3.6.1 Ergebnis

Das Konzept wurde erfolgreich umgesetzt und kann in Aalen vor Ort besichtigt werden. Dieser Art der Informationsvermittlung in einem Medienmix aus mobilen Techniken, Film und QR-Codierung kann beliebig erweitert werden und ist so auch bei der Vermittlung von Informationen von Großprojekten oder Ähnlichem denkbar.

4 FAZIT UND AUSBLICK

Die Mashup-Fähigkeit vieler Applikationen, der bibliotheksbasierte Aufbau des AndroidOS und die immer bessere Verfügbarkeit von Daten und des Datenzugangs lassen es in einem weiteren Schritt zu, nun auf besondere Fragestellungen innerhalb der räumlichen Planung entweder maßgeschneiderte Apps zu entwickeln, oder mithilfe von bestehenden mashup-fähigen Kombinationen besondere Bereiche der räumlichen Planung näher zu beleuchten. Die ständige Beobachtung der Trends im GeoWeb ist dabei eine zwingende Voraussetzung in diesem Forschungsbereich. Derzeit kristallisiert sich vor allem die Nutzung der mittlerweile von technischen Fehlern bereinigten Tablet- PCs und die Einführung von Near Field Communication (NFC) als neue Trends heraus. Die dadurch bessere und benutzerfreundlichere Komponente könnte dem Mobile Web für alle Benutzergruppen zum Durchbruch verhelfen.

Der Bereich der personenbezogenen Sensorik, bzw. das Prinzip des „Menschen als Messfühlers" wird in weiter bearbeitet und fortentwickelt werden. Dabei stehen zwei differenzierte Methoden im Mittelpunkt: eine auf Mobiltelefonen zu entwickelnde Plattform für „Urban Sensing" und die Weiterentwicklung des „EmbaGIS".

Darüberhinaus wird eine App entwickelt werden, die ortsmarkenbezogene Tags erstellt, die anschließend als „positiv" und „negativ" bewertet werden können (RADAR SENSING). Hintergrund dabei ist, dass ein Radar-System in Echtzeit entsteht, über das registrierte Nutzer als auch Planer die von den Benutzern aufgenommenen Attribute an ihren verorteten Plätzen in Form von Heatmaps direkt nach Usergruppen und Attributen visualisiert werden können. Ein möglicher Workflow sieht wie folgt aus: Die Benutzer verorten auf ihrem Mobilclient einen Platz in der Stadt und können neben den vordefinierten Attributen „Sauberkeit", „Aufenthaltsqualität", „Stadtgestalt/Architektur", „soziales Umfeld", „Barrierefreiheit", „Beleuchtung", „Sitzmöglichkeiten", „Verkehr", „Flora und Fauna", „Klang/Geräusche" auch eigene Attribute erstellen und diese mit positiv oder negativ bewerten. Jeder Ort/jede Ortsmarke dient so als Grundlage für eine „bewertete, georeferenzierte Tagcloud". Weiterhin sind alle Ergebnisse zu einem Gesamtergebnis aggregierbar und stellen einen „Zustand der Stadt" zu einem bestimmten, frei definierbaren Zeitpunkt oder über eine Zeitspanne dar. Die Ergebnisse sind in Google Maps einsehbar, entweder als absolute Punktwolke mit allen Attributen oder als generierte Heatmap aus den aufgenommen „menschlichen Sensordaten".

Weiterhin sollte das EmbaGIS in praktischen Untersuchungen validiert werden. Dabei steht im Vordergrund, wie die Messmethode in Innenstadtbereichen mentale Belastungspunkte identifizieren und analysieren kann.

Zusätzlich sollen ausgesuchte neuralgische Punkte nach Gesichtspunkten der Barrierefreiheit städtebaulich optimiert werden. Die angedachte Methode sieht vor, dass in Fallstudien die mentale Belastung (der „Stress“) von mobilitätseingeschränkten Menschen mit Ergebnissen aus anderen Zielgruppen verglichen werden sollen (z. B. sehbehinderte Menschen, aber auch Mütter mit Kinderwägen), sowie Probanden, welche nicht-behindert sind und als Kontrolleinheit fungieren können. Auf Basis dieser Ergebnisse der Fallstudien werden besondere Belastungspunkte herausgefiltert und kartografisch dargestellt. Belastungsauslösende Örtlichkeiten werden auf städtebauliche Gegebenheiten nach DIN untersucht und bei Handlungsbedarf optimiert.

Neben der Planung für behinderte Personenkreise können die Messungen auch als Grundlage für die nach EU-Umgebungslärmrichtlinie Identifizierung von Orten mit einer „hohen Eignung für ruhige Erholung“ dienen. Da in diesem Verfahren bis jetzt nur auf die standardisierten ICBEN-Fragebögen zur Lärmbelästigung zurückgegriffen wird, kann die Anwendung von Messungen des psychophysiologischen Monitorings mithilfe von Sensorband-Messungen die subjektiven physiologischen Reaktionen auf die sich dynamisch verändernde Geräuschsituation vor Ort objektiv messen und könnte eventuell eine objektivere Bewertung des Lärms und der Erholung darstellen. Diese kombinierte Erhebung aus Messung und Befragung soll Rückschlüsse auf die schalltechnischen Anforderungen an „ruhige Gebiete in Ballungsräumen“ nach der Umgebungslärmrichtlinie der EU ermöglichen.

Die sich neu bietenden Methoden für die Planung sind durch das Fortschreiten der Technik erheblich erweiterbar. Gerade subjektive Empfindungen der Menschen im Stadtraum können mithilfe von crowdsourcing orientierten Messverfahren neue Aufschlüsse über den „Herzschlag“ oder den „Puls der Stadt“ hervor bringen. Der Ansatz des „Emotional Mappings“ oder des „EmbaGIS“ können auch in diesem Zusammenhang ein probates Mittel sein. Wie die im Kapitel „Sensorik für das GeoWeb“ vorgeschlagenen weiteren Untersuchungen im Bereich des Emotional Mapping und die Entwicklung einer „App“ zur Messung des subjektiven Empfindens in einer Stadt sind auch in diesem Arbeitspaket als die logische Weiterentwicklung zu bezeichnen.

Durch die Ermittlung der Methoden für die städtebauliche Strukturplanung haben sich zwei Arbeitspakete für die Strukturplanung herausgebildet: Auf der einen Seite die Umsetzung eines smartphone- gestützten Leerstandskataster und die Entwicklung eines mobilen Audioguides im Rahmen des „Urban Storytellings“.

Neben dem touristischen Verorten von Plätzen mittels Smartphone und dem desk-topgestützten Erfassen von Flächenleerständen sollen in einem weiteren Schritt auch die Potenziale der crowdsourcing gestützten Aufnahme von Geschäftsleerständen mittels Smartphone untersucht werden. Klassische Ansätze, erwartete Leerstände durch Prozentangaben stadtweit zu verorten, sind zwar aus strategischer Sicht sinnvoll, bringen in der Planungspraxis allerdings nicht den gewünschten Mehrwert mit, da die Suche nach dem richtigen Geschäftslokal doch über den Makler oder den Besuch vor Ort läuft. Die Herausforderung liegt in der Erfassung, des kontinuierlichen Monitorings und eines effektiven Managements dieser Potenziale. Mittels des crowdsourcing sollen so innenstadtnahe, flexible, günstige und nachhaltige Ressourcen für eine kulturelle und soziale Stadtentwicklung aktiviert werden.

Das „Urban Storytelling“ soll die Bedeutung geogetaggter Audiodateien für die Erlebbarkeit der Stadt untersuchen. Dabei werden auditive Smartphone Applikationen untersucht und weiterhin der Frage nachgegangen, inwieweit diese einen Beitrag leisten können, eine auditive Identität der Stadt in Relation zu ihren Bewohnern zu vermitteln. Des weiteren soll aufgezeigt werden, welche Grenzen und Möglichkeiten der Technik in den potenziellen Einsatzfeldern bestehen. In diesem Zusammenhang werden bereits vorhandene „audio tools“ für mobile Endgeräte bewertet, wie auch eine neue konzeptionelle Idee zum Thema „auditives Stadterleben“ in Form von Geschichten, Musik und Hintergründe mit dem Titel „Urban Storytelling“ erarbeitet. Gleichzeitig wird auch das Phänomen der „Überlagerung“ der städtischen Umwelt mit mobilen Abspielgeräten und inwiefern dieses Phänomen zur (Wieder-) Identifizierung mit seiner Klangumwelt durch mobile Applikationen eingesetzt werden kann, unter-sucht. Weitere Fragestellungen in diesem Arbeitspaket können sein: Wie gestaltet sich die akustische Identifizierung der „iPod und Smartphone Generation“ mit der Stadt? Wie sehen bereits vorhandene auditive Guides aus und welchen Einfluss haben diese auf das Stadterleben? Inwiefern können diese auditive Hilfen (Smartphone, Mp3s) eingesetzt werden, um dem Menschen die Stadt (wieder) näher zu bringen? Wie könnte eine mobile Applikation in Bezug auf die auditive Wahrnehmung und Identifizierung konzeptionell aussehen?

Die Szenarien der Augmented City, die in ihren theoretischen Ausrichtungen vielversprechend klingen, sollen in zwei Projekten umgesetzt werden. Dies ist zum einen die Möglichkeit des augmentierten Bebauungsplans 3D und zum Anderen die Nutzung der Augmented Reality als (bau-) kulturelles Nachschlagewerk in Form des Szenarios der „Talking Places".

Im Bebauungsplanszenario soll deshalb neben der zweidimensionalen Darstellung auch die Bandbreite an zeichnerischen Festsetzungsmöglichkeiten, die dem Planer bei der Aufstellung eines Bebauungsplans zur Verfügung stehen, analysiert und (soweit möglich) dreidimensional visualisiert werden. Ergebnis ist eine „3D-PlanzV".Dieser wird beispielhaft für eine bessere Kommunikation zwischen Bürger und Verwaltung umgesetzt. Dabei sollen auch die Inhalte in einer Augmented Reality Umgebung visualisiert werden.

Die „Talking Places" werden anhand der Stadthistorie in Kaiserslautern überprüft. Dabei sollen analoge Daten aus dem Stadtarchiv Kaiserslautern zuerst gesichtet und nach Analyse existierender Standards und Metadatenformate zur Beschreibung digitaler Ressourcen im Kontext der Baukultur mit einem eigenen Repräsentationsformat ausgewählt bzw. definiert werden. Anschließend sollen die Inhalte aus heterogenen Quellen in einer interaktiven Plattform integriert werden. Neben der inhaltlichen Beschreibung sollen auch die Zugänglichkeiten über die entsprechenden Informationen mit einfließen. Die aufbereitenden Daten sollen dabei zwei- als auch dreidimensional aufbereitet und an ihre Originalstelle virtuell und mit Hilfe von Augmented Reality Methoden wieder erlebbar gemacht werden. Neben der Verortung von historischen Aufnahmen sollen zudem aus alten Bauplänen bzw. aus historischen Bauakten Gebäude zumindest in ihrem Ansatz rekonstruiert werden. Ziel ist es, sowohl diese Gebäude als auch die historischen Aufnahmen im digitalen Kontext mithilfe von mobile Augmented Reality, dem vom DFKI entwickelten RADAR System (Memmel 2010), als auch mit Virtual Earth Systemen wieder erlebbar zu machen.

Einige dieser angedachten Weiterentwicklungen sind schon in ersten Projektphasen umgesetzt worden und sind kurz vor Publikationsreife. Daran ist ablesbar, wie schnell die Entwicklungen im Bereich des GeoWebs momentan ablaufen. Andererseits zeigt es auch die Potenziale der Mashup-fähigkeit der Dienste an, denn was gestern noch als Problem galt, ist heute oftmals durch die Neukombination der Bausteine gelöst. Für den Planer heisst dies insbesondere, alle diese Entwicklungen aufmerksam zu verfolgen.

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🏆 *reviewed paper*

Stadtplanerische Herausforderungen einer funktionalen Durchmischung am Beispiel der Landeshauptstadt Innsbruck

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1 ABSTRACT

Die Landeshauptstadt Innsbruck verzeichnet nach Stagnation und Rückgang in den 1980-er Jahren ab 2001 wieder eine stärke Bevölkerungszunahme, v.a aufgrund einer sehr positiven Zuwanderungsbilanz. Die dem Örtlichen Raumordnungskonzept 2002 (ÖROKO) als strategisches, langfristiges, räumliches Planungsinstrument zugrunde liegenden Prognosen zur Bevölkerungsentwicklung, sagten für die Dekade bis 2012 ca. 130.000 Personen "anwesender Bevölkerung" voraus [1]. Die tatsächlichen Zahlen haben bereits im Jahr 2010, auch aufgrund einer geänderten Berechnungsmethode 145.000 Personen ergeben.

Die räumliche Situation Innsbrucks ist durch die beengte Talkessellage gekennzeichnet, von den 10.500 Hektar Stadtgebiet ist nur ein Viertel von 2.700 Hektar Siedlungsraum. Das Spannungsfeld dieser Rahmenbedingungen - rasche Bevölkerungsdynamik und beschränktes Raumangebot - stellt die Stadtplanung Innsbruck vor große Herausforderungen, um durch entsprechende Strategien die Flächen für Wohnen, Arbeiten, Bildung, Sport, Tourismus, Daseinsfürsorge und Infrastruktur [2] zu sichern.

Generelle räumliche Leitziele dabei sind der haushälterische Umgang mit Grund und Boden durch Ausschöpfung vorhandener Baulandreserven, Verdichtung und Umnutzung bereits bebauter Gebiete, Durchmischung bzw. Mehrfachnutzung bei hohem Qualitätsanspruch, wenig Neuwidmungen, Zurückstellen „strategischer Reserven" und damit Ressourcensicherung. „Mixing the City" bedeutet für Innsbruck konkret im stadtplanerischen Handeln, die Stadt weitestgehend nach innen zu entwickeln, kontinuierlich umzustrukturieren sowie eine konfliktarme und nachhaltige Durchmischung voranzutreiben [3]. Denn durch den stark begrenzenden (natur-)räumlichen Rahmen in Innsbruck liegen auch historisch bedingt verschiedene–oft konfliktträchtige–Nutzungen eng aneinander. Die Herausforderung ist das ständige Ausloten einer noch vertretbaren baulichen Dichte und Intensivierung der Flächennutzung bei gleichzeitiger Sicherung des hohen Anspruchs an die Qualität für Stadtraum und Wohnen.

Durchmischung wird in Innsbruck u.a durch Stapelung verschiedener Nutzungen erreicht. Dabei beweisen mitunter neuartige Mischungen ihre Praxistauglichkeit, etwa bei einer Stapelung von Bildungseinrichtungen und Handelsstrukturen, die zusätzlich als neues Stadtteilzentrum fungiert.

Grenzen der Durchmischung hingegen werden auf ökonomischer Ebene insbesondere durch das Zusammentreffen von Wohnnutzung und Gewerbe virulent. Aber auch Vorgaben aus der Umwelt- sowie Gewerbegesetzgebung und der darin festgeschriebenen vorrangigen Schutzwürdigkeit der Wohnnutzung stellt die Raum- und Stadtplanung vor die Situation, dass ihre rechtlichen Steuerungsinstrumente oftmals eingeschränkt sind. Dem entgegnet die Stadtplanung in Innsbruck einerseits mit der Ausweisung von „Besonderen Entwicklungsgebieten" in der strategischen Planung des ÖROKO und damit der Verankerung planerischer Handlungsspielräume sowie andererseits mit konkreten projektbezogenen, privatrechtlichen Verträgen.

2 AUSGANGSSITUATION

Das Bevölkerungswachstum der Landeshauptstadt Innsbruck liegt im österreichweiten Trend zentraler Orte und ist natürlich positiv zu beurteilen. Dies kann auch dahin gehend interpretiert werden, dass die Unternehmungen sowie Aufwendungen in Zielrichtung einer lebenswerten, attraktiven, ökonomisch und sozial stabilen Stadt erfolgreich waren und auch weiterhin sind.

[1] Vgl. STRUKTURANALYSE 2007 C-17
[2] Leitziele der Funktionellen Entwicklung im ÖROKO 2002 § 2 Abs. 1
[3] zu grundlegenden Überlegungen vgl. BRETSCHNEIDER 2007

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2.1 Wachsende Ansprüche durch demographischen Wandel an das Wohnen …

Die positive Bevölkerungsentwicklung bedeutet einen steigenden Bedarf an Siedlungsflächen, für Wohnraum genauso wie für soziale und technische Infrastruktur, für wirtschaftliche Entwicklung mit Arbeitsplätzen und nicht zuletzt für innerstädtischen Erholungs- und Freiraum. Dabei ist trotz allgemeiner Bemühungen um Ressourcenschonung des knappen Bodengutes festzustellen, dass der Bedarf an Wohnraum nicht linear mit einem Bevölkerungswachstum korreliert. Vielmehr wirken soziale und ökonomische Effekte des „Demografischen Wandels", dass der Raumbedarf und damit die Flächennachfrage für Wohnen maßgeblich steigen. Ein- und Zweipersonenhaushalte [4] nehmen in allen Altersgruppen in Folge veränderter gesellschaftlicher Rahmenbedingungen und damit gängiger Lebensstilformen zu. Neben den jungen Erwachsenen, deren Gruppe gesamtgesellschaftlich rückläufig ist, hat auch die wachsende Gruppe der älteren Menschen (über 65 Jahre) hierbei besonderen Einfluss. Deren Wohlstandsentwicklung, deren Lebenserwartung und einhergehend deren Verbleib in den oft zu groß gewordenen Wohnsitzen trägt stärker zur Zunahme der durchschnittlichen Wohnfläche je Person bei. Somit steigt letztlich die absolute Zahl der Wohnungen [5].

2.2 … sowie der Flächenbedarf für gewerbliche Nutzung …

Die kurz- und langfristige Verfügbarkeit gewerblich zu nutzender Flächen ist in Innsbruck sehr beschränkt. Das Potential wirtschaftlicher Nutzungen und Entwicklungen liegt aufgrund der topographischen und erschließungstechnischen Voraussetzungen nämlich nahezu ausschließlich im bereits verdichteten, verkehrlich erschlossenen Talboden. Zusätzliche Flächen für wirtschaftliche Neuansiedlungen sind in Innsbruck langfristig äußerst limitiert, auch gibt es keine Reserveflächen, die für einen möglichen Flächentausch im Sinne einer Neuordnung vorhandener Flächennutzungen herangezogen werden könnten. Das übergeordnete, stadtplanerische Ziel muss daher im Sinne einer langfristigen Absicherung der Wirtschaftsleistung der Stadt in der Sicherung all jener Flächen liegen, die für gewerbliche Zwecke geeignet und zum Großteil auch bereits als solche gewidmet sind. Dies unabhängig davon, ob die Flächen aus verschiedenen Gründen (z.B. fehlende Verfügbarkeit oder zu hohe Grundpreiserwartungen) derzeit keiner Bebauung und Nutzung zugeführt werden können. Darüber hinaus sind so auch die bestehenden Betriebsstandorte zu sichern.

2.3 … bei beschränkten Raumressourcen …

Von den 2.700 ha Siedlungsraum in Innsbruck sind etwa 910 ha als Wohngebiet gewidmet, 240 ha sind als Mischgebiete (allgemeines Mischgebiet, Kerngebiet, Tourismusgebiet und landwirtschaftliches Mischgebiet) festgelegt; auf Gewerbe- und Industriegebiete fallen 220 ha. In Summe ergibt dies etwa 1.370 ha Bauland. Hinzu kommen noch rund 520 ha Sonderflächen und 80 ha Vorbehaltsflächen, die teils bauliche, teils freilandbezogene Nutzungen ermöglichen [6].

Die beengte räumliche Situation stellt für Innsbruck eine besondere Herausforderung dar, um die wachsenden Flächenansprüche befriedigen zu können. Hierbei konkurrieren Interessen der Siedlungserweiterung mit den Interessen der Freilandsicherung. Einer - wenn auch extensiven - land- und forstwirtschaftlichen Nutzung kommt durch die Notwendigkeit der Sicherung alpiner Hanglagen und (Kultur-)Landschaften besonderer Bestandsschutz zu; die Erholungsflächen in und um die Stadt sind nicht nur für die Bewohner wichtig sondern auch wesentlicher Faktor für den städtischen Tourismus, etc. Und

[4] Laut vorliegender Prognose steigt die Anzahl der Wohnungen von insgesamt 62.4477 im Ausgangsjahr 2001 auf 67.721 (+8,4%) im Jahr 2011 bzw. 72.218 Wohnungen (+15,6%) im Jahr 2021 an. Diese Steigerung wird in etwa bis 2021 gleichbleiben, ab diesem Zeitpunkt aber eine Stagnation erfahren bzw. nur mehr in geringfügigem Ausmaß bis in das Jahr 2031 (72.442 Wohnungen, +15,9 %) zunehmen. STRUKTURANALYSE 2007 D-14

[5] Die in dieser Publikation zitierten Werte stammen zum größten Teil aus der "Strukturanalyse 2007 – eine Bestandsaufnahme. Aktualisierung des Basis-Informationsberichtes 2001 zum Örtlichen Raumordnungskonzept 2002 (ÖROKO 2002)". In diesem wurden zur Halbzeit der Gültigkeitsdauer des ÖROKO 2002 alle wesentlichen generischen Zahlenwerte die dem ÖROKO zugrunde lagen überprüft und aktualisiert. Aktuell im Jahr 2012 wird an der Fortschreibung des ÖROKO gearbeitet, dafür ist zum Teil bereits neueres Zahlenmaterial vorhanden, jedoch sind – auch aufgrund der Änderungen der Anforderungen an das ÖROKO durch die Novellierung des Tiroler Raumordnungsgesetzes 2011 – diese nicht gesamtstädtisch aufbereitet und stehen für eine Publikation derzeit noch nicht zur Verfügung.

[6] Daten aus der Widmungsbilanz Stand November 2008.

bezogen auf das bestehende und künftige Bauland an sich, das nur in sehr engen Grenzen erweiterbar ist und daher verstärkt verdichtet bebaut werden muss, besteht enorme Konkurrenz zwischen den verschiedenen Nutzungen. Einer Neuerschließung zusätzlicher Siedlungsfläche sind durch die Topographie (keine Anbindungsmöglichkeit der Verkehrswege) ganz grundsätzlich, durch Ausschlussgebiete aufgrund von Naturgefahren (etwa Wildbäche und Lawinengebiete) sowie ökonomischen und ökologischen Überlegungen restriktive Grenzen gesetzt.

Dieser langfristig eingeschränkte Handlungsspielraum im flächenmäßigen Wachstum wird durch das Verhältnis der noch vorhandenen Baulandreserven im Vergleich zum Baulandverbrauch besonders deutlich. Für die zukünftige Entwicklung steht von rund 1.370 ha gewidmetem Bauland in der Stadt weniger als ein Zehntel, etwa 150 ha, an Baulandreserven zur Verfügung [7]. Dies sind jene Flächen, welche als Bauland, Sonderfläche oder Vorbehaltsfläche gewidmet, aber noch nicht bebaut sind. Abzuziehen sind davon ca. 13 ha, die für Grün- bzw. Freiflächennutzungen vorgesehen sind. Auf Wohngebietswidmungen entfallen ca. 95 ha, wovon die meisten Reserven im Westen der Stadt zu finden sind, insbesondere in den Stadtbereichen Hötting-West mit ca. 18 ha und in der Höttinger Au mit 17 ha. Auch die Katastralgemeinde Vill und Igls auf der südlichen Mittelgebirgsterrasse oberhalb der Kernstadt verfügen mit 11 ha noch über einen hohen Anteil an Baulandreserven. Den zweitgrößten Anteil machen Baulandreserven in der Widmungskategorie Gewerbe- und Industriegebiet im Ausmaß von fast 36 ha aus. Diese liegen zum überwiegenden Teil im Osten der Stadt, wobei der größte Bereich das Gewerbegebiet Rossau mit 17 ha und das Gewerbegebiet Mühlau/ Arzl an der Hallerstraße mit etwa 10 ha sind.

Für den Baulandbedarf der letzten Jahre wurden neben Neuwidmungen in großem Ausmaß die vorhandenen Baulandreserven verbraucht (ca. dreimal so viel, wie Neuwidmungen!). In der Periode zwischen der Grundlagenerhebung für das ÖROKO 2002 ab 1999 und der STRUKTURANALYSE 2007 waren das fast 34 ha, wovon allerdings auch ein Großteils für Sondernutzungen, nicht für Wohnnutzung, herangezogen wurde. In einer groben Überschlagsrechnung könnte davon ausgegangen werden, dass bei linear steigendem Wachstum die vorhandenen Baulandreserven für Wohnen noch ca. 20 Jahre zur Befriedigung des Bedarfs ausreichen würden.

2.4 … verlangen nach besonderen Lösungen.

Unter diesen Rahmenbedingungen ist der allgemein gültige Ansatz eines sparsamen Umgangs mit Grund und Boden besonders elementar und muss auf verschiedenen Handlungsebenen verfolgt werden.

Die Landeshauptstadt Innsbruck verfügt über einen sehr geringen Anteil an baulandgeeigneten Eigengrund, Aktionen des aktiven großflächigen Flächenmanagement kommen daher nur untergeordnet in Frage. Die Baulandreserven sind im überwiegenden Maße in Privateigentum, eine steuernde Einflussnahme auf die zeit- und lagegerechte bauliche Verwertung sind kaum gegeben. Umso mehr haben Gespräche, Verhandlungen und Kooperationen mit Investoren und Bauherren daher einen besonderen Stellenwert und sind auch bei "kleineren" Projekten unumgänglich. Sowohl für Bauherren als auch die Stadtplanung ist dies nicht immer eine einfache oder konfliktfreie Aufgabe, es ist aber für die Einbettung des einzelnen Projektes in die gesamtstädtische Strategie notwendig.

3 SPARSAME BODENNUTZUNG ALS ZIEL - DURCHMISCHUNG ALS MASSNAHME

Raumbezogene Grundprinzipien der Tiroler Landesentwicklung sind im Raumordnungsplan „ZukunftsRaum Tirol_2012" festgehalten, so sind *"Siedlungen abgestimmt auf die Bedürfnisse der Bevölkerung und der Wirtschaft* [zu entwickeln] *und auf eine zweckmäßige und sparsame Nutzung der verfügbaren Flächen" zu achten. "Raumstrukturen, die eine gute Vernetzung der verschiedenen Bedürfnisse der Bevölkerung (Wohnen, Arbeiten, Bildung, Versorgung, Erholung, ...) auf möglichst kurzen Wegen ermöglichen"* sollen umgesetzt werden (ATLR, 2001, S. 47) [8]. Umschrieben mit dem Begriff der "kompakten Siedlung" liegt das

[7] Werte aus der STRUKTURANALYSE 2007. Im Zuge der Novellierung des TROG 2011 werden die Baulandreserven zukünftig zentral vom Amt der Tiroler Landesregierung erhoben und den Gemeinden zur Verfügung gestellt.

[8] Die übergeordneten Raumplanerischen Ziele werden in der "Tiroler Nachhaltigkeitsstrategie 2012 - Leben mit Zukunft" (ATLR 2012) programmatisch für das Land Tirol festgelegt. Dieses Strategiepapier ist der derzeit noch in der Begutachtungsphase und liegt als Diskussionsentwurf vor. Bereits von der Landesregierung rechtverbindlich beschlossen ist der Raumordnungsplan "ZukunftsRaum Tirol_2011 – Strategien zur Landesentwicklung" (ATLR 2011).

übergeordnete Ziel in der Forcierung einer Innenentwicklung bestehender Siedlungsräume. Dies soll primär durch die Nutzung des Gebäudebestandes erfolgen und in zweiter Linie durch "Nachverdichtungen, das Schließen von Baulücken, die Mobilisierung bereits gewidmeten Baulandes und Arrondierungen an Siedlungsrändern" realisiert werden. Des Weiteren sollen *"verträgliche Nutzungsmischungen eine 'Raumordnung der kurzen Wege' ermöglichen"* (ATLR, 2001, S. 58). In der raumplanerischen Umsetzung setzt dies eine konfliktminimierende Anordnung der verschiedenen Nutzungen mit einer Reduzierung bzw. Vermeidung von Puffer-, Abstands- und Ausgleichflächen voraus. Auch wäre die Körnung der verschiedenen Nutzungen klein zu halten, um Distanzen zu minimieren. Gleichzeitig ist es erforderlich, die Dichte im Gleichgewicht mit wachsenden stadtplanerischen, architektonischen und raumökonomischen Qualitätsansprüchen anzuheben.

3.1 Planungsrechtlicher Rahmen

Implizit wird die Aufgabe der Schonung der Ressource Boden in den Zielen des § 27 Abs. 2 Lit. a TROG 2011 [9] *„die Erhaltung und Entwicklung des Siedlungsraumes und die Verhinderung der Zersiedelung durch die bestmögliche Anordnung und Gliederung der Bebauung, insbesondere des Baulandes"* angeführt. Die diesbezügliche Umsetzungsebene wäre jene des Örtlichen Entwicklungskonzeptes ÖROKO (vgl. TROG 2011 2. Abschnitt §§31), welches als Verordnung der Gemeinde die übergeordneten Leitziele zur Gesamtstadtentwicklung sowie die strategischen Vorgangsweisen festlegt. So wird mit dem ÖROKO 2002 der Stadt Innsbruck auch hinsichtlich der räumlichen Entwicklung ein haushälterischer Umgang mit Grund und Boden, mäßiges Randwachstum und verstärkte Innenentwicklung bei gleichzeitigem Erhalt eines funktionstüchtigen Frei- und Grünflächensystems innerhalb des bebauten Gebiets verfolgt (vgl. ÖROKO 2002 S.6).

Explizit angeführt ist das Prinzip des Bodensparens in der folgenden gesetzlichen Zielbestimmung des §27 Abs. 2 Lit. b TROG 2011 *„Ausweisung ausreichender Flächen zur Befriedigung des Wohnbedarfs der Bevölkerung und für die Erhaltung und Weiterentwicklung der Wirtschaft entsprechend dem bei einer zweckmäßigen und bodensparenden Bebauung* […]" sowie §27 Abs. 2 Lit. e TROG 2011 *"die Vorsorge für eine zweckmäßige und Boden sparende, auf die Bedürfnisse abgestimmte Bebauung unter Berücksichtigung der Möglichkeiten verdichteter Bauformen einschließlich der nachträglichen Verdichtung bestehender Bauformen"*. Diese Handlungsanweisungen beziehen sich auf den Bereich der Bebauungsplanung.

Die Ebene der Flächenwidmungsplanung, die prinzipiell für Re-mixing beziehungsweise Durchmischung von Nutzungen im Stadtraum wesentlich ist, wird mit dem § 27 Abs. 2 Lit c TROG behandelt: *„die weitest mögliche Vermeidung von Nutzungskonflikten und wechselseitigen Beeinträchtigungen beim Zusammentreffen verschiedener Widmungen,* […]". Darüber hinaus beziehen sich die Definitionen einzelner Widmungskategorien auch auf dieses Thema.

3.2 Die Flächenwidmung bestimmt mögliche Nutzungsmischung

Funktionale Durchmischung wird in den Zielformulierungen des TROG (siehe oben) eher als möglicher Konfliktfall angenommen und nicht als strategische Herangehensweise zur Umsetzung einer nachhaltigen Stadt. Jedoch sind in den entsprechenden Paragraphen die die Beschreibungen der verschiedenen Baulandkategorien enthalten, die rechtlichen Möglichkeiten der Nutzungsmischung explizit angeführt.

Im Wohngebiet (TROG 2011 § 38) können Grundflächen auch als gemischtes Wohngebiet ausgewiesen werden in denen "öffentliche Gebäude, Geschäfts- und Verwaltungsgebäude, Gebäude für Gastgewerbebetriebe […] und Gebäude für sonstige Kleinbetriebe errichtet werden" können (ebd. Abs.2). Die Kategorien der Mischgebiete (TROG 2011 § 40 mit allgemeinen Mischgebiet, Kerngebiet, Tourismusgebiet und landwirtschaftlichen Mischgebiet) beziehen sich auf die unterschiedlichen Anforderungen der Mischung verschiedener Nutzungen. Bei diesen "Misch-Festlegungen" wird als kleinste Einheit das Gebäude herangezogen. Allerdings ermöglicht eine zusätzliche Widmungskategorie, die einer "Sonderfläche für Widmungen in Teilfestlegungen" nach §51 TROG 2011, auch eine kleinkörnigere Mischung, da auf einer Fläche *„die Festlegung verschiedener Verwendungszwecke für einzelne Ebenen von Grundflächen oder für Teilflächen solcher Ebenen"* zulässig ist.

Auf dessen Inhalt und insbesondere die angeführten Einzelmaßnahmen wird in der Tiroler Nachhaltigkeitsstrategie 2012 auch verwiesen.

[9] TIROLER RAUMORDNUNGSGESETZ 2006 in der Wiederverlautbarung vom 28.Juni 2011

3.3 Herausforderungen der Durchmischung

Auf raumplanerischer Ebene steht folglich ein Instrumentarium zur Verfügung, um Nutzungsmischung im Sinne von ressourceneffizienter Bodennutzung zu berücksichtigen und zu unterstützen. Dies ist jedoch nur ein Teil eines komplexen sozioökonomischen Gefüges, das schlussendlich für städtische Vielfalt und stabile/attraktive Quartiere steht.

So können in der Stadt unterschiedliche Phänomene in Zusammenhang mit Nutzungsmischung beobachtet werden. Im Bestand etwa sind zwei fast diametral gegenäufige Entwicklungstendenzen in Innsbruck (wie generell in fast allen europäischen Städten) erkennbar. Auf der einen Seite ist es gelungen, die bis vor 10 Jahren sukzessive Entmischung der Innsbrucker Innenstadt mit dem Verlust als Wohnstandort hintanzuhalten. Bei gleichzeitiger Stärkung als Dienstleistungs- und Einkaufsort steigt die Einwohnerzahl [10] wieder. Dies wirkt stabilisierend auf den gewerblichen Nutzungsmix ebenso, wie auf die soziale Mischung. Maßnahmen dafür waren Förderungen für Revitalisierung des Gebäudebestandes sowie moderate Nachverdichtungen im Bestand (Dachbodenausbau etc.). Auf der anderen Seite schreitet die Ausdünnung der Versorgungsfunktion in Stadtteilsubzentren, der traditionellen Einkaufsstraßen in den Stadtteilen, mit Freiständen bei den Geschäftslokalen voran. Dies trifft in Innsbruck zum Teil auf die Dorfzentren der sechs eingemeindeten Dörfer (Vill und Igls im Süden, Amras im Osten, Arzl, Mühlau, Hötting im Norden) zu. Gewerbliche Nutzung, Versorgung mit Dienstleistungen und Gütern des täglichen Bedarfs verlieren in Folge einer Konzentration von Handelsstrukturen an Stadt(teil-)Rändern und in der Innenstadt bei gleichzeitig steigender Mobilität der Einwohner die Erwerbsgrundlage. Starke Impulse gegen diesen Trend kommen mitunter von den Anwohnerinnen und Anwohnern selber und der lokalen Kaufmannschaft [11]. Die Initiative im Bereich Wiltener Platzl ist erfolgreiches Beispiel für das Zusammenwirken stadtgestalterischer und stadtplanerischer Investitionen die den Wirtschaftsstandort festigen und zu neuem sozioökonomischen Quartiersbewußtsein führt.

Besonders im Fokus der Stadtplanung stehen derzeit jedoch nutzungsdurchmischte neue Quartiere bzw. Gebäudekomplexe [12]. Aktuelle Entwicklungen zeigen positive Beispiele aber auch Grenzen der Zielsetzung einer durchmischten Stadt auf. Der Zwang zur Innenentwicklung mit höheren Dichten führt grundsätzlich zu einer höheren Komplexität in Planung und Ausführung, was auch in höheren Entwicklungskosten resultieren kann. Ökonomische Faktoren wiederum verursachen teils enorme Forderungen hinsichtlich Ausnutzbarkeit einer Baulandfläche und auch starke Verdrängungssituationen. So geraten bei Mischwidmungen gewerbliche Betriebe aufgrund der erzielbaren sehr hohen Grundpreisrenditen durch Wohnen in ein „Hintertreffen". Gewerblich gewidmetes Bauland ist zwar an sich bereits sehr hochpreisig, jedoch noch wesentlich günstiger als Wohnbauland. Die Baulandpreise, die mit einer Mischnutzung und -widmung einhergehen, sind für Betriebe nicht mehr finanzierbar. Im österreichischen Landeshauptstadtvergleich schneidet Innsbruck sowohl bei Miete, Kauf als auch Grundpreis am teuersten ab [13]. Vor diesem Hintergrund besteht, auch von politischer Seite, der Wunsch, derzeit ungenutzte gewerbliche Flächen im Sinne einer Wohnnutzung umzuwidmen. Die notwendige Vorsorge und Sicherung der Flächen als Basis einer langfristig gedeihlichen wirtschaftlichen Entwicklung werden so mitunter zum Politikum.

Darüber hinaus werden raumordnerische Ziele und Steuerungsmöglichkeiten durch Gesetze aus der Umweltmaterie, insbesondere durch die Gewerbeordnung teils konterkariert. Insbesondere bei Nachbarschaft von betrieblicher/gewerblicher Nutzung und Wohnen entstehen große Herausforderungen an Planung und Umsetzung, um gegenseitige Beeinträchtigungen und Unzumutbarkeiten hintan zu halten. Die streng gefasste Definition von "Zumutbarkeit" und des Status des „Nachbarn" in der Gewerbeordnung können leicht dazu führen, dass gewerbliche Nutzungen–egal ob Bestand oder Planung–eingeschränkt oder sogar

[10] Seit dem Jahr 2001 wurde ein Anstieg von fast 14% auf 5.827 EinwohnerInnen verzeichnet. Quelle: Lokales Melderegister, Statistik und Berichtwesen, Magistrat der Landeshauptstadt Innsbruck, 2012.

[11] Dazu sei auf die „Gute-Praxis-Beispiele" aus Wien (Wallensteinstraße), Lokale Agenda 21 Prozesse und Arbeiten der Gebietsbetreuungen verwiesen und auch auf KRAJASITS 2009

[12] Anm. der Autorinnen: Die intensive Auseinandersetzung in der täglichen praktischen Arbeit der Stadtplanung Innsbruck mit den Herausforderungen im Zusammenhang mit Nutzungsmischung war Anlass für die Reflexion in Form des vorliegenden Textes.

[13] Immobilienpreisspiegel der Wirtschaftskammer 2011: "In Innsbruck werden zwischen 800 und 1.200 € bei höheren Baudichten geboten". Stadtintern kursiert mitunter ein Wert knapp unter der 2.000 €-Marke/m² Baugrund. (WKO, 2011)

verhindert werden, indem durch heranrückende Wohnnutzungen die Betriebsbewilligungen nicht verlängert werden können, da Auflagen zur Vermeidung von Emissionen (Lärm, Geruch, Staub etc.) erforderlich sind. Vor diesem gesetzlichen Hintergrund ist also eine Durchmischung von Betrieben und Wohnen raumplanerisch äußerst diffizil und problematisch zu sehen.

Bei neuen Bauvorhaben und Quartiersentwicklungen, die ein Annähern oder Durchmischen unterschiedlicher Nutzungen bezwecken, ist die Stadt daher wesentlich von kooperativen und bereitwilligen Entwicklern abhängig. Auch, da neben geringeren Gewinnen bei der Verwertung durch eine geplante Mischnutzung mitunter auch noch höhere Aufwendungen für Planung und Ausführung entstehen können, um gegenseitige Beeinträchtigungen zwischen Nutzungen zu verhindern. Raum- und stadtplanerische Ziele zur kompakten, durchmischten Stadt treten dann ungewollt in Konkurrenz zu Renditeüberlegungen und Verwertungsinteressen der Grundeigentümer und Bauherren.

4 STRATEGIEN ZUR FUNKTIONELLEN MISCHUNG

Die Phrase “Re-mixing the city” subsumiert eine große Bandbreite an stadtplanerischen Begriffen, die in ihrer aktuellen Bedeutungsinterpretation durchwegs positiv konnotiert sind: Kompaktheit, Dichte, Urbanität / Lebendigkeit, Ressourceneffizienz, Integration, kurze Wege, (Dienst-)Leistungsvielfalt, Wissenskultur, sozialer Zusammenhalt, Nachhaltigkeit und vieles mehr (vgl. BERGHAUSER PONT, 2010 und KLOOSTERMANN 2009). Für die Beschreibung beziehungsweise Analyse einer Durchmischung der Stadt dienen gängiger Weise die Kategorien Körnung (grain), Dichte (density) und Durchlässigkeit/ Vernetzung (permeability) [14]. Die Körnung unterscheidet die Ebene des Quartiers, des Baublockes, des Gebäudes und auch unterschiedliche Nutzungen innerhalb eines Gebäudes. Bei der Dichte ist zwischen baulicher, funktioneller und Bevölkerungsdichte zu unterscheiden. Durchlässigkeit beschreibt einerseits bauliche Nähe aber auch die Möglichkeit der Nutzungsänderung (vgl. NES 2012). Für diese komplexe Vernetzung von räumlicher Struktur und sozioökonomischen Anforderungen bieten die Raumplanung mit Flächenwidmungsplan oder Bebauungsplan nur zum Teil entsprechende Instrumentarien.

Daher ist jedenfalls positiv zu verzeichnen, dass es in Anbetracht der beschränkten Marktverfügbarkeit von Grund und Boden (und einer sehr fragmentierten Besitzstruktur) in den letzten Jahren gelungen ist, auch die bodenpolitische Tätigkeit der Stadtgemeinde zu verstärkten. Trotz oder gerade wegen des hohen Grundpreisniveaus ist auch das politische Bewusstsein gestiegen, in größerem Ausmaß aktiv Grundstücke zu erwerben - nicht nur für kurzfristige Bedürfnisse, sondern auch im Sinne einer großflächigeren und langfristigen Siedlungsentwicklung und auch, um so (wenn auch eingeschränkt) Einfluss auf die Grundpreise nehmen zu können.

4.1 Das Örtliche Raumordnungskonzept enthält Strategien für eine verdichtete, gemischte Stadt

Trotz der grundsätzlichen räumlichen Unschärfe des ÖROKO ist es gelungen, insb. durch die Einführung der “Besonderen städtebaulichen Entwicklungsgebiete” (BE-Gebiet) ein strategisches Instrument zur integrierten Planung zu schaffen, die auch auf die komplexen Zusammenhänge einer Verdichtung und Durchmischung eingehen kann. Als BE-Gebiete wurden größere unbebaute Baulandreserven, städtebaulich unternutzte beziehungsweise nicht standortgemäß genutzte Flächen sowie größere Baulanderweiterungen ausgewiesen. Die BE-Gebiete selber können einem oder mehreren stadtentwicklungsplanerischen Handlungsfeldern zugeordnet werden. Dies sind Stadterweiterung, Umstrukturierung, Verdichtung und Mehrfachnutzung. Bei der Festlegung wurden folgende Strategien verfolgt:

- gesamthafte Planung und Entwicklung der Gebiete (städtebauliche und / oder architektonische Wettbewerbe, ggf. Realisierung in Etappen)
- Vorgabe der grundsätzlich angestrebten Nutzungen (auch Mischungen) und Sonderanforderungen,
- Realisierung höherer baulicher Dichten zu Gunsten größerer Grünflächenanteile
- Berücksichtigung der notwendigen technischen und sozialen Infrastruktur einschließlich der Grünflächenausstattung

[14] HAUSLEITNER 2010 beschreibt diese Kategorien umfangreich für die Voraussetzung städtischer Durchmischung insbesondere in Hinblick auf (klein-)gewerbliche Nutzung.

- gerechte Aufteilung sowohl der „Lasten“ (Infrastrukturfolgekosten) als auch des „Mehrwerts“ zwischen den Grundeigentümern und der Stadtgemeinde Innsbruck
- Festlegung von Zeithorizonten, in welchen eine Realisierung in Abhängigkeit vom tatsächlichen Bedarf und der Verfügbarkeit der Grundstücke erfolgen soll. Der längste ausgewiesene Zeithorizont stellt dabei die strategische Zurückstellung im Sinne zukünftiger Handlungsoptionen dar.

Die Umsetzung erfolgte stets in enger Kooperation der Stadt mit Bauwerbern und Projektentwicklern. Eine Evaluierung des ÖROKO 2002 als Vorbereitung für die Fortschreibung zeigt, dass die verfolgte Strategie sehr erfolgreich war und auch weiterhin beibehalten werden soll.

4.2 Integrative Planung und intensiver Austausch

Die Rahmenbedingungen und die beschriebenen Strategien des ÖROKO führen dazu, dass im stadtplanerischen Alltag intensiv an kooperativen Umsetzungsprozessen gearbeitet werden muss. Die dabei auch in Innsbruck gemachten Erfahrungen und Einschätzungen wurden bereits im Jahr 2000 u.a. in den Ergebnissen des ExWoSt-Forschungsfeld [15] *“Nutzungsmischung im Städtebau” des Deutschen Bundesamtes für Bauwesen und Raumordnung treffend formuliert: „Die Mischung von Nutzungen in einem Gebäude, beispielsweise Läden im Erdgeschoss, darüber Büros und dann Wohnungen, ist bei vielen Investoren unbeliebt. Sie verursacht höhere Planungs-, Bau- und Bewirtschaftungskosten. Die Modellvorhaben belegen jedoch, dass auch vertikale Mischung an geeigneten Standorten wirtschaftlich tragfähig sein kann, da intensivere Grundstücksnutzung, relativ geringere Erschließungskosten und höhere Erträge der einzelnen Nutzungselemente den Mehraufwand ausgleichen. Widerstände der Investoren gegen Nutzungsmischung sind häufiger auf Spezialisierungen und Routinen als auf ökonomische Kalküle zurückzuführen. Eine wichtige Aufgabe für die Stadtplanung ist daher, Investoren von der Wirtschaftlichkeit von Mischprojekten zu überzeugen.”* (BMVBS, 2000 S.5)

4.3 Umsetzung durch Wettbewerbe und Vertragsraumordnung

Um den Herausforderungen durch Lage, Konfiguration und Dichte qualitätvoll und kreativ zu begegnen, wird seit fast 20 Jahren in Verwaltung und Politik der Stadt Innsbruck eine konsequente Wettbewerbspolitik verfolgt. Dies hat nicht nur positive Auswirkungen auf die architektonische Qualität, sondern auch auf städtebauliche Lösungen. Sehr zufriedenstellende Beispiele gibt es im Stadtgebiet viele, etwa die Universitäts- und Landesbibliothek Tirol, die die Topographie und Lage im Stadtraum geschickt nutzt und statt der ursprünglich städtebaulich unbefriedigenden Situation eines Grabens entlang der Straße nun einen belebten Begegnungsraum schafft [16].

Besonders bei Projekten, die Nutzungsmischungen vorsehen, werden auch die Wettbewerbe sehr komplex: beginnend bei umfassenden städtebaulichen Zielsetzungen und Randbedingungen, die hohe Zahl an zu beteiligenden Personen, das Wettbewerbsverfahren selbst, bis zur Realisierung des Siegerprojektes. Um die so gewonnenen Projektqualitäten auch bei der projektbezogenen Widmung und Bebauungsplanung zu sichern, reicht oft die reine Festlegung im Flächenwidmungsplan oder Bebauungsplan nicht aus. Daher haben sich in Innsbruck privatrechtliche Projektsicherungsverträge bewährt. Hierin können unter anderem spezifische Anforderungen an Konzeption, Ausführung und Ausstattung, die aus der Projektentwicklung erwachsen sind, und die wesentliche Voraussetzung für die Umsetzung des Vorhabens darstellen, verbindlich festgelegt werden. Der Vertrag wird in der Regel direkt an die Beschlussfassung des Flächenwidmungs- oder Bebauungsplanes geknüpft, da die hierin getroffenen Festlegungen oft überhaupt erst durch die mit der Projektentwicklung definierten, flankierenden Maßnahmen fachlich und politisch vertretbar werden. Oft können auf diesem Wege auch Konflikten neuer Nutzungen mit bestehenden Nachbarschaften erfolgreich vermieden werden.

[15] Das Forschungsprogramm "ExWoSt" (Experimenteller Wohnungs- und Städtebau) ist ein Programm des Bundesministeriums für Verkehr, Bau und Stadtentwicklung (BMVBS) und wird vom Bundesinstitut für Bau-, Stadt- und Raumforschung (BBSR) im Bundesamt für Bauwesen und Raumordnung (BBR) betreut

[16] Für Projektbeschreibung und Ansichten sei auf www.nextroom.at verwiesen.

5 DIE BANDBREITE AKTUELLER UMSETZUNGSBEISPIELE IN INNSBRUCK

5.1 Bildung und Konsum unter einem Dach? Ein gelungenes Beispiel!

Besondere Bedeutung kommt der Mischung von verschiedenen Sondernutzungen zu. Als Initialzündung kann dabei durchaus die Umstrukturierung und Mehrfachnutzung im Zuge der Innsbrucker Rathausgalerien bezeichnet werden. Die Verschränkung kommunaler Infrastruktur und Verwaltung mit Geschäften, aber auch öffentlicher konsumfreier Nutzung war herausfordernd. Im Alltag hat sie sich bewährt. Die Rathausgalerien werden trotz privaten Eigentums und gewerblicher Nutzung des Erdgeschoßes als Erweiterung des städtischen Straßenfreiraumes gesehen. Die fußläufigen Quer- und Anbindungen bieten für das umliegende innerstädtische Quartier eine hohe Qualität.

Ein neueres, sehr positives Beispiel einer Stapelung verschiedener, normalerweise sehr flächenintensiver Solitärnutzungen ist das Bundesrealgymnasium in der Au mit dem Einkaufszentrum West. Von städtischer Seite war man auf der Suche nach einem Standort für ein Gymnasium im Westen der Stadt, konnte jedoch keine verfügbare und auch ökonomisch vertretbare Fläche finden. Gleichzeitig gab es konkrete private Projektenwicklungen für ein Einkaufszentrum an einem ehemaligen gewerblich genutzten Standort in diesem Stadtteil. Am Verhandlungsweg wurde in der Folge zwischen Investor und Landeshauptstadt Innsbruck mit dem "Bildungs- und Nahversorgungszentrum Innsbruck West" ein gemeinsames Bauvorhaben entwickelt. Für die vielen Partner (Projektentwicklung Signa Holding, Bundesimmobilien GesmbH als Entwickler für Bundesministerium für Unterricht, Kunst und Kultur und Landeshauptstadt Innsbruck) resultierte dies in einer Win-Win-Situation. Eine offene Gesprächskultur und realistische Zielvorstellungen auf allen Seiten, sowie eine integrative Zusammenarbeit überzeugt durch das positive Resultat. Dies wird auch in einer breitangelegten deutschen Studie zur Nutzungsmischung aus 2000 festgehalten: *„Die wichtigsten Elemente eines erfolgreichen Umsetzungsverfahrens sind eine konsequente und innovative Anwendung des bau- und planungsrechtlichen Instrumentariums und informeller Planungsinstrumente, eine aktive Vermarktung des "Produktes" Nutzungsmischung mit einem effizienten Projektmanagement, die Unterstützung durch die Kommunalpolitik sowie eine intensive Information und Beratung der Träger und Nutzer."* (BMVBS, 2000 S.1)

Abb. 1: Einkaufszentrum West und Bundesrealgymnasium in der Au, Bachlechnerstraße, Innsbruck von Arge Reitter - Eck–Reiter. Aktuelle Ansicht von Süden. Das Luftbild zeigt die stadträumliche Situation der Baustelle: im Kreuzungspunkt verschiedener baulicher Strukturen an einer stark befahrenen Kreuzung.

Das aus einem geladenen Wettbewerb als Sieger hervorgegangene Projekt der Arge Reitter - Eck–Reiter fand für die konträren Nutzungen eines Einkaufszentrum und einer Bildungseinrichtung die entsprechende bauliche Form; bei gleichzeitiger Kompaktheit und Einheit wird eine klare und notwendige Trennung der Bereiche sichergestellt. Der kubische Solitärbaukörper realisiert auf insgesamt sechs Ebenen, zwei Untergeschossen und vier Obergeschossen, für die Nutzer jeweils spezifisch für ihre Bedürfnisse entwickelte, komplett getrennt erschlossene Bereiche.

Die Tiefgarage nimmt das gesamte 2. Untergeschoß sowie etwa die Hälfte des 1. Untergeschoßes ein, die andere Hälfte dient als Verkaufsebene für den Lebensmittelhandel mit Kassenbereichen die direkt von der Tiefgarage aus erreichbar sind. Die dreigeschossige Mall hat insgesamt ca. 13.800 m² Kundenfläche mit über 30 Geschäften und Gastronomiebetrieben. Das Gymnasium wird über eine eigene Eingangsterrasse im 1. Obergeschoß erschlossen, welche ausschließlich vom öffentlichen Straßenraum erreichbar ist. Während das Einkaufzentrum mit Schaufenstern Verbindung zum Außenraum aufnimmt, ist die Schule konsequent nach Innen orientiert und reagiert derart auf den verkehrlich intensiven Standort.

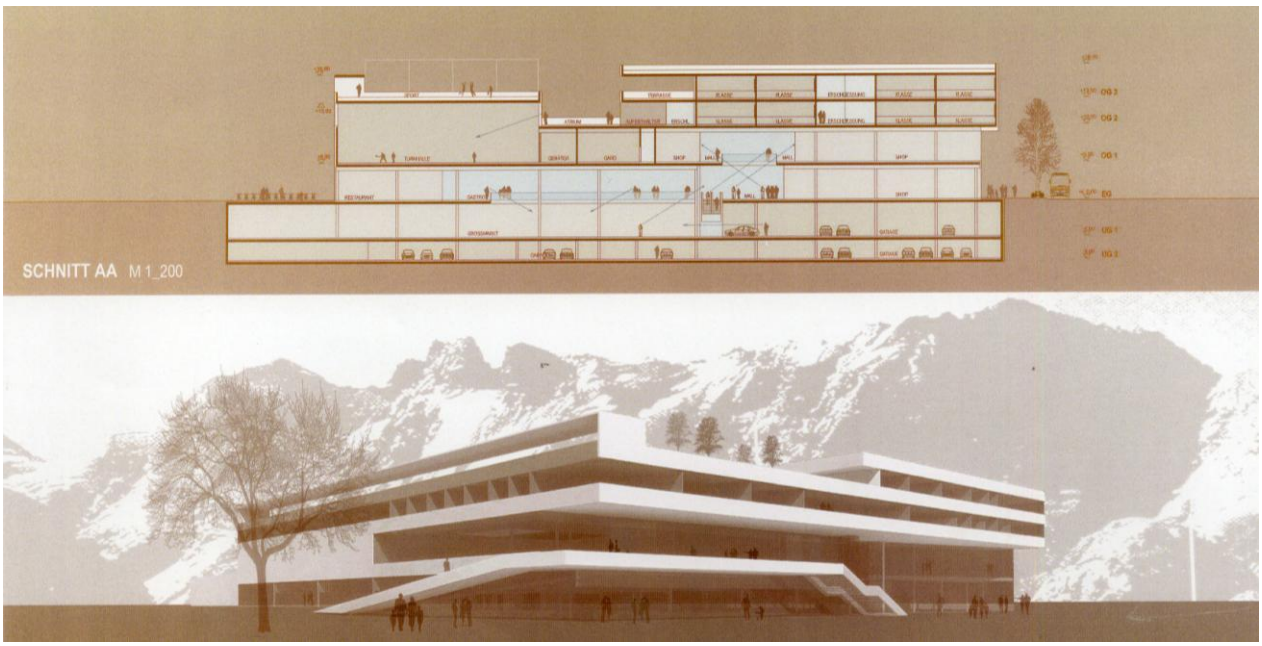

Abb. 1: Einkaufszentrum West und Bundesrealgymnasium in der Au. Abbildungen aus dem Wettbewerbsbeitrag. Der Schnitt zeigt die Verschränkung der Nutzungen in der Gebäudekonfiguration.

Über einem großzügigen Foyer und der Turnhalle befinden sich im 2. Obergeschoß die Verwaltungsräume der Schule sowie die Nachmittagsbetreuung. Durch zwei große eingeschnittene Hofbereiche werden jeweils zweigeschossige „Schuleinheiten" gebildet. Großzügige interne Erschließungszonen mit Aufenthaltsnischen innerhalb dieser „Schuleinheiten" bieten gute Voraussetzungen für Kommunikation, Bewegung und unterschiedliche zeitgemäße Unterrichtsformen. Im südlichen Teil des 3. Obergeschoßes ist über den Verwaltungsräumen sowie der Turnhalle eine Dachterrasse als zusätzlicher Freibereich und Pausenhof angeordnet.

Im Alltag hat sich das ursprünglich sehr kritische gesehene Projekt der Stapelung von Bildung und Konsum bewährt und wird auch durch Mehrfachnutzung etwa der Schulräumlichkeiten immer mehr zum Stadtteilzentrum. Besonders ist auch der ökonomische Nutzen durch Public Private Partnership zu erwähnen.

5.2 Wohnen in gewerblicher Nachbarschaft–Die Herausforderungen!

Die Schwierigkeiten einer Durchmischung zeigen sich dagegen insbesondere bei einer Mischung mit Wohnen. Das hohe Immobilienpreisniveau in Innsbruck verursacht einen großen Druck, Wohnen auf Gewerbeflächen (die über eine entsprechende Widmung, Lage, Nachbarschaft und infrastrukturelle Anbindung verfügen würden) zu realisieren. Dies insb. dann, wenn Gewerbeflächen aktuell nicht genutzt sind und an bereits vorhandene Wohnnutzung angrenzen.

In einer solchen (zum Stadtzentrum orientierten) Randlage eines Gewerbegebietes wurde eine neue Wohnanlage geplant. Das Gewerbegebiet in diesem Bereich weist im Bestand eher mittlere betriebliche Strukturen mit wenig Kundenfrequenz auf. Durch die sehr gute verkehrliche Anbindung sind hier Lagerflächen, kleine Verteilerzentren und spezialisierte Handelsstrukturen zu finden. Es besteht durch zahlreiche Baulandreserven und geringe bauliche Dichten ein starkes wirtschaftliches Entwicklungspotential, dass es langfristig zu sichern gilt. Die Lage für die neue Wohnnutzung konnte zwar nicht als ideal bezeichnet werden, die Entscheidung dafür fiel aufgrund der angespannten Wohnraumsituation und der Möglichkeit, bei der Projektentwicklung spezifische Schutzmaßnahmen ergreifen zu können. Insbesondere zum Zweck der Durchmischung und Innenverdichtung wurde die Wohnanlage daher grundsätzlich auch planerisch vertreten. Durch die bauliche Situierung sollte es gelingen, introvertierte, sich selbst vor Immissionen schützende qualitätsvolle Wohnräume und auch (private) Freibereiche zu schaffen. Zudem sollte ein integriert geplantes Hotel- und Boardinghaus die Puffernutzung zwischen dem bestehenden Gewerbegebiet und der heranrückenden Wohnanlage übernehmen. Der bestehende Bedarf hierfür und das Interesse seitens des Bauherren lies eine gute Lösung erwarten.

Im Projektverlauf, kurz vor Fertigstellung der Wohnungen wurde nun jedoch vom Projektentwickler beanstandet, dass die städtebauliche Situation zu teuer sei, auch die spezifischen Lärmschutzmaßnahmen

(vorgehängte Fassade, etc.) nicht wirtschaftlich seien und dass es ganz grundsätzlich aufgrund der zwischenzeitlich getätigten hohen Investitionssummen nunmehr unmöglich sei einen Investor für die Errichtung und den Betrieb des Boarding-Hauses zu finden. Zusätzlich zeigt sich in der Praxis, dass Bewohnerinnen und Bewohner neuerer Wohnungen - und hier besonders bei Eigentumsanlagen–die hochpreisig verkauft werden, empfindlicher auf mögliche störende Nutzungen reagieren, als dies in bereits gealterten, gemischten Quartieren der Fall ist. Konflikte zwischen der neuen Wohnnutzung und dem bestehenden Gewerbegebiet scheinen daher wahrscheinlich. Hier sieht man - leider idealtypisch - dass Projekte zur Durchmischung nur funktionieren, wenn alle Akteure an einem Strang ziehen, allfällige Restriktionen als Herausforderungen sehen und gemeinsam an evidenten Vorteilen arbeiten.

6 SCHLUSSFOLGERUNGEN

Schien in den ersten Überlegungen "Re-Mixing the City" das Schlagwort für Stadtplanung in Innsbruck zu sein, zeigt die professionelle Reflexion, dass nicht "Wiederdurchmischung" sondern viel mehr "neue Mischung" planerisches Thema ist.

Grundsätzlich basiert und passiert Mischung in unterschiedlichen städtebaulichen Körnungen, vom Quartier bis auf die Ebene des einzelnen Gebäudes. Die Nutzungen regieren unterschiedlich in den verschiedenen Maßstabsebenen. Innerhalb des Gebäudes sind Mischungen von Wohnnutzungen und gewerblicher Nutzung–leider auch mitunter durch die Vorgaben der Wohnbauförderung oder des Umwelt- und Gewerberechtes–oft Herausforderung oder nicht realisierbar und auch im Alltag schwer dauerhaft aufrecht zu erhalten. Im Stadtraum zeigt sich dies in Leerständen von vorher oft mühsam verhandelten Gewerberäumlichkeiten in Wohngebäuden. Grundsätzlich ist daher die *„funktionale Verflechtung zwischen Wohnen und Arbeiten […] gering. Die räumliche Einheit der Lebensbereiche im Alltag existiert kaum."* (BMVBS, 2000 S.5) Positiv bewährt hat sich vielmehr eine "additive Nutzungsmischung" (vgl. ebd.), die Nähe von unterschiedlichen Nutzungen.

Dagegen gibt es gute Erfahrungen bei der Kombination von Sondernutzungen mit gewerblichen Nutzungen. Sowohl in der Planung, der Umsetzung und auch der Verwertung muss eine dauerhafte Nutzung gesichert sein. Denn es sind nicht nur Vorteile mit einer Nutzungsmischung verbunden. Mischung bedeutet generell, sich im positiven Sinne zu arrangieren (vgl. FOORD, 2010). Voraussetzungen für eine Realisierung sind immer ein Interessensausgleich und dieser verlangt Innovation, Kreativität und Mut zu Neuem auf allen Seiten.

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🏆 *reviewed paper*

Strategic Forecasting and Planning that City Planners can do Themselves: Examples of Simple but Powerful Visual Techniques for Specifying Urban Outcomes in Growing Metropolitan Regions

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1 ABSTRACT

Where urban regions are growing and changing quite rapidly, effective metropolitan strategies should be supported with quite detailed projections and descriptions of the region's future subregions, districts, centres and neighbourhoods.

These descriptions should include, for instance, detailed and explicit forecasts, targets and specifications of future population densities and distributions, of future patterns of land use, and of the future social characteristics of neighbourhoods and districts. This detail is not a 'blueprint' or masterplan: it provides a meaningful picture of one possible set of outcomes of the present metropolitan strategy. These kinds of pictures are essential if stakeholders are to engage in a meaningful dialogue with the planners and decision makers. Perhaps even more importantly, these pictures can be continuously refashioned and updated as policies change and as the real city evolves. Without such a detailed picture of the future urban region, metropolitan strategies are not only vague and 'broad brush', but also inaccessible, weak, unconvincing and unable to influence the powerful actors who shape the future region through their day-to-day investment decisions.

This paper presents three concrete examples of visual techniques for exploring and anticipating the future spatial characteristics of the urban region, techniques which are quite powerful but simple enough for the planners to use themselves, thus avoiding forecasts, population projections and scenarios which are driven by the practices and demands of other disciplines.

2 MOTHER OF INVENTION

2.1 Challenges and opportunities

The modest ambition of this paper is to present three examples of the visualisation of metropolitan development to support the formulation of strategic metropolitan policy.

Each example begins with standard demographic and spatial data. Through simple manipulations, the data is transformed into 'operational graphs', 'operational charts' or 'operational maps'. In this form, standard metropolitan data is used to present policy issues in a visual form. More importantly, these 'operational' formats can become live tools for shaping and testing policy.

The experiments that led to these tools were prompted by specific problems. Metropolitan planners in Perth, Western Australia, work within a longstanding tradition of strong regional planning. They have comprehensive statutory powers, bipartisan commitment from governments and a high level of community support. (A description and explanation for this happy situation can be found in Dawkins (2009), written when the author was executive chairman of the Western Australian Planning Commission.) Nevertheless, in the mid-2000s the planners had no effective responses to a number of important policy opportunities.

A centre-left state government – effectively the metropolitan government of Perth, almost solely responsible for urban development, hard and soft infrastructure and urban services, and equipped with an integrated land, transport and urban planning portfolio led by a smart and energetic minister – had won the public argument for a 'sustainable' Perth: impeding sprawl, densifying existing built areas, privileging public transport, expanding the well-equipped and well-run urban rail and bus systems, developing new 'activity centres' and 'activity corridors', and adopting stronger measures to protect water resources and biodiversity (WAPC 2004).

This was a historic opportunity to foster new forms of urban development, and to reverse long-term patterns of low-density car-based suburbs, dispersed employment, poorly located centres of intense activity such as university campuses and hospitals, and a demand-led approach to the provision of land, roads, water, power, etc. Given the role of the state government as the funder, regulator or provider of all these things, and given the high level of legitimacy enjoyed by the state's planning agency, the Western Australian Planning

Commission, there were few institutional or political impediments to major changes in policy and performance. Furthermore, the growth of the metropolitan region, propelled by China's appetite for the energy and mineral resources that Western Australia has in abundance, meant that new policies were not only urgently needed but would have a rapid impact. (A reasonable way to characterise the situation was to say that Perth was halfway through a century of growth, and would grow from 1.5 million to 2.5 or even 3 million by about 2050.)

2.2 Opportunities not taken

If they were to lead this transformation of planning in Perth, the planners would need to do a number of things.

- Firstly, the planners would need to propose how the distribution of the population in the Perth region would change with growth. If the inner and middle areas were to resume the growth that slowed and stopped a few decades ago, how soon, at what rate, and to what degree would 'urban consolidation' impact on their current character? If the outer areas were to slow down and stop growing, how soon and at what rate would this happen? The planners would need a plausible method for arriving at population 'targets', and a method for depicting patterns of growth over time.
- Secondly, the planners/policy makers would need to propose concretely how the existing patterns of urban and suburban development would change, and what the new urban living environments would be like. They would then need to find a way to communicate this to all the stakeholders.
- Thirdly, the planners would need to conceptualise the intended structure of the metropolitan region over time, and find a way to depict it and communicate it.

Over a period of years the Western Australian Planning Commission pressed the Department of Planning and Infrastructure, which provided the Commission with planning services, to undertake the above tasks. No progress was achieved. There appeared to be several reasons for this failure to act. The transference of power from heads of technical departments to ministers, a transference which occurred in most countries with 'representative government' systems during the latter third of the last century, weakened the public sector and led to a serious loss of capacity in departments such as the Department of Planning and Infrastructure. In the period examined in this paper, 2004-2008, the very competence and confidence of the minister only made matters worse. Metropolitan and regional strategic planning is a fairly fragile art with few expert practitioners, so the loss of capacity in this area was nearly total. There was no-one to challenge the demographers and other specialists, who operated their black boxes to produce population projections that were largely impervious to policy objectives.

The projects briefly described and illustrated in this paper were my response to this unfortunate circumstance. The projects – part demographics, part new policy, part persuasion, part graphic communication – were undertaken to demonstrate by example the possibilities of new policies and new ways of communicating them through simple visualisation techniques. They are not offered as more than this, and certainly not as a comprehensive set of regional planning tools.

3 DISTRIBUTING FUTURE POPULATION

3.1 First, meaningful pictures of the past

We worked with readily available statistics on population and households: those for each of the local government areas in the metropolitan region. We could have used statistics of a much finer grain based on census collector districts of roughly 400 households each, but such high-resolution data was not necessary or appropriate. We could have created a different geography, for instance a grid of urban cells. As it happened, the number of local government areas in the region, thirty-two, were sufficient to provide a reasonable mid-resolution picture of the region, and in any event were the obvious areas to work with since the politicians and communities of each of the local governments had to be persuaded that our 'targets' were plausible, probable and acceptable.

We worked with census data from 1961 onwards, because that was within a decade of when post-war growth really took off, and was when the national census settled down into a regular pattern of five-yearly censuses. In each presentation we depicted data for the census year until 1996, and then used both census data and

annual intercensal estimates for the years 1997 to 2007. (Due to local government boundary changes, each graph needed two small boxes to explain sudden changes in trajectories: the boxes said, 'From 1991 the population of "Perth area" splits into Perth, Cambridge, Victoria Park and Vincent' and 'From 1998 Wanneroo splits into Wanneroo and Joondalup. Their respective populations are shown from 1991' respectively.)

For those with a deeper interest in how Perth had developed into its present form, we drew the graph for population change over the previous period, showing the actual number of people by which the local government area increased or decreased in each interval (figure 1). The graph shows significant and unexpected volatility (as different areas were developed and the market changed) and presents a visual impression of when local government areas took off – reflecting Perth's planned frontal expansion – or when they started losing population.

We translated the data into growth rates for each of the intervals (figure 2). While the older suburbs were losing population, there is a clear picture of the new suburbs, in turn, experiencing initial high rates of growth, then decaying gradually until a generalised growth spurt in the late eighties, a time of resource-based economic expansion. The graph demonstrates that growth rates can be highly misleading (rates are a ratio related to the base population, and are correspondingly larger in small local government areas) and at the same time revealing: a small council with a modest population increment is still faced with major challenges if the rate is high.

We depicted the extent to which the different local government areas shared in metropolitan growth (figure 3). Again, there are surprising variations and volatilities, at odds with expectations and conventional wisdom, with local government areas swapping places from census to census. Overall, the graph dramatised how, at any one time, the share of metropolitan growth was dominated by a few outer urban areas.

Finally, we showed the total number of people, at each interval, in each local government area (figure 4). Overall, this is a picture of exponential growth, although local government areas started to grow at different times in the past 45 years. The growth curve of individual local government areas rises and then flattens out: this can be seen in the graph. A number of interesting cases stand out: for instance, three fully developed middle-ring local government areas remain largely stable in the twenty-thousands for four decades, yet the distinct upward movement of one of them in recent years can be taken to foreshadow future demand for inner-city living in all three.

This fourth graph depicted the familiar measure of the total number of people in each of the 32 local government areas, that is, population as commonly understood. This became the benchmark for the next phase of the project, exploring desirable distributions of the regional population in the future.

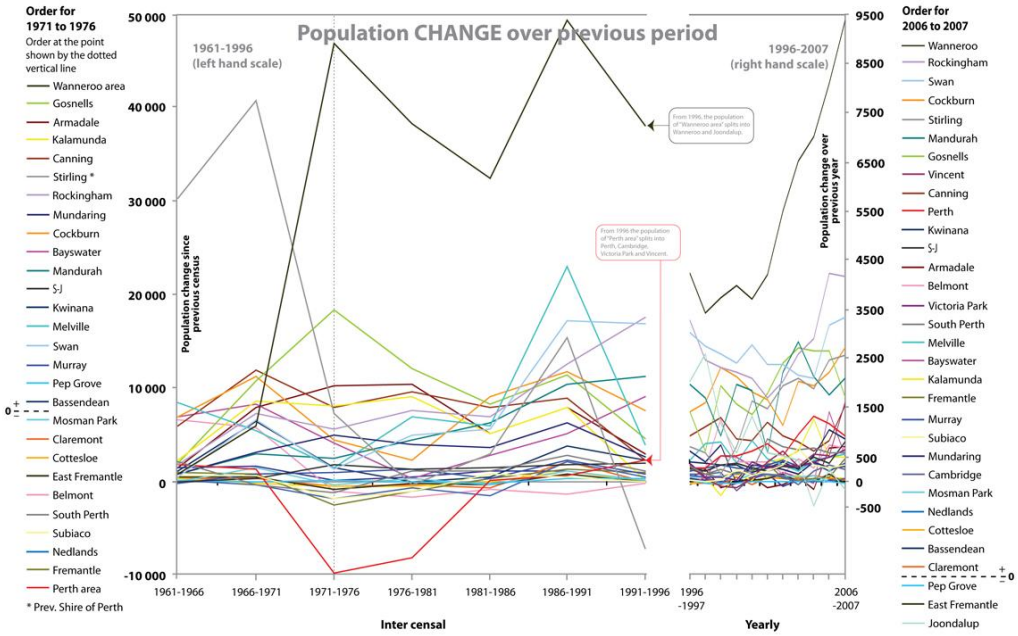

Fig. 1: Population change in local government areas in the Perth metropolitan and Peel regions from 1961 to 2007 (Dawkins and Matan 2008a, p. 7)

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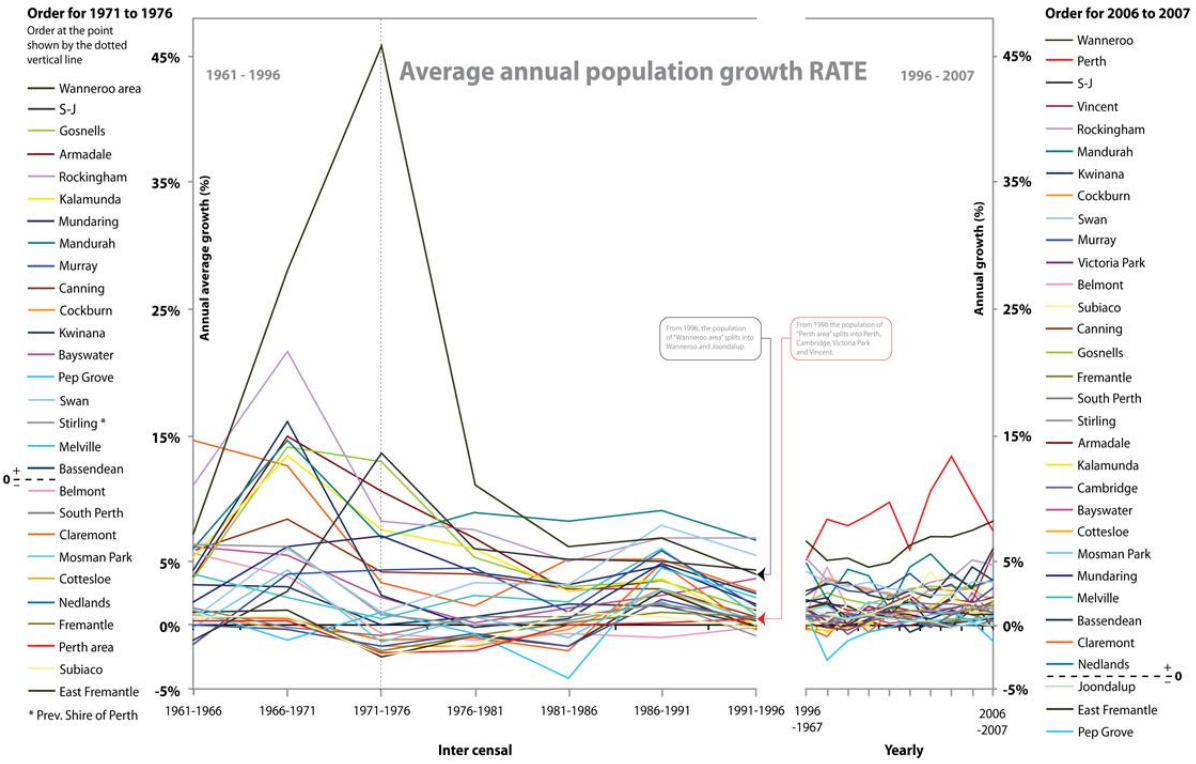

Fig. 2: Average annual population growth rate by local government areas in the Perth metropolitan and Peel regions, 1961 to 2007 (Dawkins and Matan 2008a, p. 9)

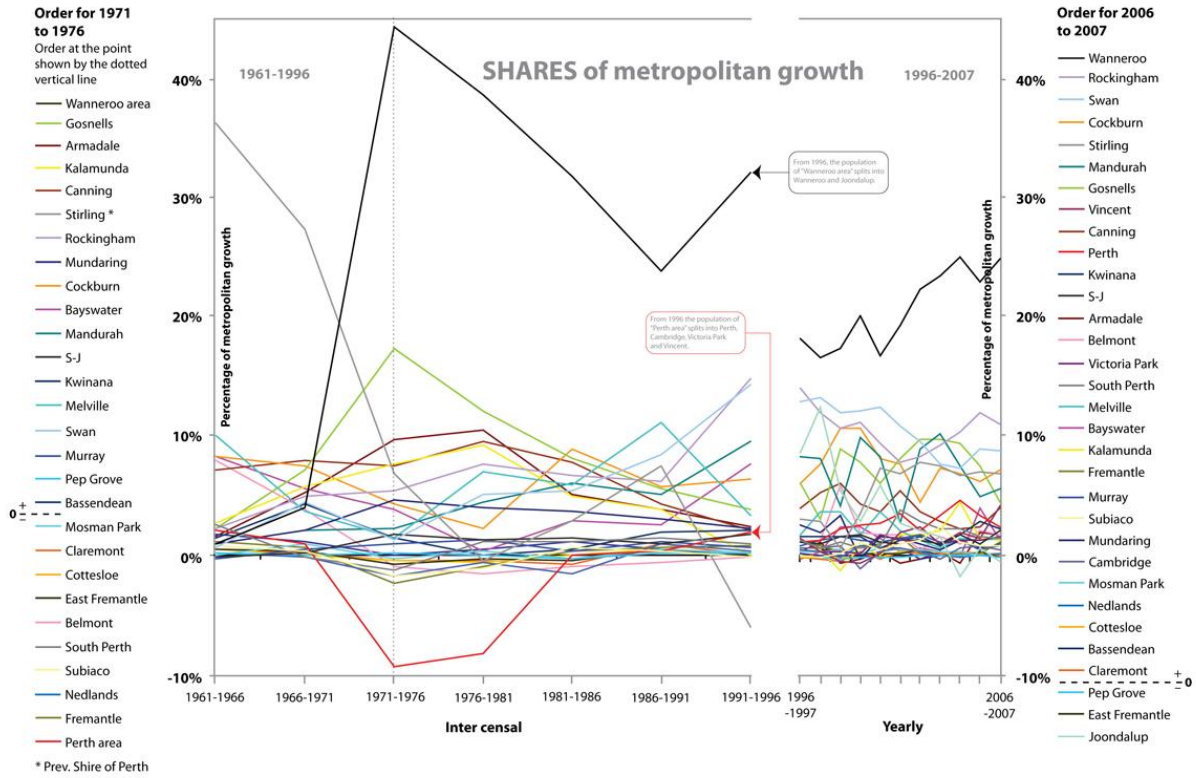

Fig. 3: Shares of population growth in local government areas in the Perth metropolitan and Peel regions from 1961 to 2007 (Dawkins and Matan 2008a, p. 11)

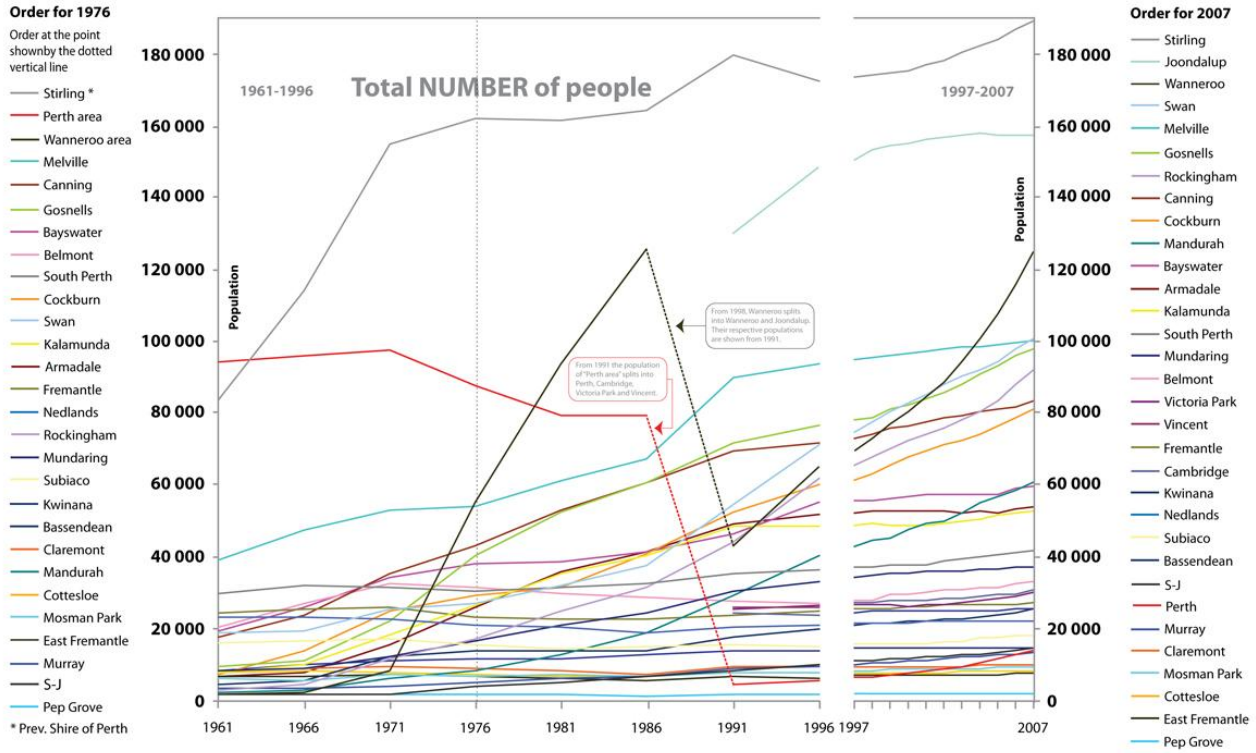

Fig. 4: Population in local government areas in the Perth metropolitan and Peel regions 1961 to 2007 (Dawkins and Matan 2008a, p.13)

3.2 Then, a policy for the future

The demographers in the Department of Planning and Infrastructure used sophisticated methods for allocating the population projections of the Australian Bureau of Statistics to smaller areas, and specifically to Perth's local government areas. They carefully analysed past development and density patterns, and calculated potential capacities based on local zoning and development standards (figure 5). This generated accurate projections only if all these assumptions were correct, and no transformations in policy and performance took place. In other words, the official projections showed us what we did not want Perth to become. Despite this, the demographers regarded any other form of projection as unscientific: they seemed to have no tools with which to assist the planners to project the outcomes of alternative policies, except through mechanical measures such as future zoning changes. Perhaps under this influence, the planners separately attempted to derive various small-area population projections based on simple mathematical formulae, for instance adjusting growth rates down for outer areas and up for inner areas, or applying factors based on, for instance, the number of train stations in a local government area. They were uncomfortable with the idea of subjectively applying a combination of local knowledge and known policy objectives: any projections (no matter how much at odds with commonsense) had to be arrived at by the application of 'objective', numerical methods. The result was a set of projections which, for instance, treated all inner and all outer areas the same, despite fundamental differences in policy terms, and which contemplated sudden step changes in growth rates as a result of the application of notional growth factors.

A novel approach was called for. This could be called a 'planning' approach: subjectively combining a detailed knowledge of the region and its component parts with a clear view of policy objectives. How to apply this approach? The method chosen was a form of reverse engineering, by directly shaping the population curves of each local government area to reflect policy objectives. Specifically, the curves are generated by a table of populations for five-year intervals to 2050 for each of the 32 local government areas. The value of each cell is manually adjusted, with the only hard constraint being no change in the total population for the region in any year: the curves are literally shaped to produce the most appropriate picture of population change across the region. The resulting set of curves in figure 6 has the following characteristics.

- Interval by interval, a plausible change is proposed based on explicit policy objectives (slow outer growth, densify inner areas, intensify future major centres including those on the fringe, recognise

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growth moving from north to south, strengthen activity corridors, etc) and on a feel for momentum and inertia resulting in development lagging behind policy changes.

- At each of these intervals, for each local government area, the population estimates are based on explicit quantifications of greenfield suburban development, exurban development, intensification of centres, urban infill, and wholesale redevelopment, depending on the nature of the local government area.
- At all times, the total population of the region remains the same as that in the official projections (these are zero-sum redistributions of the population between local government areas).
- Unlike the step projections calculated by other methods, these curves can generate smooth year-to-year, or even month-to-month, population projections (targets).
- The curves are alive: anyone can fine-tune the curves (by adjusting the values in the cells of the table) to propose alternative outcomes, or test scenarios, or to illustrate alternative assumptions and alternative policies.
- At the same time a strict discipline is imposed on the testing of such alternatives: local governments cannot aspire to higher populations (in the case of the booming outer areas) or resist densification (in the case of inner areas) without showing all the gains and losses amongst the other local government areas.

As an aside, it may seem to some readers that the difference between figure 5 and figure 6 is inconsequential. Coming to that conclusion would be to misread the graphs (perhaps because the graphs, admittedly, remain hard to read) or to underestimate the challenges of overcoming momentum, inertia and path dependency in order to reverse current trends in metropolitan growth. The targets depicted in figure 6 are actually bold, even heroic, leading to an ever-widening gap between the intended structure of the region and the business-as-usual region.

For want of a name, figure 6 is an example of an 'operational graph'. Manipulations are carried out by modifying the cells in the associated table of populations, generating a visual and (with a bit of effort) readily understood picture of the regional population over time, and at the same time allowing the population of each local government area for any given year to be read from the table.

This is just an illustration. The same manual-visual technique can be used for larger and smaller areas, for traffic, for housing types, for urban hierarchies, for commercial centres, for the distribution of jobs, etc.

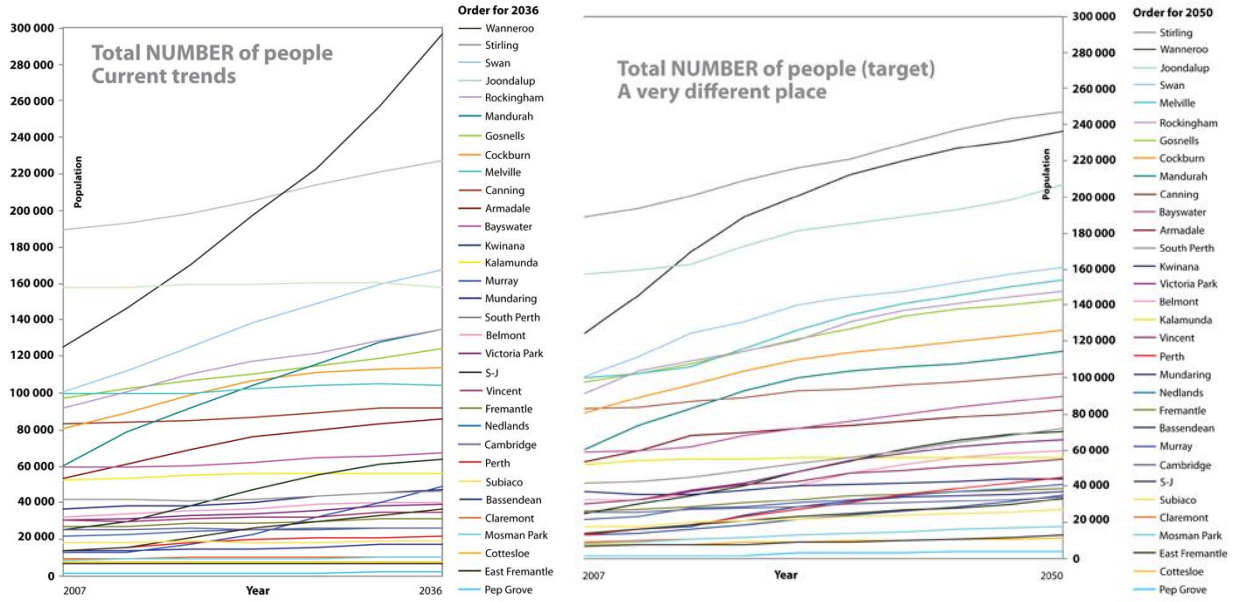

Fig. 5: Official population projections (based on continuation of current trends and policies) (Dawkins and Matan 2008a, p. 14). Fig. 6: Population targets for Perth's local government areas to 2050, (extract from 1961-2050 graph) (Dawkins and Matan 2008a, p. 17)

4 PROFILING URBAN PLACES

4.1 First, x-raying the urban area

In the mid-2000s Perth had an opportunity to begin a significant reconfiguration of the metropolitan region, fundamentally changing the outcomes of the rapid growth that would characterise the next several decades. To better understand the past and present anatomy of the region, and to more concretely describe the forms of urban area that might be possible, it was essential to go beyond averages, norms and generalised patterns. Tradition and habit made this almost impossible: the practice was to write planning rules without feeling any need to first understand the complexity of existing urban areas and processes, to prescribe the future without closely investigating past and present growth trajectories, and to work with coarse tools, such as 'residential', 'commercial centre', '15 dwellings per hectare', etc. (Worse, when measuring or prescribing dwelling density, as in '15 dwellings per hectare', there was no recognition that values can vary by orders of magnitude depending on what kind of 'hectare' forms the denominator of the ratio: site, neighbourhood, local government area, etc.) These practices, which made it nearly impossible to understand the starting point of any development strategy, or to work with the dynamic forces shaping the new built environment, simply meant that regional policies and strategies were not going to change what would happen in any event.

Novel tools were needed to expose the rich complexity of the urban area behind the bland, broad-brush descriptions and proposals. The necessary inputs were readily available.

- Census data was available from the Australian Bureau of Statistics giving household characteristics for each of 3000 collection districts in the region (200-300 households per collection district). For regional analysis this resolution was ideal: both sufficiently fine and sufficiently manageable to reveal the 'DNA' of the region.
- Simple land use data was also available: the state government's Valuer General regularly valued every land parcel in the state, and from field surveys assigned a land use code to every land parcel in their geographic information system.

Accessing the digital and spatially-referenced raw data, we were able to construct tables of broad land use, dwelling density and household size (more strictly, persons per dwelling) for every collection district. To test the methodology, we chose thirteen diverse 'places', each of 53 collection districts. These sample areas constituted an interrupted transect from the northern fringes of the metropolitan region through new suburbs, post-war suburbs and older suburbs to the mixed inner areas and the dense core, the City of Perth.

This analysis was able to provide remarkable insight into the richness of what might have seemed to be a fairly uniform built environment, and to reveal patterns that were otherwise hidden by cruder characterisations of the region. These insights and patterns are presented and discussed in detail in Dawkins and Matan (2008b). There is space here only to provide a glimpse of how the data was presented in a visual form, using data for two of the thirteen places, Subiaco, an attractive, diverse inner area with rich urban, social and environmental resources, and North Joondalup, a newer, more distant area with uniform, low-density residential areas and a planned commercial centre on its way to becoming a subregional CBD (figure 7).

- Land use – the proportion of each collection district used for residential sites, roads and 'other', that is, everything else – was shown in charts for the thirteen places. Each chart became a kind of profile showing similarities and differences between the individual collection districts; the bars at either end gave the resulting land use proportions for the whole 'place'. The charts were assembled on one page so that the similarities and differences in the land use 'profiles' of the thirteen places could be explored and explained.
- Dwelling density was shown in two graphs across the 53 collection districts of each place, one plotting dwellings per residential-site hectare (often inexactly referred to as net density) and the other plotting dwellings per collection district hectare, in other words dwellings divided by the area of the collection district in hectares (equally inexactly referred to as gross density). The graphs also showed, as lines, the averages of these measures, that is, dwellings divided by the total area of residential sites in the place, and dwellings divided by the total area of the place.

- The sizes of households were estimated by showing, for each collection district, the number of dwellings (light blue bars in the lower charts of figure 7) and the number of people (dark blue bars), then resolving this into a graph of persons per dwelling across the collection districts, and persons per dwelling for the whole place.

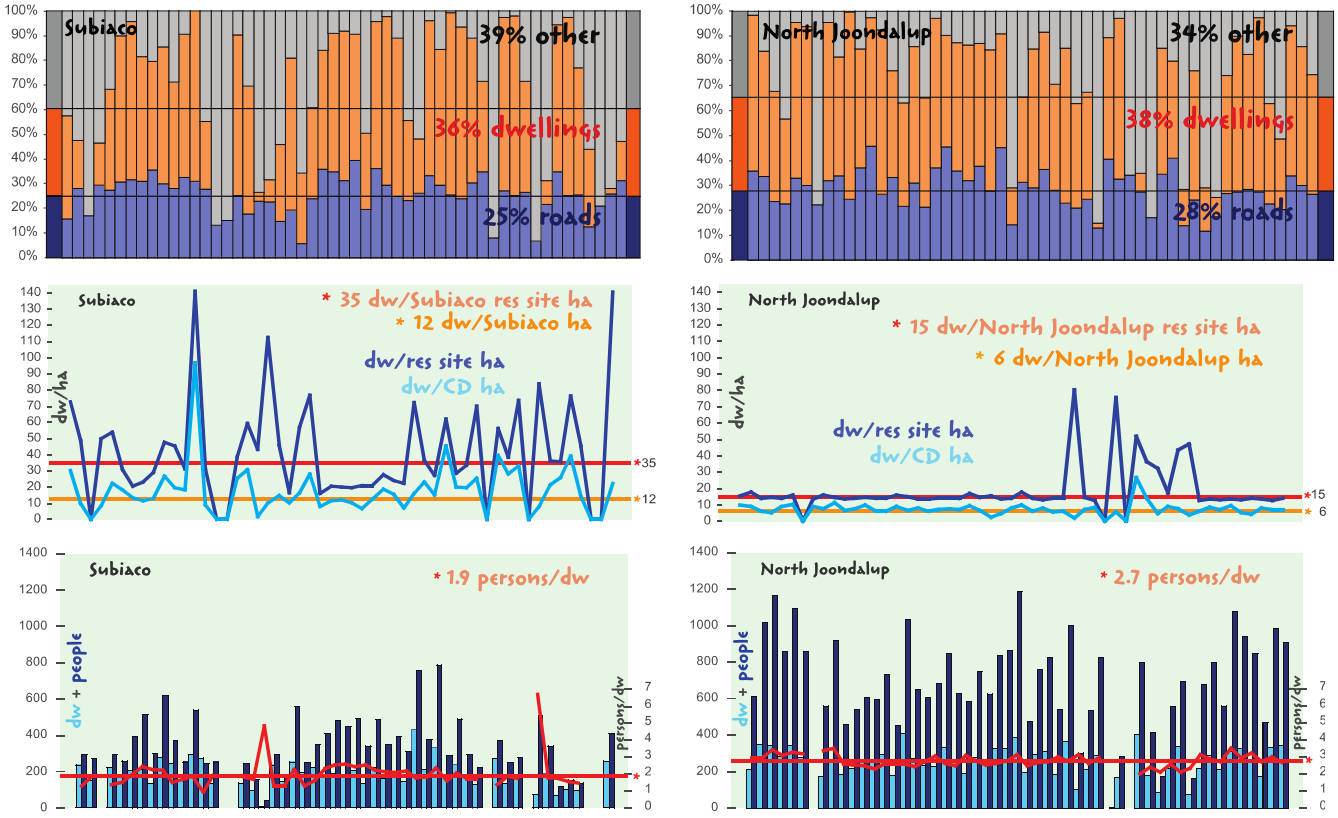

Fig. 7: Land use, density and household profiles for two sample places in the Perth region (Dawkins and Matan 2008b, pp. 13,15, 19)

The three pictures, or profiles, of each place can be read vertically: the collection districts are arranged in the numerical order assigned by the census bureau, so the land use, density and household characteristics of any one collection district correspond vertically. The pictures can be read horizontally, in the sense that the land use, density and/or household profiles of Subiaco can be compared with those of North Joondalup. Assembled on one page, as in figure 8, the pictures present the possibilities of the region, inviting comparisons and the identification of typologies.

Particularly in the case of the density profiles, there is a remarkable convergence between plotting the data and visualising the actual place it refers to. Subiaco is a diverse, mixed inner-city area with areas of high and low density residential use, and diverse areas of non-residential use. The density profile almost allows the cityscape to be imagined. In North Joondalup, much of the place is single-storey, single-family housing, producing the flat lines of most of the area, but it also has the emerging CBD, which is represented by a cluster of collection districts with dense residential development. This convergence is of course most noticeable in the City of Perth, where residential development is confined to high-density enclaves, and produces a pattern that resembles the CBD skyline. The City of Perth also illustrates the potentially large gap between dwellings per site hectare (101 dwellings/site ha) and dwellings divided by the area of the whole place (only 6 dwellings/City of Perth ha) (figure 8).

4.2 Then, designing new urban forms

The findings of this exercise in profiling urban areas included the following.

Even this relatively simple data can provide a typology of places as guides to new and revitalised places. Should East Wanneroo be more like Subiaco, or Vincent, or Joondalup? East Wanneroo should be a new urban form, but how do these places provide models to identify the differences intended for East Wanneroo? What is the broad land use pattern likely to be? What is the diversity of neighbourhoods in terms of land use

mix, dwelling types and densities, and household types and sizes? Plans that do not attempt to answer these questions, even tentatively, are hardly plans at all.

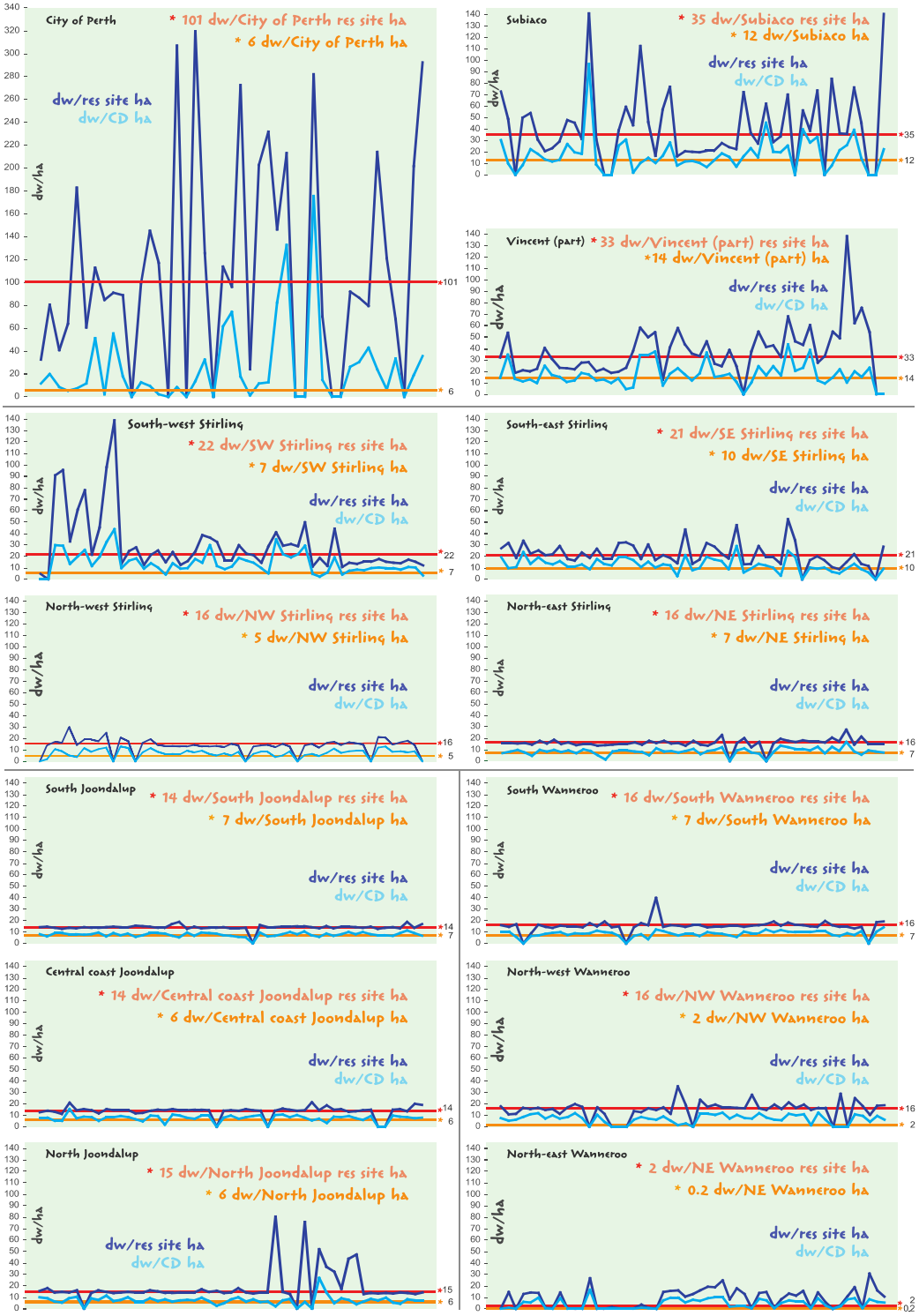

Fig. 8: Density profiles for thirteen sample places in the Perth region (Dawkins and Matan 2008b, pp.15)

What other places in the region can develop some of the characteristics of the City of Perth? Can we reproduce, in other activity corridors and urban areas, some of the land use mix, the dwelling diversity and density and the household patterns of Subiaco? Is Vincent a reasonable model for new and revitalised urban areas? Is it appropriate to see the profile of SE Stirling as a baseline from which to plan new urban areas? Should the precincts being developed around new rail stations have aspects of the profiles of Subiaco, or Vincent, or SE Stirling? How will their profiles differ? Likewise, what should be the profiles for Stirling Highway, Canning Highway, Guildford Road? Which of these profiles are appropriate for the centre and inner areas of Mandurah and for the corridor between Mandurah and Pinjarra? How will the profiles for the Cockburn Coast, Alkimos, Keralup, Wungong, the hills, etc, reflect or differ from the thirteen places in the transect? (Dawkins and Matan 2008b, p. 24)

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All of these questions invite planners to not only use the profiles as typologies or partial typologies, but to test new alternatives and manipulate the profiles into new forms. In short, these charts and graphs are 'operational', like the population graphs discussed earlier. If planners are anticipating, or designing areas for, specific mixes of land uses, residential forms and households, all this can be depicted – visualised – in this manner. The proposed pattern of uses, densities and households can be created as notional collection districts, then plotted and graphed so that comparisons with existing, profiled places can be made, and further iterations of the notional places can be carried out.

As with the earlier example, this exercise in picturing the characteristics of urban places is just an illustration of technique and potential. The project report said that the 'search for a typology needs to be comprehensive and therefore include more types of places…and the profiles need to include the age, qualifications, occupation and purchasing power of the people in each collection district. These are relatively minor extensions of the matters explored in this paper' (Dawkins and Matan 2008b, p. 25).

5 DEPICTING THE STRUCTURE OF THE METROPOLITAN REGION

The map in figure 9 illustrates a novel way to visualise the characteristics of the metropolitan region. Typically, a regional map which attempts to show policy or strategy uses simplifications such as symbols to represent different centres in the centres hierarchy, uniform corridors, growth paths in the form of arrows or something similar. These kinds of strategy map cannot even hint at the richness and complexity of the real world. Their idealised simplifications, often not even based on an attempt to characterise how the city is presently structured or how it is presently evolving, provide little guidance for action and intervention. Strategies presented in this way are inaccessible to stakeholders, unconvincing and unable to influence the powerful actors who shape the future region through their day-to-day investment decisions.

In contrast, the map in figure 9 attempts, despite its own simplifications, to capture the fuzziness of the urban area, it transitions, its range and spread of denser and more intense areas, none of which have discrete locations and hard edges, and most of which do not conform to idealised notions of the metropolitan structure.

The map is also 'operational'. It lends itself to the building and testing (in a qualitative manner) of alternative scenarios – for instance, more growth north than south, greater or lesser degrees of expansion, this corridor rather than that… Given access to the graphics file, planners can change the parameters, modify the growth patterns, and produce different metropolitan regions. Each is a picture, and can support discussion and debate through semi-realistic images of the future region.

6 CONCLUSION

Planners often lack simple techniques for presenting to the public a meaningful picture of what their locality or district or subregion will be like. To the extent that forecasts and depictions of the future urban region are provided at all, they are generated by demographic and other experts in ways over which the planners have little control, and which often claim to be exact and precise, with little responsiveness to changes in policy and preferences. If the planners had simple visual methods for depicting the future region to the politicians and the public – and if they can show both how those depictions were created and how they can be continuously adjusted and adapted as preferences, priorities and politics change – discussion of the strategy would take on greater reality, and politicians would be less concerned about being trapped in specific promises.

This paper has merely sought to illustrate three such techniques. The salient feature of all three is that they are policy oriented, attempting to translate into visual forms the subtle, possibly abstract, and sometimes complex issues of metropolitan strategy. All three are 'operational', in that they invite live modification, to test alternatives and explore options.

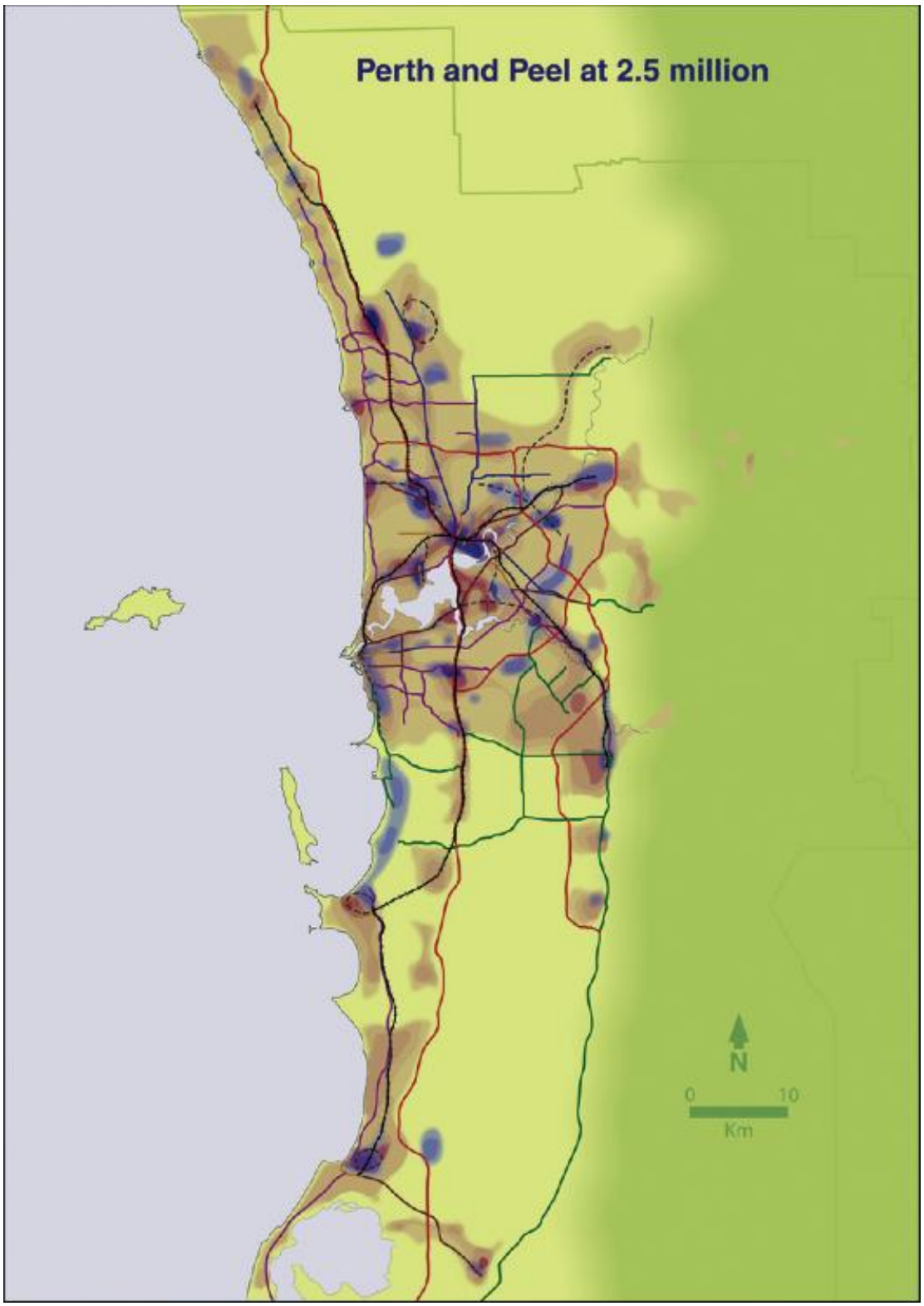

Fig. 9: A visualisation of urban densities, and the intensities of activity centres and corridors, in Perth in 2050 (Dawkins and Matan 2008a, p. 21)

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🏆 *reviewed paper*

Studying Industrial Symbols in Contemporary Shiraz Urban Landscape

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1 ABSTRACT

Before industrial revolution, city's identity was based on their continental specifications and life patterns according those specifications. That is geography that determining economic and livelihood processes, specified social interactions manners and its skeleton sight means architecture and civilizing. But by deploying industry and propounding mass-products, new live advantages were formed that didn't see themselves in limit continental frame. Based on it, new social interactions were formed that in their architectural expression added new organs to a city body. Modern architecture is a product of those conditions. Industry language as a life style and an architecture style encountering to tradition language created new conditions. In some fields like religious spaces, conquest was by tradition language, and in spaces like factories and offices victory was by industry language. City of Shiraz as a city with known cultural and architectural tradition has passed almost one century history in industry experiment. So as one of Iran's industrial poles, presents industry language as a part of its traditional language. In this new situation, how can be industrial symbols symbiosis with traditional symbols in Shiraz view? In this article, by surveying city designing projects, gardens, cultural buildings, industrial museums, restaurants, and houses in Shiraz, we study the role of industry and its encountering methods to traditional symbolic system and survey these buildings success in absorbing tourists and public fortuity. It is memorable that, buildings are studied in this research, as contemporary buildings compete with ancient buildings in absorbing a tourist has come to Shiraz for visiting a traditional place and they have accepted as Shiraz new landmarks.

2 INTRODUCTION

During the agricultural and animal husbandry revolution, continental differences caused economical, cultural and inevitably architectural differences among nations. As after industrial revolution, likeness in economical processes, dictate a universal position to culture and architecture, there have been many different materials and construction style in traditional architecture, vary from herbal stem to mountains, in modern time in all of the geographical latitudes, metal and concrete define contemporary structures. Factories with wide outlets and big but plain programs in planning made the possibility of position and necessity of the new structural techniques at the first of modernism. Bolton and Watt foundry factory was the first building in which spikes and piles made of iron were used simultaneously. That steam engine manufacturer which made the industrial revolution heart to beat. Is one of the reasons of structural innovations that built architectural basis on industry, shows the modern architectural harmony with industry in history beginning of these two constituent elements of contemporary civilization. In fact if we suppose technique as the advantageous juice of industry, visual reopening of that in structural abilities will be occurred. But the 3rd revolution which is called globalization is based on ultra-nation (Fockoyama) economics and unlimited information universe (Mc Luann) besides the preparing of environmental similarities of second revolution and has the capability to conserve differential cultural layers of the first revolution. This position has an international tendency (similar) and regional products (different) in today world architecture. If we look at industrial development pattern in traditional cities, we will know that the construction of any modern building in a traditional background is a modern tendency which produces a post-modern product. Palmist is known as papers of papyrus or skin on which by grazing of original context, a new text is written. But yet there are some sections of the pervious text. So the addressee of a post-modern city such as Shiraz has a view of pervious traditional texture, while he is living in contemporary buildings. A texture which has placed words of concrete and steel among its brick lines by industrial development. In this paper with the consideration of the industrialization process and the development of Shiraz, correspondent tendencies with this process in creation of environments which can reshow the binary architecture, will be studied.

3 INDUSTRIAL CONDITION

3.1 Industrial Iran

The industrial revolution of the west entered Iran with a relatively long delay. According to historic books and documents the most important steps for familiarizing Iranians with modern civilization and European culture took place during the Qajar era. However its weakness and dependence on foreign powers not only prevented the government from managing and developing industrial projects it also kept from supporting the initiatives of Iranian investors, and therefore, Iran's industrial growth during this time was extremely limited and slow. Iranian entrepreneurs tried very hard to compete with foreigners in the realms of industry, transport, and communications, but with little success. In the beginning of the Pahlavi era, the central government became more powerful, and as a result the roads became safer, highway robbery was reduced, and the costs of transport and trade were lowered. The start of oil grilling increased the foreign exchange earnings of the country as well as its domestic demands, and improved its overall economic condition. Therefore Iran's industrial development began in earnest in 1930 as one of the main objectives of the government. This development was so rapid that in 1931 around 20% of the countries entry budget was allocation to the creation of industries. With the start of World War II, like most other activities, industrial production also came to a standstill and was only resumed after the war, with the establishment of the 2nd Pahlavi dynasty. In the next few years the increase in the price of oil was also a great help industrial development of Iran. The material of the section is an overview of the most important factories built in various cities during Iran's rapid industrial growth at the time of the 1st Pahlavi dynasty.

3.2 Shiraz, Yesterday

Old Shiraz can be known as an axis from Isfahan gateway (Darvazeh Isfahan) to sanctuary Shahcheraq. An axis which has been considered as the main morrow of commerce, industry and transportation. In Shiraz market like the other traditional markets, goods arrived caravans from neighbouring cities and then with the production parallel with market axis, they were offered. In fact, industry in its pre-modernism concept was a long coat covered market axis. From old industries of Shiraz, we can imply to inlay, pottery, glazier, calico, carpet-weaving, fretwork, miniature and wadding. Generally Shiraz has a special tradition in different kinds of weaving and decorative works on wood, metal and glass.

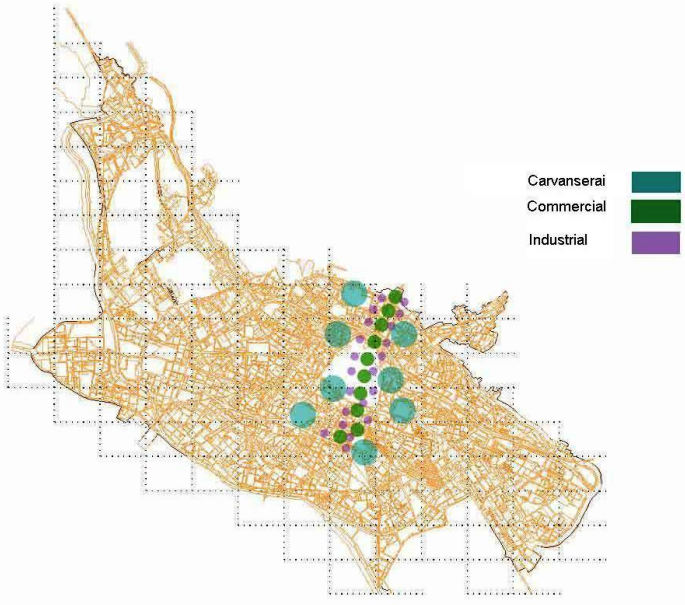

Fig. 1: Old Shiraz Urban Skeleton

3.3 Shiraz, Today

With the entrance of modern industry in 19th century, different factories of electricity production, armoury production and advanced weaving workshops and agricultural products were appeared in Shiraz. These urban functions according to their requirements to space and communications were located in wide land by which car usage will e available. By the creation of car-streets which made the network of residential and

traditional textures of city, commercial advantages of main axis disappeared and other industrial and commercial axis appeared according to urban changes.

3.4 The Correspondence between Traditional and Modern Layers

New buildings which have been formed with different logic from their traditional texture background were like heterogeneous seeds in traditional urban texture. From the other hand the appearance of new materials such as metal and concrete made the visual language of these buildings different. So according to different visual patterns, different criteria and different urban relationships appeared which were developed according to commercial advantages and were distributed as a cancer along the city. By passing of decades from this event, Shiraz is now a complex with traditional and modern layers in which the urban links network connects the blood vessels of this biological complex of these two bodies to each other.

Fig. 2: Palimpsest of contemporary Shiraz

From one hand by the development of oil commerce and the dominance of import on production from the other hand and formation of industrial towns around the big cities and according to urban problems of industry and factories, the master plan of Shiraz transformed an important part of factories and workshops to out of the city and introduce the entireness of Shiraz as a tourism city. But according to passing around a century from citizens' common life and industrial sites, we can't ignore the urban organs and we can't make decisions without caring about their analogy and their urban background. Because of this most of the buildings which are documented in following, are buildings based on the correspondent point of two layers, traditional and modern or direct dependence on industrial sites have been evacuated. According to this fact that Shiraz has a strong artistic background in different fields and traditional crafts were most decorative and also the urban planning based on tourism development, this tendency was created so that the facing with industrial sites will be based on decorations and also the representation of these sites. In other words by the highlighting and symbolizing of industrial aspects of these sites, some kinds of industrial aesthetics have been introduced as a standard which has been common during around a decade.

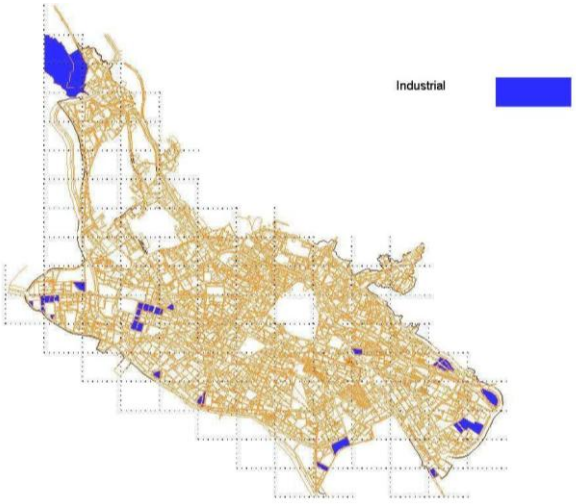

Fig. 3: Shiraz Future Master Plan

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4 SHIRAZ STYLE

4.1 Symbolism

Any phenomenon introduces itself in relationship and companion with other phenomenon. So any component in its context is a part of a whole and receiving the message from the addressee happens. But if a component separates itself from the main context, according to its visual history in addressee's mind, it can be the sole reminder of general concept. The positive advantage of this tendency is that without any necessity the existence of all components which is costly, a limited component transform not only that concept, but also shows this concept transformation in other levels with its unique visual flash and make the addressee to think deeply about that lost wholeness. In many recent buildings of Shiraz, the symbolic attitude with industrial elements and taking advantage of them in a new totality cause the previous concept of industry, besides the new concepts to create a new level of conceptual relationship with addressee and imply to historical, social and cultural themes.

In weaving museum, which revive traditional building of Shiraz weaving factory, metal and concrete elements show aesthetics and weaving philosophy and tattering of universe by showing the lost mechanism of production and by fixing a dynamic movement in a static statue form, the possibility of addressee's thought about weaving, not as an industrial event during the past century, but as an ideology.

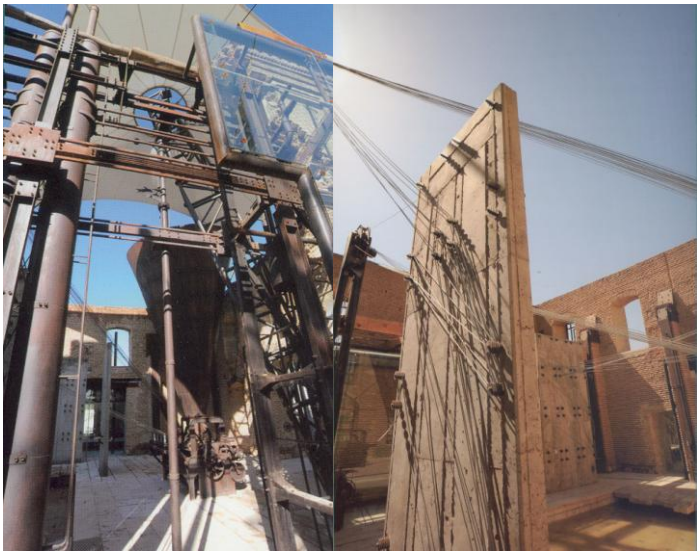

Fig. 4&5: Weaving Museum, Mehrdad Iravanian, 2008

Fig. 6&7: Weaving Museum, Mehrdad Iravanian, 2008

In some urban designs such as Shiraz water mills by aesthetics representation of old mills which are in current location of element, historical background of pattern is introduced and on the other hand, platonic

geometry of wheels versus natural geometry of current water, shows the relationship between human and nature.

Fig. 8: Shiraz Water Mills Monument, Mehrdad Iravanian, 1994

Fig. 9: Gas Company, Mehrdad Iravanian, 1998

Fig. 10: Sanat Tower, Soroush Saberi, 2007

4.2 Framing

Looking at any phenomenon is happened based on viewers coordinates. The mental time of addressee and the view which he chooses to look at, will be both his looking tools and also the effective elements on

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received concept. The look of contemporary human, who passed the industry experience, occurs from a historical glasses to his traditional past. This museum view in any moment separate traditional theme from surrounding phenomenon and also by emphasizing on modern framework which is covered by, declare our relation with that phenomenon. Framing of themes by modern industrial and architectural elements is one of the most common tendencies in considered buildings of this study.

Fig. 11: Tourist information, Ali Sodagaran, 2003

Fig. 12: Amini House, Ali Ghahremanpour, 2004

Fig. 13&14: Mostaghimi House, Ali Ghahremanpour, 2006

4.3 Conflict

Any building, in its materials or it's from has a timely quality. A quality which shows the formation mechanism and also introduce it's cultural and aesthetics features to represent it's time ideology. Adjacent of two different qualities and two different architectural languages, beside introducing each of them, cause the

possibility to review historical and cultural roots of them in addressee's mind during comparison and to reread the passed direction.

Fig. 15: 13# House, Mehrdad Iravanian, 2005

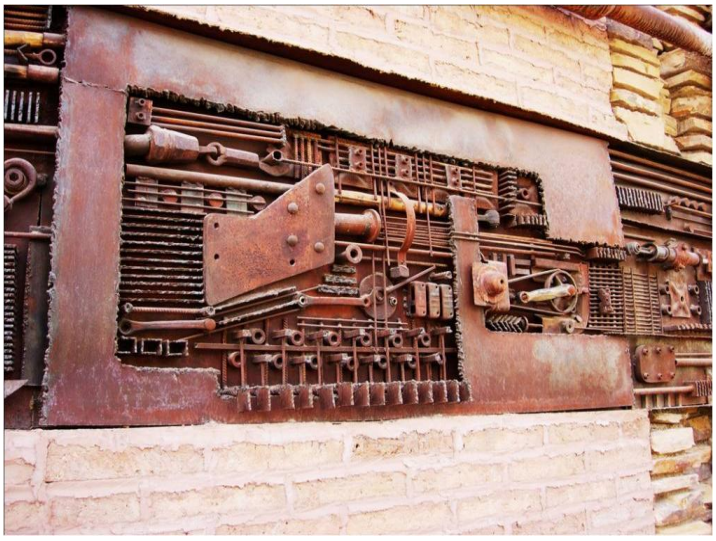

Fig. 16: Haft Khan Restaurant, Mehrdad Iravanian, 2010

4.4 Transformation

Any component has highlight features in addressee's mind as a visual sign which can show that phenomenon. According to this capacity, any component can has some changes which is responsive of new needs, and also shows its previous meaning. In this tendency, form can be changed while the original substance is fixed. In this way industrial elements are used in new usages and the background of cultural facing of addressee in new context is played.

Fig. 17: 13# House, Mehrdad Iravanian, 2005

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Editors: Manfred SCHRENK, Vasily V. POPOVICH, Peter ZEILE, Pietro ELISEI

By relative success of this tendency in Shiraz and taking advantage of it in projects in direct relation with people, such as restaurants, hotels, museums, and commercial centres, public favorites tend to them too and apply this attitude in smaller fields like residential apartments.

Fig. 18: Mostaghimi House, Ali Ghahremanpour, 2006

5 CONCLUSION

Development of on aesthetics tendency in architectural and urban planning of shiraz which is formed based on traditional and modern needs of this city has a root in gaining of formation from historical organization happened in city field. In other words, all of the effective components in this analyzing, means traditional architecture, industrial and modern architecture and the pattern of their exchange are based on the biological experience of people from Shiraz in 3rd millennium. A human who has yet roots in his language and region traditions and his economy is based on modern world and industry, inevitably in global background of today world; express all of his properties and his experiences, so that his unique experience can make a unique future for him. This local tendency with a global look caused the development and success of tourism in Shiraz, as the statistics if visiting from recent buildings is not less than ancient and historical places. This economical success changes the development and repetition of this experience to an architectural style in a city scale. A style which its success is base on its correspondence with life style of Shiraz.

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Testing the Resilience of Underground Infrastructure Solutions through an Urban Futures Methodology

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1 ABSTRACT

Resilience engineering is about building in sufficient flexibility whist ensuring that outcomes are robust. As such it is a measure of the ability of Urban Engineers to provide solutions today that can cope (i.e. adapt) to real world complexity ensuring they remain relevant no matter what the future holds. Success in this area is undoubtedly related to the ability of Urban Engineers to define current operating conditions and anticipate more fully how these may change in the future. In so doing, risk of failure or breakdown within any given solution is reduced, a better understanding of what might trigger such threats to occur is highlighted, and necessary adjustments (either now or in the future) are identified; in short the resilience of the solution is improved.

This paper presents an Urban Futures (UF) methodology that facilitates testing the future resilience of any underground water infrastructure solution (e.g. potable and non-potable mains water, wastewater and stormwater). Through the use of 5 scenarios (1 baseline and 4 plausable futures each considering increasing technological water efficiency in the home) the resilience of localised rainwater harvesting infrastructure is tested at four city locations within Europe (i.e. Birmingham - UK, Lancaster - UK, Barcelona – Spain and Malmö – Sweden). In so doing a methodological approach to robustly test the resilience of any underground infrastructure asset is defined, and it is shown that so called 'sustainability' solutions may provide varying degrees of resilience in each scenario and location.

2 INTRODUCTION

Urban water provision and investment are predicated on trend analysis, where future demand forecasts rely upon what we know now. Unfortunately, the future is never certain and rarely conforms to set trends, therefore the infrastructure which is being adopted today in the name of sustainability may be vulnerable in a future which resides outside the limits of current predictions. Moreover an infrastructure solution that has been optimised for sustainable benefits today may not be resilient (or even sustainable) if operating conditions dramatically change. In responding to this challenge it is suggested that Urban Engineers might seek to provide infrastructure solutions today that can cope (i.e. adapt) to real world complexities ensuring they remain relevant no matter what the future holds. Some engineers would advocate that built-in flexibility (or redundancy) will always propogate robust future outcomes (O'Rourke, 2007). Although this is reliant upon Urban Engineers defining current infrastructure operating conditions and anticipating more fully their potential for future change (i.e. for better but also for worse). Through the use of a worked example this paper presents a five-stage Urban Futures (UF) methodology (Section 3) that can be used to explore a variety of ways in which the operating conditions of a localised underground infrastructure solution (i.e. non-potable rainwater harvesting - RWH) may change in the future and helps evaluate how this could trigger threats/risks not only to its own resilience but also the resilience of other adjoining infrastructure networks (e.g. mains potable water supply, wastewater and stormwater systems). A better understanding of what might trigger such threats to occur is highlighted, and necessary adjustments (either now or in the future) are identified; in short the resilience of the RWH solution is improved. Allied to this process is the application of an UF tool, initially developed to test the performance of water-based solutions - through scenario-based analysis (i.e. normative or explorative) where social, technological and environmental changes are considered.

3 URBAN FUTURES (UF) METHODOLOGY

The Urban Futures (UF) methodology, as originally described by Rogers et al. (2012), consists of five discrete stages that are for the most part linear (Figure 1). In this paper the methodology has been adapted for testing the resilience of underground infrastructure solutions and shows clearly where the UF tool is applied. Stages 1 to 5 are explained through the use of a worked example.

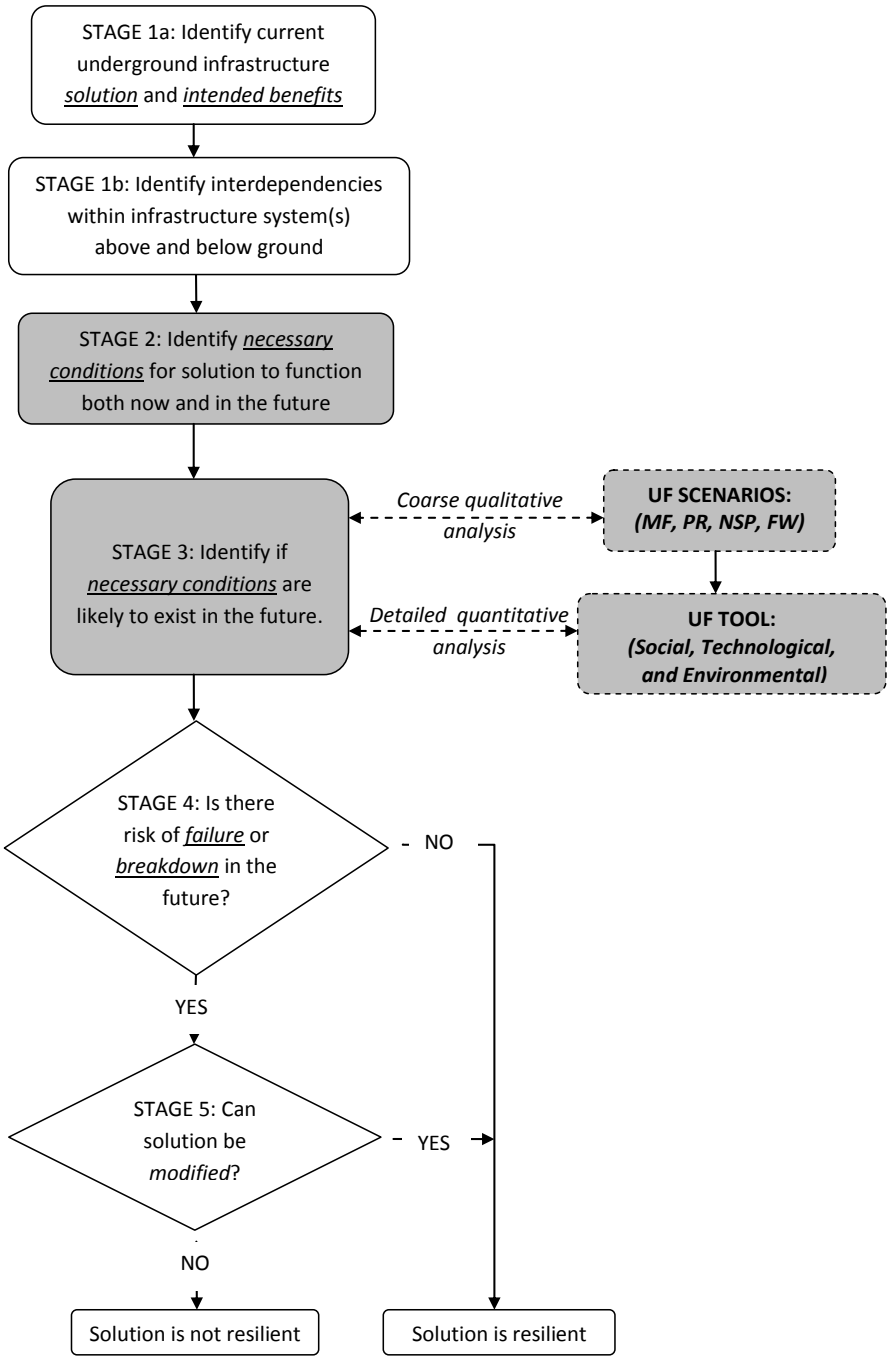

Fig 1: Urban Futures methodology as applied to urban infrastructure

3.1 Stage 1a – Identify underground infrastructure solution(s) and sustainability benefits.

Underground infrastructure solutions can be selected in one of two ways; either planners/developers/infrastructure engineers are aware of a specific problem(s) within urban areas and seek sustainable solution(s); alternatively solution(s) have been adopted without any prior knowledge of their sustainability function/benefits and/or current and future problem(s).

In this example urban engineers have proposed the introduction of an underground non-potable water supply network (i.e. rainwater harvesting – RWH, Figure 2) in order to achieve the following sustainability benefits within the local area (Hunt et al., 2012a):

- Reduced consumption of potable (i.e. drinkable) mains water;
- Reduced requirements for stormwater outflow;
- Increased water storage in times of drought and mains water failure;

- Increased pluvial flash flood protection.

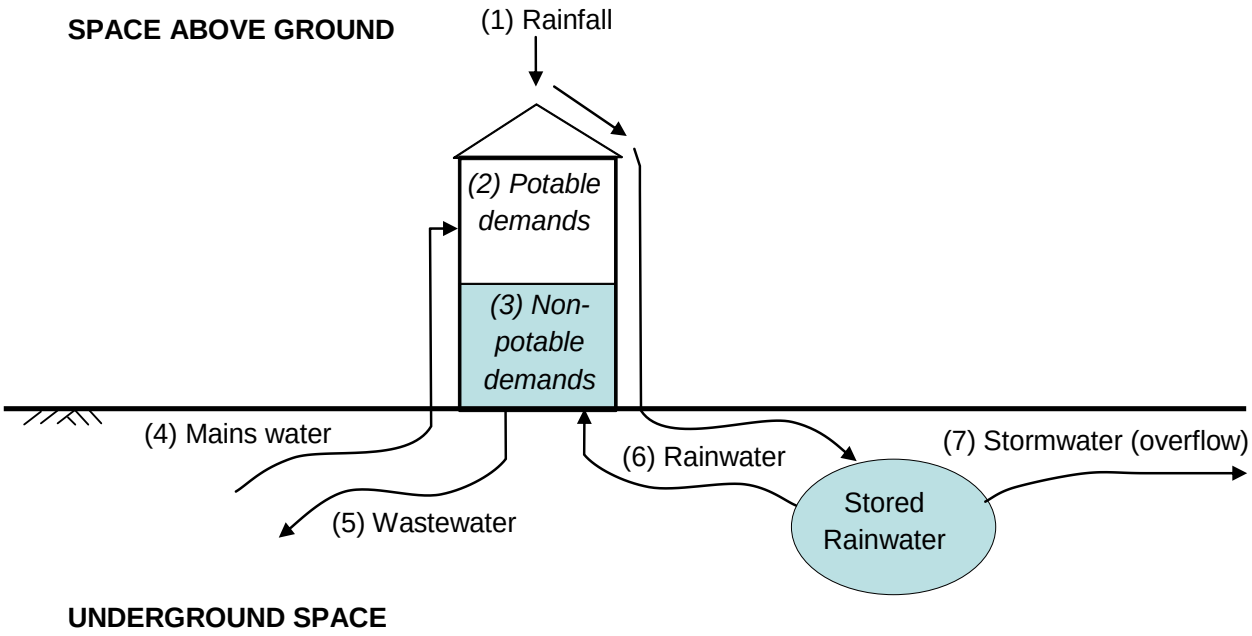

Fig 2: Key elements for RWH infrastructure

3.2 Stage 1b - Identify interdependencies above and below ground

By narrowing down the analysis to the scale of an individual domestic dwelling (Figure 2) we can easilly identify key interdependencies that are directly related to the adoption of an RWH system. Each of these interdependencies will ultimately impact upon the use of space above and below ground, which in urban areas is becoming increasingly compact.

- Within the house the numerous daily water related demands per person (e.g. cooking, washing, cleaning) are dependent upon the technologies adopted (e.g. a shower with 12l/s flow rate), the frequency of use (e.g. once a day) and longevity of use (e.g. a 5 minute shower). The total household demand is directly dependant on occupancy rates. Changes to any one of these influencing factors will impact greatly upon all inflows and outfloes therefore related infrastructure requirements (4 to 7 in Figure 2). In turn this will influence the resilience of localised and non-localised utility infrastructure which is conventionally placed underground.
- Potable demands (2 in Figure 2), e.g. showering, are met through drinking quality water and are therefore dependent upon mains water supplies (4 in Figure 2). Conversley non-potable demands (3 in Figure 2), e.g. toilet flushing, are dependent upon harvested rainfall supplies (6 in Figure 2). Wastewater capacity (5 in Figure 2) is directly dependent upon both of these.
- The performance of an RWH system is highly dependent upon rainwater being collected (from a domestic roof) and stored within an underground tank, from where it is pumped to the point of demand. Any changes in rainfall (1 in Figure 2) will impact greatly upon the volumes of water that can be collected/stored. Subsequently this effects the ability of the RWH system to meet non-potable demands. When the tank reaches its capacity excess rainwater will overflow into the stormwater system. The volume and frequency of overflow (7 in Figure 2) is highly dependent upon how much water is coming in (i.e. rainfall), how much is being drawn off (i.e. non-potable demands) and the size of the RWH tank and roof. Correctly sizing these is important, because one requires a significant amount of underground space (~1-2m3 per household) and together a dual resilience role is served (i.e. to maximise potential for non-potable supplies and minimise stormwater outflow).

The most important point to highlight here is that any of these interdependent properties will change with location and are likely not static in the future. Therefore difficulties will undoubtedly arise when trying to understand (and quantify) what is happening to all inflows and outflows within a highly interdependent and somewhat complex system where changes in one area can have repurcussions in another. This is why the development and application of the UF tool is so very important. Whilst the example of a single domestic

house is given here for simplicity outputs can be scaled-up within the UF tool (i.e. multiple dwellings of numerous types) so as to be representative of a (re)develeopment site or ultimately as part of a city.

3.3 Stage 2 - Identify necessary conditions for solution(s) to function.

This stage identifies the necessary conditions (NCs) that allow an RWH solution to function both now and in the future. Whilst in some cases these NCs will be straight forward to identify, others may require expert opinion (including validation through detailed modelling). However, in nearly all cases it is likely that NCs will be derived from (and subsequently influenced by) the following list of key drivers (Hunt et al., 2012a):

- **S**ocial (e.g. demographics, values, equity, public attitude, user-behavior)
- **T**echnology (e.g. type, efficiency)
- **E**nvironment - Natural and Built (e.g. climate, local resources, built form)
- **E**conomic (e.g. cost, affordability, payback)
- **P**olitics and Governance (e.g. regulations, laws, standards)

These NCs include, but are not limited to, the following list:

NC1 - Non-Potable demand must remain

NC2 - Enough water must be collected

NC3a - Enough water must be stored for supply

NC3b - Enough water must be stored for pluvial flash flood protection

NC4 - System must be economically viable

NC5 - System must be publically acceptable

NC6 - Policy for adoption of systems must remain in place

NC7 - Systems must be maintained

Some of these NCs are likely to be generically applicable anywhere in the world whilst others will be influenced greatly by, or simply explicit to, a particular location. This forms an obvious link with the theme of sustainability, where it is necessary to look at local, national and international requirements and impacts within economic, social and environmental spheres.

3.4 Stage 3 - Identify whether necessary conditions will exist in the future.

This stage determines whether the solution is likely to be effective in the future and forms a critical part of the resilience testing process (Rogers et al., 2012). In the UF methodology the future is envisioned through the use of four scenarios (Market Forces - MF, Policy Reform - PR, New Sustainability Paradigm - NSP and Fortress World - $FW_{HAVES\ (H)}$ or $FW_{HAVE\ NOTS\ (HN)}$) that are plausible, yet significantly different from each other and well-grounded within academic literature (Hunt et al., 2012b, Boyko et al., 2012). Rogers et al., (2012) showed that it is possible to identify whether NCs are vulnerable in the future through the use of contextual scenario-based narratives that include consideration of key drivers (Stage 2). Hunt et al. (2012a) found that this level of analysis was sufficient for identifying vulnerabilities in some NCs (i.e. NC5 to NC7) and would allow the user to confidently pass from Stage 3 to Stage 4. However, within NC1 to NC4 they highlighted that more detailed analysis may be required in order to understand better the vulnerabilities that exist. As such the generic excel-based UF tool (Figure 1) was subsequently developed in order to consider more easily the effect of making changes to social, technological and environmental drivers - all highly influential considerations within UF research. As described in Section 3.2 household water demands (hence water inflows and wastewater outflow) are influenced directly by a mix of technological efficiency and user-behaviour which in the future are relatively unknown quantities. By using these ‘axes of uncertainty‘ we can produce a defined parametric space (Figure 3) within which to test the performance (and therefore resilience) of an RWH solution. Therein we can see that future demands may stay constant (anywhere along the dotted line), increase in value (area above dotted line) or decrease in value (area below dotted line). The UF scenarios (grey ovals) are shown within this parametric space and it can be seen that they allow us to test extremes, moreover they allow us to consider the case where households have the same demand values (NSP and FW_{HN}) although for very different reasons. The 5 scenarios being considered here (A to E) allow us to

better understand the resilience implications along one axis of uncertainty (i.e. where technological efficiency alone is changing). In this case A refers to a scenario where technologicial efficiency is reduced compared to the Baseline B, whereas C, D and E refer to scenarios where progressively more water-efficient technologies are being adopted. The various input values for Scenarios A to E are shown in Table 2 and Table 3, a broader discussion of which follows.

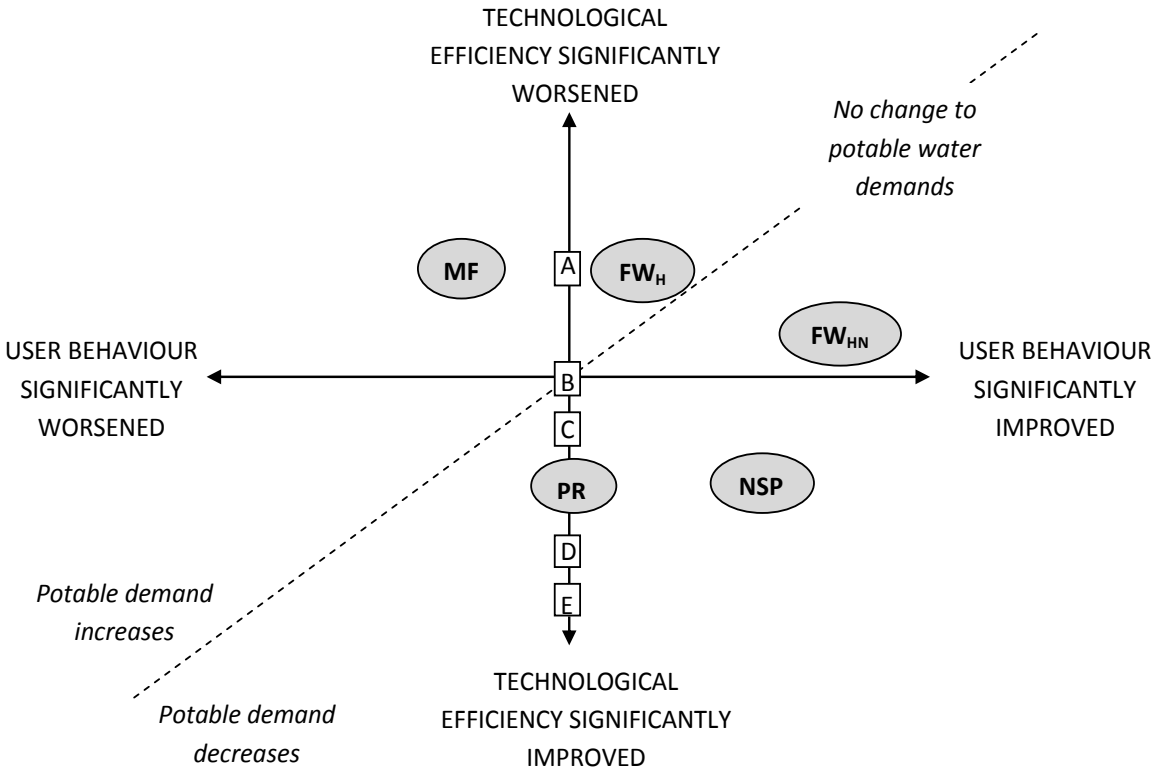

Fig 3: Parameter space required for resilience testing in UF analyses

Driver	**Operating condition(s)**		***Units of measure***	**Scenarios**				
				A	**B**	**C**	**D**	**E**
Environment	Climate	Rainfall	*mm/day*	Figure 3a (Lancaster scenarios)				
			mm/day	Figure 3b (Birmingham scenarios)				
			mm/day	Figure 3c (Barcelona scenarios)				
			mm/day	Figure 3d (Malmö scenarios)				
	Built form	Roof space	*m^2*	50 (all scenarios)				
		Roof type	*% water capture*	90 (all scenarios) [5]				
		Roof material	*% water capture*	90 (all scenarios) [5]				
Social	Demographics	Occupancy	*Occupants/dwelling*	2.4 (UK scenarios) [3]				
			Occupants/dwelling	2.6 (Barcelona scenarios) [4]				
			Occupants/dwelling	2.0 (Malmö scenarios) [3]				
	End-user behaviour [2]	WC	*Flushes/day*	4.42 (all scenarios)				
		Bath	*Capacity filled**	0.11 (all scenarios)				
		Shower	*Minutes/shower**	4.37 (all scenarios)**				
		Washing machine	*Frequency of use*	2.10 (all scenarios)				
		Dishwasher	*Frequency of use*	3.60 (all scenarios)				
Technology	Technological efficiency [1]	WC	*Liter/flush*	6	6	4.5	4.5	2.6
		Bath	*Liter capacity*	230	230	230	160	97
		Shower	*Liters/minute*	24	12	8	8	6
		Washing machine	*Liters/kg*	13	13	10	6.1	6.1
		Dishwasher	*Liters/place setting*	1	1	1	1	0.7
	Total potable water demand		*l/person/day*	199	148	117	101	76
	Total non-potable water demand		*l/person/day*	54	54	48	41	24

Table 2: Input values adopted within the UF tool. [References: 1Hunt et al., (2012a), 2 DCLG (2010), 3 NHBC (2010), 4 ECPF (2010), 5Leggett et al (2001), *Frequency of use not disagregated, ** Would increase to 5.1 if no bath adopted.]

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3.4.1 Environment: Natural and Built

Local climates (e.g. rainfall, temperature, irradiance, wind speeds, etc.) are influenced greatly by geographical location and certainly within Europe can vary considerably throughout the year. In most respects this leads to reduced rainwater availability in hotter climates and during summer months. This paper uses the example of four European urban locations: Lancaster (UK), Birmingham (UK), Barcelona (Spain) and Malmö (Sweden), where climates vary markedly as shown in Figure 3a-3d. All aspects of roof design may be specific to a certain location and/or be dictated by local policy and this will influence how much rain can be collected. In order to limit the amount of variables within the analyses presented here it is assumed that roof types in all four locations are identical sizes (50 m2), pitched and tiled (Table 2). Therefore rainwater collection is merely a function of changing rainfall patterns in each location rather than roof design. The UF tool allows the user to generate any type of scenario and change potable and non-potable water demands and environmental operating conditions (Table 2). The impact on water infrastructure at various locations at different times in the year can then be assessed; this includes water inflows (i.e. mains water), water outflows (i.e. stormwater and wastewater), and tank storage (i.e. size of tank and water volumes stored). As stated previously all of these have implications for the use of underground space.

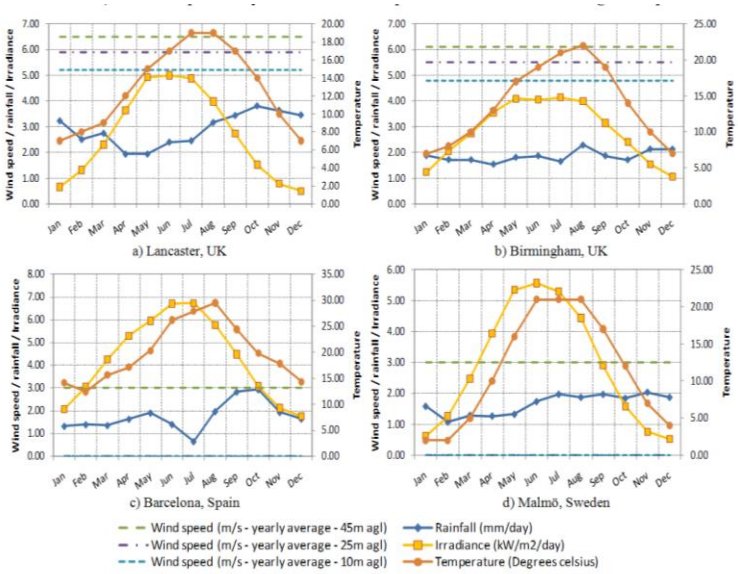

Figure 3. Local weather conditions in different locations

Location	Demand type	*Units of measure* (hh = household)	Scenarios				
			A	B	C	D	E
UK	Potable	*l/hh/day*	418	311	246	212	160
	Non-potable	*l/hh/day*	113	113	101	86	50
Spain	Potable	*l/hh/day*	517	385	299	270	198
	Non-potable	*l/hh/day*	140	**140**	125	107	62
Sweden	Potable	*l/hh/day*	398	296	230	208	152
	Non-potable	*l/hh/day*	108	108	96	82	48

Table 3: Influence of occupancy rates on total household potable and non-potable demands.

3.4.2 Social

User behavior will impact considerably on future water demands within and outside the home. For example it is well reported that showering within the home is the largest consumer of water; showering for an average of 4.4 minutes in a 12 l/minute flow rate shower will consume 52.8 liters of mains water. Therefore changing shower times by 1 minute will change total demands by more than 10 liters. If the flow rate of the shower is changed also the cumulative effects would be considerable. This is true of many water-using appliances within the domestic home. In addition water-using behavior can be influenced greatly by climate, i.e. more frequent showering or car washing in warmer months (Roebuck, 2007) and if vegetables/plants/flowers/shrubs are grown at home (perhaps adopted in an aim to be more sustainable) significant water demands (i.e. >> the highest value of 199 l/person adopted in Scenario A) will be required during these periods. Occupancy rates, vary according to location (Table 2) and leed to highest demands (potable and non-potable) in Spain, followed by the UK and then Sweden (Table 3).

3.4.3 Technology

Future technologies adopted within the home form a significant contribution to total future water demands. As the efficiency of water-using appliances increases total water demands (including non-potable) will reduce and vice versa (Table 2, 3). Hunt et al. (2012a) showed that increases in domestic water demands from 149 l/person/day (Scenario B) to 199 l/person/day (scenario A) occurred through the adoption of power showers alone (24 l/minute flow rate), whereas reductions to 76 l/person/day (scenario C) required improved efficiency measures over a broader range of technologies including reduced flow rate showers (Table 2).

3.4.4 Politics, Economics and Governance

Whilst economics, policy and governance are important drivers their influence in this case is secondary. For example, a road map of policy requirements (gradually increasing in strength over time) could require that domestic demands to be decreased from 148 l/person/day to 80 l/person/day by 2014 and seek to implement this by rewarding uptake of more efficient technologies (and assuming behaviour is unchanged). In fact scenarios C, D and E do exactly this and are directly in line with Levels 1, 3 and 6 specified within the Code for Sustainable Homes in the UK, see Hunt et al., (2012a). Rather than addressing behavioural issues the preference in these scenarios is to enforce metering only. Alternatively policy may be extremely weak and inadvertantly encourage inefficient technologies to be adopted (Scenario A) or simply rely upon peoples‘ conscience to evoke a step-change in behaviour (e.g. In Feb, 2012 residents in South East UK were asked to reduce shower times by 1 minute due to fears of ensuing drought, but without strict policies in place how effective would this actually be?). Likewise economics (i.e. the rising cost of water) might influence the uptake of efficient technologies (for those who can afford the investment and will see a payback) or incentivise more water-efficient user-behaviour (for those who cannot). In such cases Government incentives can be used to bridge these gaps. Therefore when all influences are considered, it can be seen that water demand within a domestic home will always be directly dependent upon technological efficiency and user behaviour operating within spheres of environment constraints (i.e. availability of natural resources), policy requirements (i.e. those that seek to push or pull change) and economics (i.e. cost/value of water).

3.5 Stage 4 – Identifying future risks

In Stage 2 a range of NCs were identified. In this stage associated future risks to these NCs will be highlighted in order that their vulnerability (and therefore resilience of the solution) in all four locations are better understood. Table 2 shows that non-potable demands remain in the future, therefore there is likely to be a demand for non-potable water in the future, although to differing degrees in each scenario, hence NC1 is fulfilled. Provided that rain falls and RWH systems are implemented and working the ability of each location to collect rainwater (NC2) is fulfilled. However, the subsequent implications for water storage to meet demands (NC3a) and spare tank capacity to allow for flash flood protection (NC3b) is unclear and will vary drmatically within each scenario and within each location. In this paper we consider further risks related to NC3a and b. Risks associated with NC4 to NC7, are discussed further in Farmani et al. (2012). The effect of adopting the various demand profiles (Table 3) within each location is investigated through the use of the UF tool. Tanks (Table 4) are sized according to standard methods throughout (i.e. the greatest of 5 % annual rainfall and 5 % annual demand – BS8515; BSI, 2009).

Location	**Scenarios**				
	A	**B**	**C**	**D**	**E**
Lancaster, UK	2063	2063	1567	1253	931
Birmingham, UK	1526	1526	1526	1253	931
Barcelona, Spain	1436	**1436**	1436	1436	1153
Malmö, Sweden	1359	1359	1359	1194	887

Table 4. Tank sizes used within scenarios at each location (bold indicates solution which is further modified in Section 3.6).

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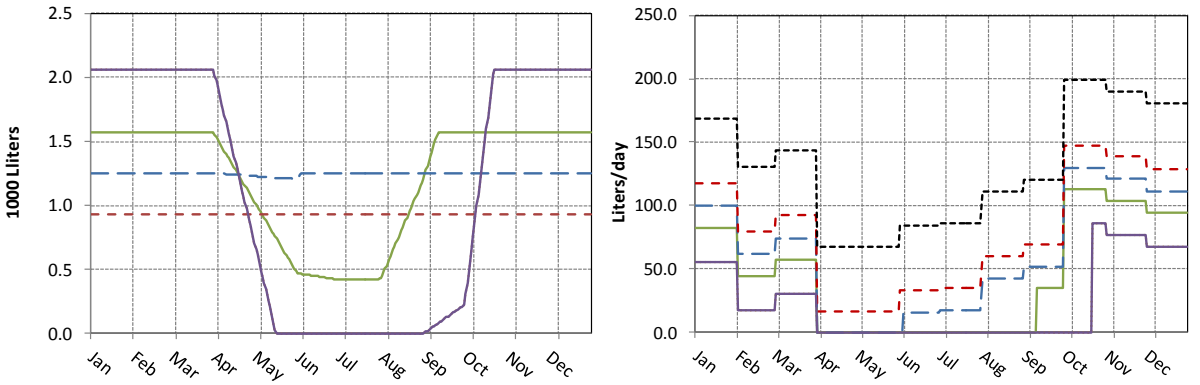
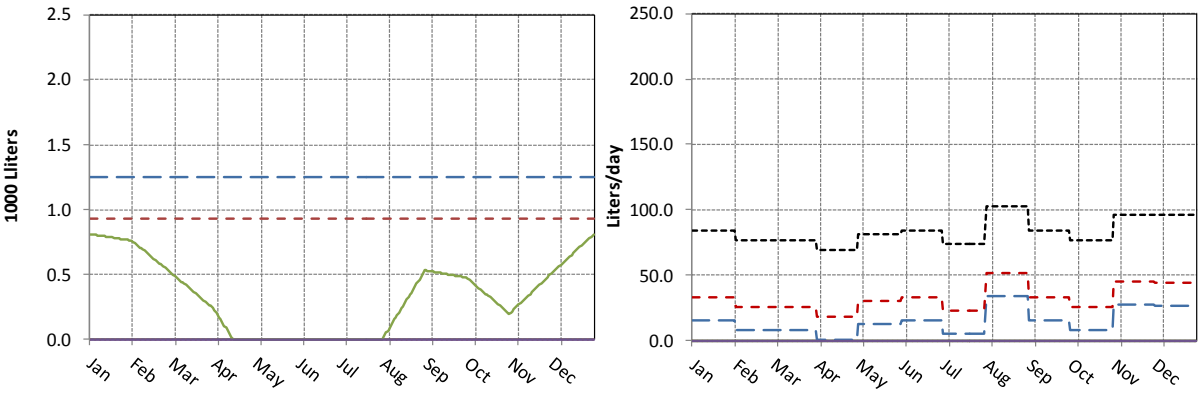
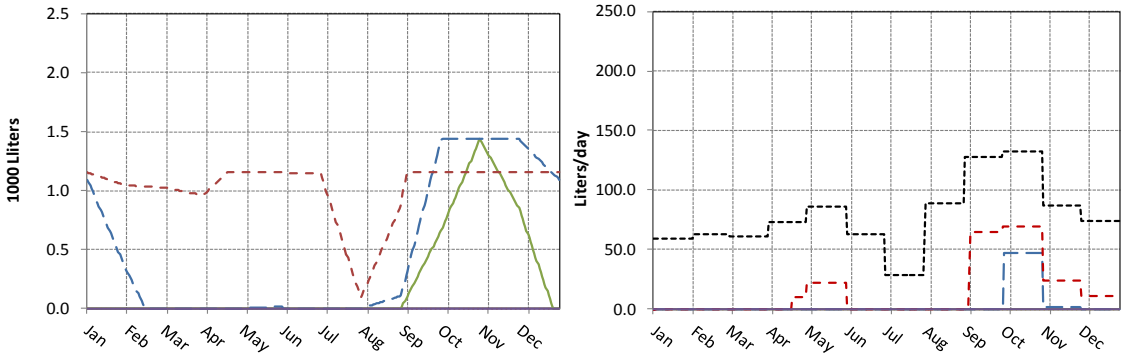


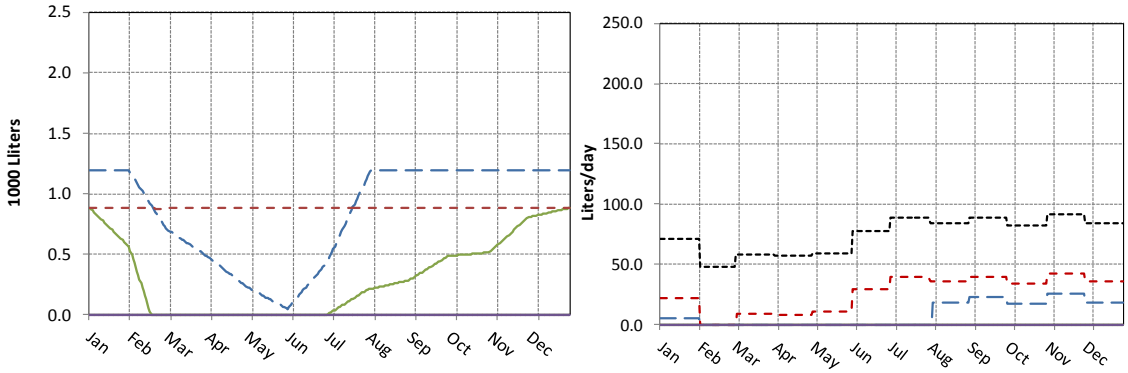
a) Lancaster, UK



b) Birmingham, UK



c) Barcelona, Spain



d) Malmö, Sweden

Fig. 4. RWH tank storage volumes (lhs) and related outflows to stormwater system (rhs) in different scenarios and case study locations.

Fig 5. Influence of RWH roof size in Barcelona (a) 1436 liter RWH tank (b) RWH tanks sized for 5 % annual rainfall.

Figure 4a to d show the corresponding yearly water levels with RWH tanks and respective stormwater outflows within Scenarios A to E within all four case study locations. It is assumed that yield before storage occurs (Mitchell, 2007) and that tanks are installed in January. The data are presented for the 2nd year of installation thereby allowing tanks to fill and reach a steady state. However it should be recognised that average daily values of rainfall are used (calculated from monthly average values in Figure 3a to d), therefore results, whilst indicative, should be treated with care. Intuitively it can be seen that significant risk to NC3a will occur when RWH tanks are empty (i.e. not enough water to meet demand) and significant risk to NC3b will occur when the RWH tanks are full (i.e. not enough spare capacity for flash flood protection). In Lancaster it can be seen that RWH tanks are empty for 3.7 months (May through to August) within scenario A and B. [N.B. In all cases data for scenarios A and B are identical as non-potable demands are equal, Table 3.] However, they are full for different time periods in all five scenarios; 5.5 months (mid October to end March) in A and B; 6.9 months for C; 11 months for D and 12 months for E. When considering the three other locations RWH tanks only ever fill in Scenario D and E, i.e. 12 months in each scenario for Birmingham and only 2 months and 7 months in Scenario D and E respectively for Barcelona. RWH tanks in Scenario C are empty for 4 months (April to July) in Birmingham; 4.5 months (mid-February to July) in Sweden and 8 months (January to August) in Spain. In scenarios A and B it can be seen that RWH tanks are empty year round in Birmingham, Barcelona and Malmö. Therefore an RWH solution poses least risk to NC3a in Lancaster because tanks are fullest year round in all scenarios, this is attributed to a much higher rainfall within this region. The opposite is true of Spain where most risk occurs. The least risk to NC3b occurs in Spain, followed by Sweden, Birmingham and then Lancaster. The risk in Lancaster is highest in winter months and lowest in summer months, where spare capacities of up to 2000 liters occur in scenarios A and B. The corresponding related outflows, from RWH tanks to the stormwater system, are also shown in Figure 4 (rhs). It can be seen how the adoption of RWH tanks significantly reduces stormwater outflows (per household) in all scenarios, in all locations, during the year. In Birmingham, Spain and Sweden stormwater outflows (from roofs) has deceased in Scenarios A, B and C, which could have implications for future infrastructure resilience (i.e. it may be oversized) or more simply in planning terms this would allow for more houses to be connected without modification. Scenario D is interesting because it is assumed to be the most sustainable solution in terms of reduced mains water demand and wastewater outflow, yet it offers least protection against fluvial floods and least reduced capacity requirements for stormwater infrastructure.

3.6 Stage 5 – Modification of solutions

In this stage solutions can be modified in order to change their performance and increase their resilience, e.g. if rainwater supplies are insufficeint to meet demands it is not possible to increase rainfall. Although we might consider increasing collection areas. Table 5 shows a range of collection areas back-calculated from non-potable demands and expected rainfall. Scenario B (Barcelona) suggests a 89 m2 collection area (i.e. an additional 39 m2) should be sufficient to meet yearly non-potable water demands – 140 l/hh/day (Table 3). However, by also increasing the roof area above this value (Figure 5a), whilst maintaining at 1436 liter RWH tank (Table 4), we can see that more water is collected year round, i.e. a 110 m2 roof area leads to surplus water over 11.5 months (4.5 months more than when using a 90 m2 roof). If we then increase tank capacities (Figure 5b) in line with the 5 % annal rainfall design rule, surplus water will occur for 12 months with the 110 m2 collection area. Another alternative would be to use water collected from other rooftops (e.g. shopping centers, commercial or office roofs) where demand is much lower than potential rainfall supply. It is worth recognising that, under identical conditions, 80 % more rain can be harvested from pitched tiled roofs than from flat gravel roofs (Leggett et al., 2001); moreover rainwater availability per occupant will be higher in low occupancy dwellings with large roofs than high occupancy dwellings with small roofs (e.g. high rise buildings). Alternatively other solutions could be adopted (e.g. greywater recycling), however the benefits may not be identical and will have to be considered carefully and perhaps even traded-off.

Location	**Scenarios**				
	A	**B**	**C**	**D**	**E**
Lancaster	44	44	33	27	20
Birmingham	68	68	51	41	31
Barcelona	89	**89**	68	54	40
Sweden	72	72	55	44	33

Table 5. Collection areas back-calculated from non-potable demands and rainfall (unrestricted tank size).

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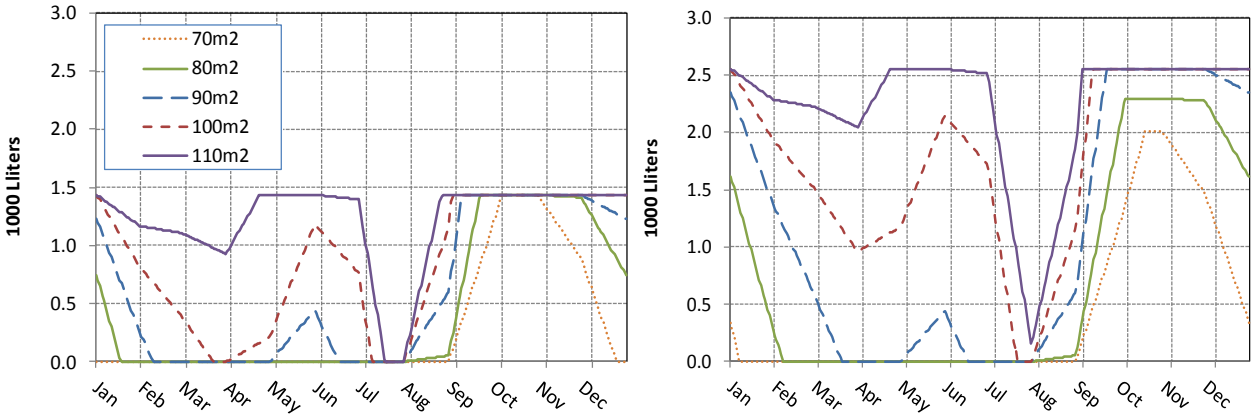

Fig 5. Influence of RWH roof size in Barcelona (a) 1436 liter RWH tank (b) RWH tanks sized for 5% annual rainfall

4 CONCLUSION

Through the use of an urban Futures methodology this paper has shown how it is possible to test the resilience of solutions that are being adopted today in the name of sustainability. By looking specifically at technology, user behavior and location through the use of a UF tool the close relationship between actions above ground and infrastructure requirements below ground can be better understood and tested in terms of sustainability performance and resilience provision. The methodology helps to raise questions that wouldn't normally be asked and enhances the solution that is put into place. The capabilities of the UF tool has far reaching implications (beyond what is presented within this paper) and can be used to inform decision-makers, planners and urban engineers alike. A future publication will describe the UF tool in detail.

5 ACKNOWLEDGEMENTS

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🏆 *reviewed paper*

The Ability of Wheelchair Users in Utilizing Urban Facilities, Sari 2011

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1 ABSTRACT

Purpose: Wheelchair users have much more problems than other disabled people. The only way for them to participate in social activities is through using wheelchairs. On the other hand, if urban facilities aren't convenient for them, wheelchairs won't be useful. We studied the ability of wheelchair users to enter urban facilities without helps.

M&M: The study was done in summer 2011. One hundred and forty wheelchair users were selected. The questionnaire consisted of 20 statements starting with the phrase: "I can use… without help". Answers in 4 scales of "almost always, usually, sometimes and rarely" were equivalent to getting nil to 3 points respectively. Reaching the points 40-60, 30-39 and <20 was considered as "easy access", "rather easy access" and "no access" respectively. Content validity was achieved by expert consultation. The reliability of the checklist was attained by retesting the 20 people in 2 weeks (Pearson Correlation Coefficient, r= 0.89). Questionnaires were totally anonymous in order to participant feel free to express their opinions. Descriptive statistics were reported using SPSS (16) software.

Results: One hundred and twenty (80%) of participants responded. Eighty percent stated as "no access" whereas 20% were "rather easy access". One hundred percent could not get in public buses, the beaches, clinics, religious places, registration offices and libraries.

Conclusion: Despite international and national codes, the majority of urban facilities are not appropriate for wheelchair users.

2 INTRODUCTION

As wheelchair users are dependent to others in most of their needs, access to social facilities should be as such that they could use them without help or with minimal help one. The United Nations General Assembly (UNGA/GA) adopted resolution 31/123 of 16 December 1976, proclaiming 1981 the International Year of Disabled Persons; It is a cornerstone towards recognizing the rights of the disabled and enhancing the understanding of their needs and appreciation of their capabilities (1). A major outcome of the "International Year of Disabled Persons" was the formulation of the World Program of Action (WPA) concerning Disabled Persons, adopted by the General Assembly on 3 December 1982, by its resolution 37/52(2-4). The WPA is a global strategy to enhance disability prevention, rehabilitation and equalization of opportunities, which contributes to full participation of the disabled in social life and national development. The WPA also emphasizes the need to approach disability from a human rights perspective (3). In its resolution 37/53 of the same date, the General Assembly proclaimed the period 1983-1992 the United Nations Decade of Disabled Persons. These actions enhanced considerable activity in the field of disability at international, regional and national levels (1). Among the major outcomes of the decade, dedicated to meet the needs of disabled, was the adoption of the standard rules on the equalization of the opportunities for the disabled by General Assembly on 20 December 1993 (resolution 48/96 annex). Equalization of opportunities is a central issue in the WPA and its assisting philosophy for the achievement of full participation of persons with disabilities in all aspects of social and economic life. An important rule underlying this theme is that issues related to persons with disabilities should not be treated in isolation, but within the context of normal community services (3). The Ministry of Social Affairs is cooperating in the area with the National Committee for the Disabled in an integrated approach and a program that includes: quality of services suggested, ease of procedures followed, current legislation, and standards to be adopted for training and rehabilitation. The approach is to progress into the present of accessibility for the disabled, a design manual for a barrier- free environment (1). A barrier-free environment is a space that allows free and safe movement, function and access for all, regardless of age, sex or condition, a space or a set of services that can be accessed by all, without obstacles, with dignity and with as much independence as possible(5). Barrier-free design includes a design that removes those barriers that obstruct the social participation of disabled people. It started in 1953

as a movement to remove barrier for the disabled, which is referred to as "welfare community development" in Japan, began in Machida city in 1974(6). The developing countries can apply this manual as a reference and guideline. They should consider their environment and try to renovate the existing buildings and inspect new spaces so that every person could utilize urban facilities without segregation. All people have equal rights to use urban facilities and enjoy life.

The Declaration on the Rights of Disabled Persons with the International Covenants on Human Rights, The Declaration on the Rights of Mentally Retarded Persons in the Universal Declaration of Human Rights stated that all people have equal right to utilize various urban facilities without discrimination. The Declaration on Social Progress and Development remarked the necessity of respecting the rights of physically and mentally disabled people and assuring their welfare and rehabilitation. All urban facilities such as the physical and cultural environment, accommodation and transportation, social and health services, educational and work opportunities, cultural and social life, including sports and recreational facilities must be accessible for all (2-3). The developing countries can apply this manual as a reference and guideline. They should consider their environment and try to renovate the existing buildings and inspect new spaces so that every person could utilize urban facilities without segregation. All people have equal rights to use urban facilities and enjoy life.

The Conference on the Capabilities and Needs of Disabled Persons in the United Nations Economic and Social Commission for Western Asia (ESCWA) Region was held in November 1989. Their purpose was attention to urban facilities for disabled persons. They recommended that city planning and construction legislation, should consider the conditions that ease the movement of disabled persons and ensure their safety, including in the design of infrastructural services, transport and the entrances and interiors of buildings (1). There are more than 500 million persons with different kinds of disabilities. They have the same rights and equal opportunities like other normal human beings (2). Researches show the world's population is going toward aging in such a way that number of the elderly over 60 years old will reach 1.2 billion in 2025 and the necessity of attention to these group increases (7). It is inevitable that human is base of sustainable development and attention should be paid to all strata of society. In a healthy society, all citizens have equal rights to its services. (8). Disabled persons should have job opportunities to be active members of the society (1, 4). Disabled persons especially wheelchair users have lots of physical problems. They need especial medical and rehabilitative care so that they can participate in society actively. Accessibility of the environment is that of the "trip chain". It means they are able:

- to go from home to a working place
- to go from home to sidewalk or pathway
- to enter in a vehicle
- to go out of the vehicle to sidewalks or pathways near the working place
- to reach the entrance of the building
- to enter the building
- to move around in the building
- to enter the office or other kind of place for work
- to reach the working station

If only one link is not accessible, then the journey becomes impossible. Each link must be considered and improved as necessary (6). Poor socio-economic conditions contribute significantly to disability in developing countries. The United Nations states that poor nutrition, dangerous working and living conditions, limited access to vaccination program, and to health and maternity care, poor hygiene, bad sanitation, inadequate information about the causes of impairments, war and conflict, and natural disasters all cause disability (9-10). People who use wheelchair have lots of problems. Typical problems include maneuvering through narrow spaces, going up or down steep paths, moving over rough or uneven surfaces, using toilet and bathing facilities, reaching and seeing items placed at conventional heights, and negotiating steps or changes in level at the entrance/exit point of a building(11). In this study we tried to survey the ability of wheelchair users in utilizing urban facilities without helps.

3 MATERIAL & METHODS

The study was done in summer 2011. One hundred and forty wheelchair users were selected. Questionnaires were totally anonymous, therefore participants filled free to express their opinions. The questionnaire consisted of 20 statements starting with the phrase: "I can use …….without help". Answers in 4 scales of "almost always, usually, sometimes and rarely" were equivalent to getting nil to 3 points respectively. Reaching the points 40-60, 30-39 and <20 was considered as "easy access", "rather easy access" and "no access" respectively. Content validity was achieved by expert consultation. The reliability of the checklist was attained by retesting the 20 people in 2 weeks (Pearson Correlation Coefficient, r= 0.89). Questionnaires were anonymous in order to participant feel free to express their opinions. Data were reported using SPSS (16) software.

4 RESULTS

One hundred and twenty of participants (80%) responded. All of participants were man and between 35-60 years old. One hundred percent could not go to bus station and get in; As well as beaches, clinics, religious places, Registration offices, libraries and public toilets. Eighty percent of participants stated as "no access" whereas 20% were "rather easy access" (Table1 and Fig. 1).

Row	I can use ……without help.	Almost always No. (%)	Usually No. (%)	Sometimes No. (%)	Rarely No. (%)
1	Get to the banks	0(0)	0(0)	6(5)	114(95)
2	Use cash dispensers	0(0)	0(0)	6(5)	114(95)
3	Gets to hospitals	0(0)	0(0)	6(5)	114(95)
4	Go to pharmacies	0(0)	0(0)	6(5)	114(95)
5	Get to clinics	0(0)	0(0)	0(0)	120(100)
6	Get to university	0(0)	12(10)	12(10)	96(80)
7	Get to libraries	0(0)	0(0)	0(0)	120(100)
8	Use public drinking-fountains	0(0)	0(0)	12(10)	108(90)
9	Use public toilets	0(0)	0(0)	0(0)	120(100)
10	Get to religious places	0(0)	0(0)	0(0)	120(100)
11	Get to gyms	0(0)	0(0)	6(5)	114(95)
12	Get into shopping centers	0(0)	0(0)	6(5)	114(95)
13	Use public & private recreational	0(0)	0(0)	6(5)	114(95)
14	Get to cinemas	0(0)	0(0)	12(10)	108(90)
15	Get in park & use their facilities	0(0)	0(0)	12(10)	108(90)
16	Go to restaurant & eat lunch	0(0)	0(0)	12(10)	108(90)
17	Get to bus stations/buses	0(0)	0(0)	0(0)	120(100)
18	Going around as pedestrians	0(0)	12(10)	96(80)	12(10)
19	Getting to beaches	0(0)	0(0)	0(0)	120(100)
20	Getting to registration offices	0(0)	0(0)	0(0)	120(100)

Table 1: The distribution of the ability of wheelchair users in utilizing urban facilities, Sari 2011.

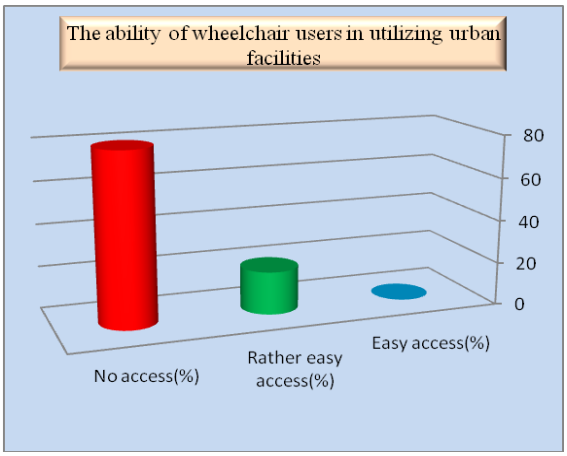

Fig 1: The access of wheelchair users to urban facilities, Sari 2011

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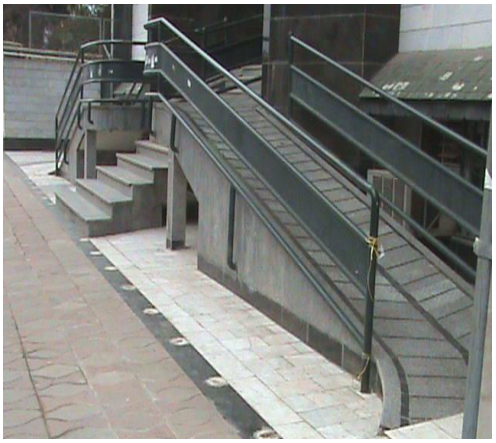
Editors: Manfred SCHRENK, Vasily V. POPOVICH, Peter ZEILE, Pietro ELISEI

How can disabled persons take advantage from urban facilities when they cannot get into the buildings and areas? (All photos have been taken by author, Sari, September 2011)


Picture 1: The ramp isn't standard and wheelchair users could not go to beach. Picture 2: There is no ramp in the beach.

Picture 3: The ramp is not standard and suitable for the disabled

Picture 4: An entrance to a general hospital, the slope of ramp is not standard and is unprotected border. Picture 5: Ramp of inappropriate slope for access into a clinic.


Pictures 6 and 7: A not standard ramp to a bank.

5 DISCUSSION & CONCLUSION

The study showed almost all of urban facilities were not appropriate for wheelchair users. In another research that was performed on private and public buildings in Sari, we found that they were not suitable for these people (12). In spite of the existence of law since more than 11 years in the country, the majority of urban areas didn't meet the urban designs criteria (13). Some research showed in many areas of Tehran in Iran, there aren't the minimum amenities for the disabled and no appropriate welfare amenities and facilities based on their needs are considered. Streets, sidewalks, shopping centers, educational centers, hospitals and other urban facilities still are far from global standards. In most European and American countries that number of their disabled and elderly are far less than Iran, attention to this stratum of society is enormous. There is direct relationship between levels of development of countries; citizenship rights and considering all strata of society especially disabled persons (8, 14). There are international and national legislations for the disabled and many countries especially the developed countries performed them so that the people with disabilities could work and attend in the society (15-25). We all may experience some types of disabilities in different periods of our life. Every person has ability to be an active member of society. Disabled people have equal rights and duties. The authorities and government should provide career and vocational opportunities for them. They should try to renovate the existing buildings and inspect new spaces so that every person could utilize urban facilities without segregation. The urban facilities should help them to put their abilities in beneficial way because they have right to live and feel pleasure like normal people. Because almost all of cities in Iran don't have standard designs for people with disabilities, we recommend the international conventions observe Iran as a pilot country so that all can take advantage of the same facilities in the society.

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The Effects of Mobility Management for Companies in the Course of the German Mobility Management Action Programme "effizient mobil"

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1 ABSTRACT

The Action Programme "effizient mobil" of the German Energy Agency is funded by the Federal Ministry for the Environment. It aims for a further dissemination of Mobility Management (MM), as this concept is so far mainly implemented on an ad hoc basis. MM measures promote environment friendly transport modes and an efficient use of the existing transport systems. By shifting trips from cars to environment friendly transport modes noise exposure, pollutant emission, land consumption and separating effects on people´s living space can be reduced. The programme supports the uptake and the effective implementation of MM, both within the municipalities and for different sites and organisations. In the first phase of the programme 15 regional networks are established to address municipalities and companies and to involve different regional actors. In the second phase more than 100 municipalities and companies get free of charge consulting that leads to a specific concept taking the framework conditions into account. The programme has a special focus on possible CO_2 reduction in order to point out the positive outcome of MM on the climate. For MM in companies the possible CO_2 reduction has been estimated by analysing the mobility concepts and data about the staff's mobility behaviour and the current site characteristics and quality of available mobility options. For estimating the possible CO_2 reduction a two-step approach was developed. It takes different factors in regards to the possible effect into account and calculates in the first step a theoretical potential of CO_2 reduction based on more objective factors. The second step looks at the more realistic potential due to the share that can be achieved in relation to the planned measures.

By extrapolating the data obtained in the staff surveys conducted as part of the consultation sessions it can be seen that there are, in the companies surveyed, around 53,000 people driving to work by car. About 28 % of these cannot use other forms of transportation (bicycle / public transport / car pools) due to their individual circumstances. However, 72 % could, at least in theory, shift to other means of transport. To what extent this potential is tapped depends on the proposed measures and on the local quality of the alternative means of transport. An analysis of 85 concepts showed that on average 26 % of the theoretical potential is being tapped. A full implementation of all concepts of the participating companies could lead to a total CO_2 reduction of 23,600 t/a.

2 INTRODUCTION AND BACKGROUND

Even though Mobility Management is more and more seen as a suitable approach to meet the challenges of mobility and transport, a nationwide and top down strategy has been missing in Germany so far. The action programme "effizient.mobil" of the German Energy Agency (dena) (present runtime 01/2009–12/2010) is the first attempt to go a more systematic way to foster Mobility Management strategies and implementations.

It is funded by the Federal Ministry for the Environment (BMU). It aims for a further dissemination of Mobility Management, as this concept is so far mainly implemented on an ad hoc basis. The programme supports the uptake and the effective implementation of Mobility Management, both within the municipalities and for different sites and organisations. Effective structures shall be established which support a better institutional anchoring and a better integration into suitable strategies and programmes. So far more than 100 municipalities and companies got free of charge consulting that leads to a specific concept taking the framework conditions into account.

A special focus is laid on possible CO_2-reduction. It is estimated by analysing the mobility concepts and data about the staff's mobility behaviour and the current site characteristics and quality of available mobility options.

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Editors: Manfred SCHRENK, Vasily V. POPOVICH, Peter ZEILE, Pietro ELISEI

In detail the programme aims at the following:

- Initialisation and encouragement of conceptual design and implementation in order to support concrete Mobility Management strategies and measures on the municipalities' level as well as on the site level.
- Creation of a nationwide network of stakeholders to concentrate the knowledge and to use it for an area-wide implementation of Mobility Management.
- Anchoring of the subject in politics and the public
- Evaluation of the effects on a structural and organisational level and development of a standardised method and tools to estimate the expected CO2-reduction of the programme.

The ISB-Institute for Urban and Transport Planning and the ILS-Research Institutes for Regional and Urban Development are assigned with both the evaluation of processes (mainly ILS) and the estimation of effects (mainly ISB). That is why the paper concentrates on the last bullet point and here mainly on the method and tools to estimate the excepted CO_2-reduction of the programme. In addition first results relating to potential CO_2-reductions are presented.

3 GENERAL APPROACH OF THE EVALUATION

The evaluation of the processes takes place throughout the whole project duration. Therefore results will be available at the end of the project runtime (until end of 2010). The process evaluation looks at all relevant procedures and processes within the action programme. With the help of interviews and surveys with the regional coordinators the effectiveness of the coordination offices for the regional networks in regards to their networking capabilities and the dissemination of the concept of Mobility Management will be deeply analysed. A survey of all mobility advisors and beneficiaries will generate findings about factors of success in the consultation processes.

The estimation of possible CO_2 reduction will be described in detail in the following chapter.

4 ESTIMATION OF THE POTENTIAL OF CO2 REDUCTION

Mobility management is a concept to promote sustainable transport by the use of "soft" measures like information, communication, organisation and coordination, as well as an accompanying marketing. Thereby different fields are distinguished. Mobility management for cities and regions is mainly strategically. At this level measures aim to create the basis for further mobility management measures, linking the policy level with the management level in order to ensure the support of the responsible authorities or management and create new offers like car sharing or new public transport tickets. Mobility centres offer intermodal information about travel options. Mobility management for target groups or locations develops concepts based on the individual demands and conditions of the group or location, e.g. mobility packages for new citizens. Accordingly mobility management in companies focuses mainly on employees. Measures aim at the promotion of environment friendly transport modes such as adjusting the public transport schedules to the working time at companies, establishing job tickets or participate in action programmes such as "Cycling to work" [1].

Within the framework of the project the development of a method to estimate the CO_2 reduction focuses on mobility management in companies, because most of the mobility management concepts within the programme are made for companies. Due to the strategically focus of mobility management for cities and regions the benefit of these concepts cannot be estimated by the reduction of CO_2.

The base for the development of a standardized assessment of soft measures and the estimation of CO_2 reduction for these measures is complex. On one hand mobility management combines many different measures, which have different effects and can be combined in different ways in concepts in order to adapt the services to the specific individual needs and demands. On the other hand there are just a few mobility management measures or concepts which have been verified due to their effect on modal shift.

[1] ILS, ISB (2000)

Examples for scientific evaluated measures are the Dialogue Marketing Campaigns for New Citizens [2] or the mobility management for companies at Infineon in Dresden [3].

Mobility management measures have effects on different target fields (see fig. 1). With the aim to promote the environment friendly transport modes and an efficient use of the existing transport systems mobility management has an important effect on the environment. By shifting trips from cars to environment friendly transport modes noise exposure, pollutant emission, land consumption and separating effects on people´s living space can be reduced. Another target field of mobility management is health. The modal shift from car use to non-motorized transport leads to more exercise and therefore to a better health. The safety of transport can be described by the number of accidents due to transport modes. As each mode has a different accident rate (the risk of an accident is higher for nonmotorized modes) modal shift has an impact on safety. In addition mobility management has an influence on costs. On the one hand the measures can lead to decrease mobility costs of people, if trips are shifted from car to environment friendly transport modes. On the other hand companies or authorities need to carry the costs of the measures.

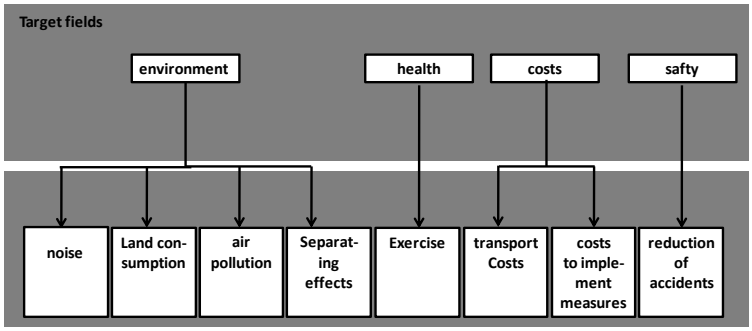

Fig. 1 Target fields of Mobility management Within the framework of the project the focus is on the estimation of CO2 reduction in order to point out the positive outcome of mobility management on the climate.

5 REQUIRED DATA

The essential factor to estimate effects is the available data on which the method can base on. Therefore the survey of the parameters which have an influence on the effects of mobility management measures plays a crucial role.

- The outcome is in general influenced by:
- Conditions of location and surroundings
- Activities of the companies and
- the travel behaviour and opportunities of the employees

As part of the project these data are measured with different survey tools. The conditions of location and surroundings are recorded trough a standardized profile of the companies. This profile consists of collected data of the location and the circumstances of the companies. This includes the existing accessibility to public transport, the existing bike infrastructure in the surroundings, the situation for pedestrians, the existing accessibility for motorized transport and the situation of stationary transport. In addition information about the activities of the company are recorded through the profile such as if sustainability is already an issue in the company. In order to determine the travel behaviour and the opportunities of the employees an employee survey is carried out. For this a questionnaire was developed based on the data needed to estimate the CO_2 reduction. The data collected is for example the frequency of use of transport modes of the employees, the availability of transport modes and the reasons for car-use.

In addition to this survey the distances from residence to workplace of the employees is calculated by using residence location data. This is the basis to determine the distance travelled of trips to and from work.

[2] ISB (2009)
[3] PGN, BiP (2003)

6 METHOD TO ESTIMATE THE CO_2 REDUCTION OF MOBILITY MANAGEMENT MEASURES

The estimation of the potential of CO_2 reduction of trips to and from work is based on the reduced distance travelled by motorized private transport. The kilometres of motorized private transport are calculated by today's distance travelled and the estimated distance travelled after the implementation of the measures proposed in the concept. The change in CO_2 emissions by public transport is more difficult to calculate because there is no information about the occupancy rate in public transport in the different regions. Therefore it has been neglected in this method.

Today's distance travelled by motorized private transport is calculated by the distance between residence and workplace of the employees and their use of motorized private transport. The estimation of the distance travelled made by motorized private transport after the implementation of mobility management measures is based on the collected data of conditions of location and surroundings and the travel behaviour and opportunities of the employees. Figure 2 shows an overview of the steps of the estimation. In a first step a theoretical potential is determined. This is defined by the proportion of car-users that could be shifted to different modes of transport, based on their personal conditions. The conditions of the location determine the level of this potential which can be obtained by the measures proposed in the concept.

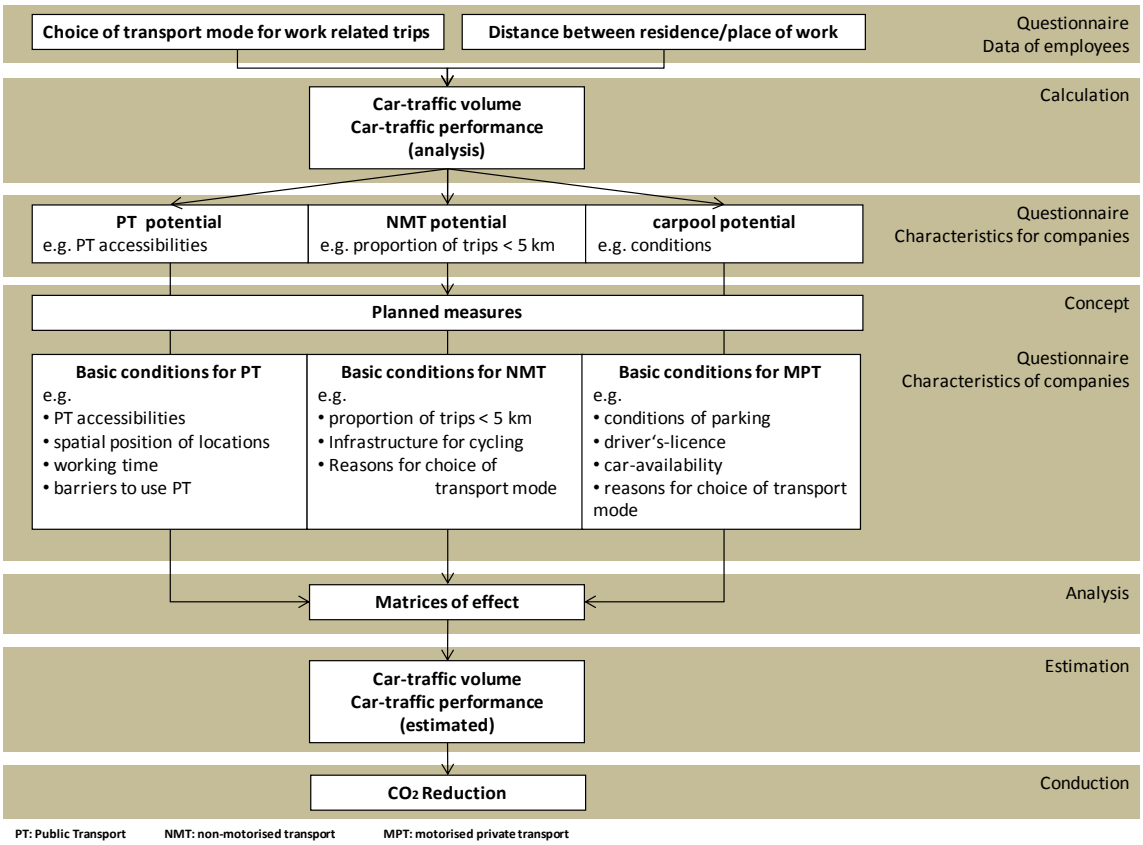

Fig. 2 Overview of the estimation

The determination of the theoretical potential is carried out on the basis of the car-drivers. This group of people is divided based on their personal circumstances weather they can be shifted to other modes of transport or not. The group of car users is divided into those who can theoretically use a bike or walk, those who can use public transport, those who are willing to use car pooling and a group of car users which have to use the car due to their personal circumstances.

This classification of people is carried out based on the data collected from the employee survey (see figure 3). In a first step the group of car users is divided in potential pedestrians and cyclist and potential public transport users based on the distance between residence and workplace. Those people whose trips to work are less than three kilometres are fully added to the potential of non-motorized transport, those whose trips have more than five kilometres are fully added to the potential of public transport. Car users with trips between three and five kilometres are divided into the potential of non-motorized transport and public

transport due to the quality of the location for public transport and non-motorized transport. The result is a clear assignment of each person to one potential group. The interaction of public transport and non-motorized transport can be neglected in this context, since the CO_2 estimation is based on the change of distance travelled by car.

In a second step the potential groups of cyclists and pedestrians as well as public transport are further divided by different parameters such as the availability of transport, the working time model, the ownership of a bike or the reasons for car use. People, who for instance live in an area with no public transport service to their workplace, are split off at this point. The result is a number of car users who can theoretically be shifted to public transport and non-motorized transport. The remaining persons are divided into a car pooling potential and those, who cannot be shifted to other transport modes based on their circumstances and their personal attitude towards car pooling.

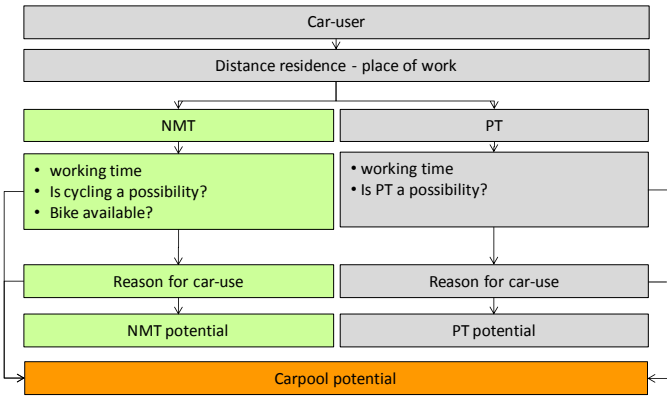

Fig. 3 Simplified description of the determination of the theoretical potential

The rate of the theoretical potential which can be realized is estimated depending on the proposed mobility management measures of the concept and the conditions at the location for different modes of transport. As mentioned before there is only little knowledge about the effects of mobility management measures. Therefore calibration and validation of the estimation method can only be made based on these few conclusions. In general it may be said, that the presented method needs to be calibrated and developed further with additional empirical data that needs to be generated.

The measures proposed in the concept for the companies are classified in three categories by their probability to obtain a modal shift. It is hereby considered that, for example a job-ticket with a high cost-reduction compared to a monthly ticket has a higher effect on the modal split of the employees than information about public transport service in general. The classification of the measures is based on a Delphi survey carried out with the regional coordinators of the programme.

To take into account the conditions at the location for different modes of transport the quality of the location for the different transport modes is classified.

Due to the effect of restrictions in stationary traffic these types of measures are separately taken into account. The restriction of motorized private transport at the location of the companies is classified based on the following factors:

- number of company-owned parking spaces
- authorization for use the company-owned parking spaces
- fees for company-owned parking spaces
- utilization of company-owned parking spaces
- parking space management in public space
- utilization of parking space in public space

Measures that increase the restriction of motorized private transport such as the increase of fees are considered in the classification of the location. Each factor is weighted according to its influence. The specifications of each factor are marked with points. According to the total mark the total restriction of motorized private transport of the location can be ranked.

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The quality of a location for non-motorized transport and public transport is classified by the influencing factors such as location of the company and existing infrastructure and service. To classify the quality of public transport at the company`s location the following factors will be considered:

- location/spatial position of the company
- existence of a rail network
- existence of a tram or subway network
- distance to the next public transport stop
- travel time to the city centre
- travel time to the next rail station
- number of arrivals between 7 and 9 o'clock or in a two-hour-range at start of work (if working hours start differently)
- accessibility to company grounds

Each factor is weighted according to its influence. The specifications of each factor are marked with points. According to the total mark the quality of the location for public transport can be ranked.

To evaluate the quality of the location for non-motorized transport the attitude towards cycling is taken into account on the basis of the proportion of urban bicycle traffic. In addition the opportunities to park bikes, the infrastructure and the accessibility to company grounds is considered. In particular the following factors will be considered:

- proportion of urban bicycle traffic
- quality of bicycle racks
- utilization of bicycle racks
- existence of showers and dressing rooms
- quality of bike infrastructure in the area of the company
- accessibility to company grounds

The factors are weighted due to their influence and marked with points. Based on the total mark the quality of the location for non-motorized transport can be ranked.

The quality of the location for car pooling is not classified since there will be only little influence on the effect of the measures due to small differences in quality for motorised private transport.

Based on the classification of the location for different modes of transport and the proposed measures of the concept the rate of the theoretical potential which can be realized is estimated. By multiplying the theoretical potential with the rate which can be realized the estimated number of shifted car users is calculated. The distance travelled by motorized private transport is obtained by multiplying this estimated number of shifted car users and the distance of trips to and from work.

7 RESULTS OF THE CLASSIFICATION OF LOCATION

The companies that took part in the programme differ by number of employees, business sector, location and accessibility for different modes of transport. So does the classification of their locations. The classification of non-motorized transport and public transport is classified in the three categories good, moderate and poor, whereas the classification of motorized private transport is classified in the three categories strong restriction, moderate restriction and poor restriction.

The analysis is based on data from 85 companies. It shows that with 64% of all locations a major proportion is well accessible by public transport only a few locations are difficult to access. The classification of location for non-motorized transport is in the upper and medium range. At many locations there is already a high restriction of motorized private transport (47 % of the locations). At 18% of the locations though is only little or no restriction (cf. figure 4 and 5).

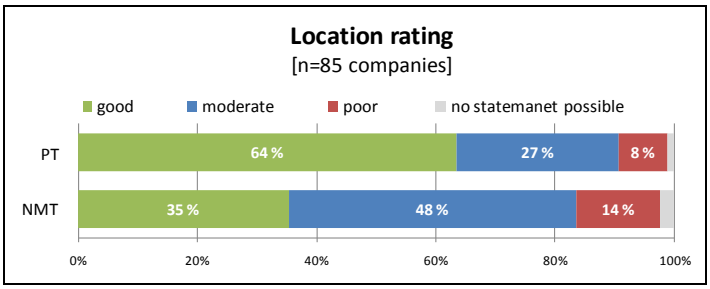

Fig. 4 Results of the classification of location–non-motorized und public transport

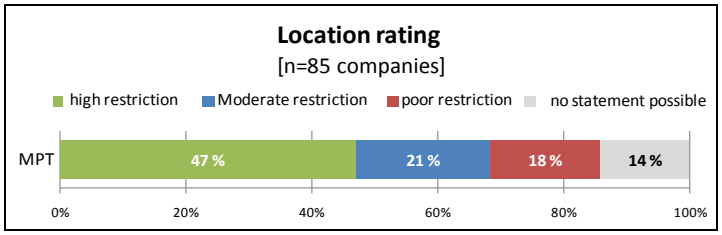

Fig. 5 Results of the classification of location–motorized private transport

By examining the classification of location with regard to the spatial position of the company in town it is obvious that, with exception of few locations, urban locations have a better accessibility for public transport due to their higher-valued offer. The classification of non-motorized transport is in the middle range for urban locations while locations at a periphery position are distributed across all ranges with tendency to good location for non-motorized transport. As expected the restriction of motorized private transport is in urban areas relatively high due to lack of parking spaces and the related management and utilization fees of these (cf. figure 6 and 7).

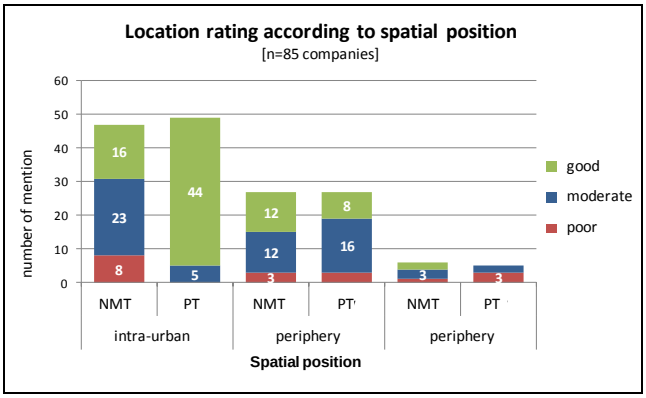

Fig. 6 Results of the classification of location–acc. to spatial position–non-motorized and public transport

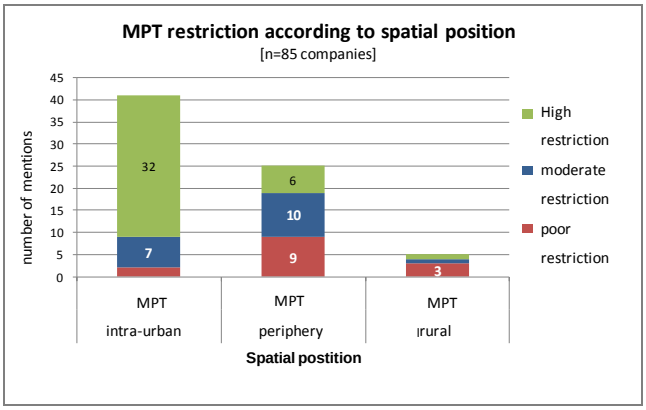

Fig. 7 Results of the classification of location–acc. to spatial position–motorized private transport

The analysis of the classification of location according to the business sector shows a heterogeneous dispersion. At first it is noticeable that public institutions are well accessible by public transport and the restriction of motorized private transport is high. However the explanation of this correlation is that most of

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public institutions are situated in the urban area. The classifications have no correlation with the size of the company, measured by the number of employees.

8 RESULTS OF THE THEORETICAL POTENTIAL

Based on the employee survey about 53.000 people out of 102.794 employees can be identified, who use a car for their trip to and from work each day. About 28% of these people cannot be shifted to either environment friendly transport modes or car pooling due to their individual circumstances. The majority of the remaining car users, 33%, could be shifted to public transport. In addition about 13% could be shifted to public transport if the travel time with public transport could be reduced due to measures improving the public transport supply (additional PT potential). The theoretical potential of non-motorized transport is about 6%, this seems to be relatively low compared to today's car-users (cf. fig. 8). But it shall be taken into account that the potential of non-motorized transport is based on a distance of max. 5 kilometres between residence and workplace. This distance may be considered to be, manageable by bike especially for those who are used to go by car to and from work each day.

The theoretical potential of those people, who use a car between one and three times a week for their trips to work, is rather similar. But in comparison to the high proportion of daily car users only a small number of people drive to work 1-3 times a week by car, therefore only daily car users are depict in the following analysis.

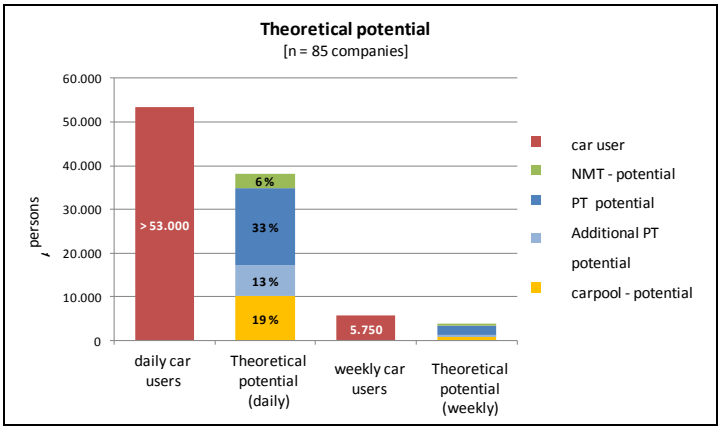

Fig. 8 Results of the theoretical potential

Car-drivers who are employed at a company in an urban area or in the periphery could be easier shifted to non-motorized transport than those who are employed in rural areas. In rural areas, due to the lack of public transport offer, only few car-users could be shifted to public transport, however they could be shifted to car pooling (cf. figure 9).

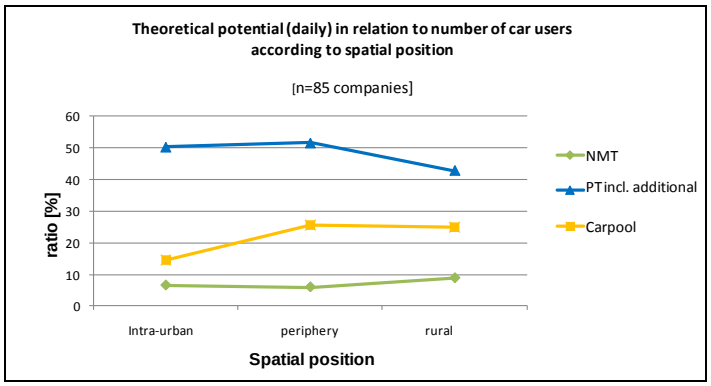

Fig. 9 Results of the theoretical potential–acc. to the location

8.1 Modal shift due to the measures proposed in the concepts

The level of the theoretical potential which can be obtained by the proposed measures depends on the quality of location for each transport mode. The better the public transport quality of a location and the higher the restriction of motorized private transport is, the higher is the proportion of the theoretical potential that can

be obtained. The calibration of this method is made on basis of evaluated examples. Since there are just few examples available which have been evaluated it is necessary that the calibration continues with further empirical data.

The estimation of the 85 concepts shows that on an average 26% of the theoretical potential could be obtained. Averaged 119 daily and 17 weekly car users of each type of location could be shifted (see figure 10).

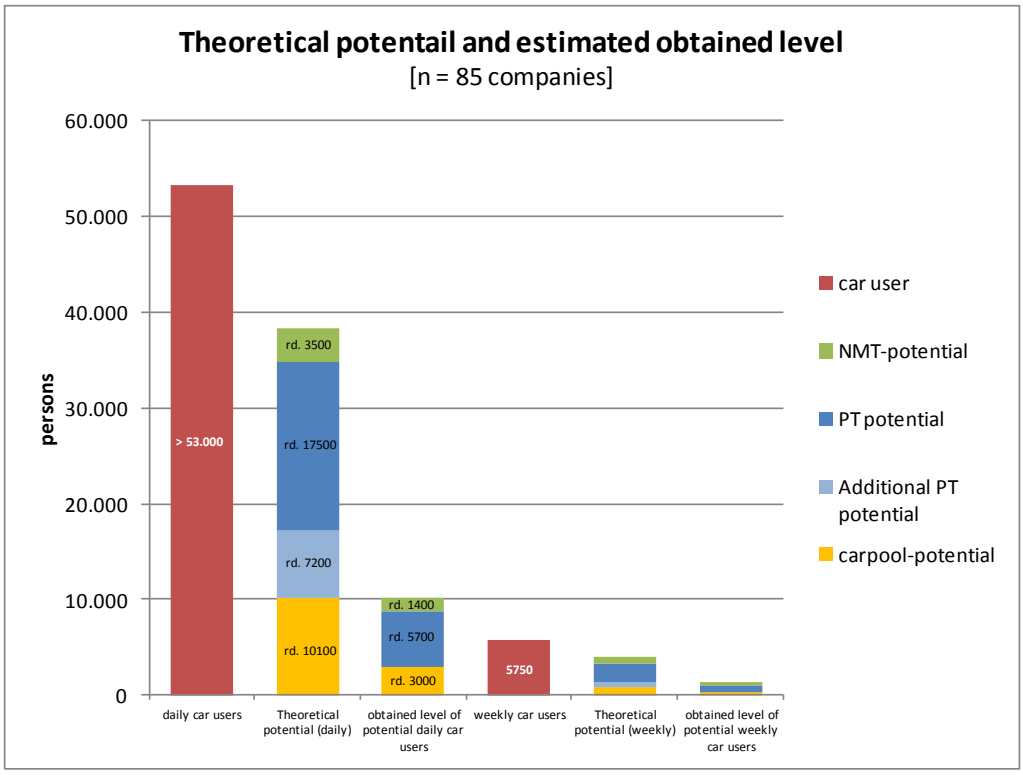

Fig. 10 Part of the theoretical potential which can be obtained

8.2 Potential of the concepts to reduce CO_2

To determine the reduction of CO_2 the estimated reduction of car distance travelled is multiplied by an average CO_2 value for cars (177 g/km).

A full implementation of the concepts of these 85 evaluated companies would lead to an average CO_2 reduction of 0.19 t/a for each employee and an average reduction of 248 t/a for each company. The total CO_2 reduction of these 45 companies is about 23.000 t/a.

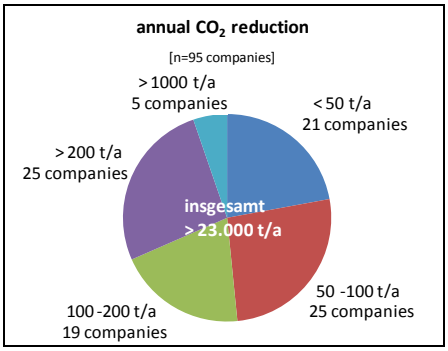

Fig. 11 Annual CO_2 reduction

9 CONCLUSION AND PERSPECTIVE

By extrapolating the data obtained it can be seen that there are, in the companies surveyed, in all some 53000 people driving to work by car. Some 28 % of these cannot use other forms (public transport / car pools) due to their individual circumstances. However, 72 % could, at least in theory, shift to other means of transport. To what extent this potential is tapped is dependent on the proposed measures and on the locational quality

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of the alternative means of transport. An analysis of the 85 concepts showed that on average 26 % of the theoretical potential is being tapped.

As mentioned at the beginning it is not possible to calibrate all possible combinations of locations and measures with existing examples, since there is only little knowledge about the effects of mobility management measures so far. Therefore the different combinations of measures may, with regard to their potential of shift, only be classified roughly. In general it may be said that there is only little empirical data available, so that the presented method needs to be developed with additional data. This data needs to be generated.

With the standardized survey tools the programme offers the opportunity to carry out a comparison of the situation before and after the implementation of the concepts and evaluate the effect of realized measures.

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PGN, BiP Betriebsbezogenes Mobilitätsmanagement und Stadtentwicklung; Forschungsprojekt des experimentellen Wohnungs- und Städtebaus (ExWoSt) des Bundesministeriums für Verkehr; Bau und Stadtentwicklung (BMVBS); Planungsgruppe Nord (PGN),Büro für integrierte Planung (BiP); Dresden, 2003

reviewed paper

The Egyptian Revolution from the Perspective of an Urban Planner: Demonstrations on the Streets of Alexandria, Egypt

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1 ABSTRACT

Urban design is mainly about connecting people and places, movement and urban form, nature and the built fabric. Hence, one of the aims of urban design should always be that humans lie in the focal point of the design and not only technical infrastructure or buildings. Egyptian public spaces play an important role to activate demonstrators socially and even politically, inspiring the whole world. Public squares were and still are playing a valuable role in political changes all through the country.

Urban spaces have different impacts on humans' feelings and perception. Those feelings are affected directly and indirectly through urban settings, human masses or crowds, topography, distance, weather, etc. This leads to the need of developing new methods to measure the feelings of people in urban spaces. "SMART-Bands" are ambulatory assessment devices that measure how people feel in their city and how they react to the surrounding built and non-built environments. These devices can measure body parameters in real-time, like skin temperature, skin conductance and heart rate, as indicators for human emotions.

This paper presents a human urban experience on one of the protesting events in Alexandria using "SMART-Bands" as a tool for collecting protestors' feelings. The case study covers one of the major arteries of the city, with its variations of width, topography, and street furniture. It documents the whole experience of two different participants walking within the crowds, and living the whole experience with changing weather conditions, crowd density, and street settings.

This experimental research is considered as a pilot stage for similar in-depth studies that could lead to a new way of thinking about urban planning and public participation.

2 INTRODUCTION

For a long time in Egypt, younger generations were often perceived to be arrogant or spoiled when expressing their ideas. Being unaccepted from the elderly forced them to seek shelter in the virtual world for articulating themselves (Youssef, C. 2011). However, starting from 2008 groups of youngsters (such as 6 April Movement) started to switch from the virtual to the real world, and started going on strikes and demonstrations opposing the old regime. The call for January 25th demonstrations were first initiated by those groups, and then followed by the rest of the population (Shabab 6 April, 2012).

When masses of young Egyptians flowed into the streets during the revolution days in Cairo, Alexandria, and allover Egypt, it has been learned that the "virtual streets" for demonstrating that were percolating on various social media web sites were not entirely separated from actual, physical ones. Hence, public streets began to be the most motivated arteries in Egypt (Figure 1). At that time the unprecedented scene of streets and squares packed with people became an urban brand for Egypt and an icon for liberty and freedom for both Egyptians and Non-Egyptians.

Figure 1: El Tahrir Square, Cairo (BBC, 2011), El Corniche Boulevard & Port Said Street, Alexandria (author)

Public open spaces can take the responsibility as key design elements for enhancing urban life quality and to reduce the negative effects of urbanisation. For that sake, open spaces must meet the expectations of

potential users and offer the suitable mix of environmental, economic, social, and even political conditions (Bruse, 2007; Raslan, Bakr, & Ayad, 2011).

Designing public spaces, which are accepted and used by pedestrians, is a challenging task for urban planners as it deals with a multitude of different disciplines. There are several factors that directly and indirectly affect the pedestrians' behaviour in public open spaces, such as the right mix of sun and shade, the presence of windy and calm areas, spaces and streets conditions, topography, multitude of different materials used in the urban fabric and the arrangement of buildings, trees, and other urban objects besides the surroundings situation and crowd characteristics.

3 OBJECTIVES

Conventionally, urban planners depend on data gathered by professionals to aid them through their different design and decision making processes. Even when they tend to interview the different stakeholders, the process is deliberate, and tends to neglect intangible parameters that stakeholders find difficult to spell out. Hence, it is of great importance to make use of state-of-the-art technologies to effectively and efficiently collect feelings sensed by users of those urban spaces.

The presented research investigates the use of "SMART-Bands" as a newly developed tool to collect demonstrators' feelings while parading one of the major arteries of the city of Alexandria. If the tested tool and technique proves to be useful, it can easily be implemented on many study areas to facilitate the tasks of urban decision makers for collecting users' attitudes towards urban spaces.

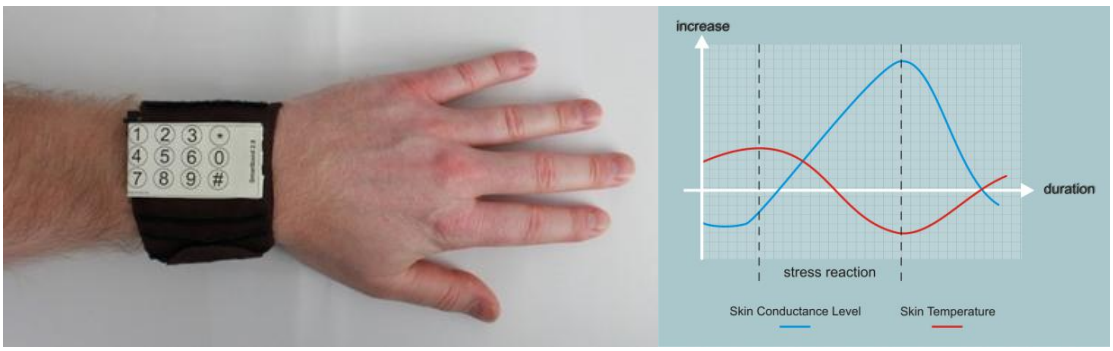
4 METHODOLOGY

This research is a pilot study to test how useful "SMART-Bands" can be for urban decision makers. Although the sample size is not representative, however, such a research pinpoints potentials and limitations for upcoming, more elaborate studies using the same tool.

4.1 Emotion measurement with physiological vital data

Emotions can be observed in many different ways. In the research at hand a new technical device, the sensor wrist-band called SMART-Band (Figure 2), is used to measure changing body physiology as a consequence of the actual feelings and emotions of the participants. Based on previous research in the new field of Affective Sciences (NFS Affective Sciences, 2011) and classical emotion research, emotional reactions are reflected in changes in the activity of the autonomic nervous system. As a result of this activity, specific physiological parameters (e.g. skin conductance and skin temperature) show different values depending on the actual emotion (Kreibig, 2010). These parameters are classified as vital data of the individual. In this context, the so-called method of the psychophysiological monitoring implies the recording of objective vital data in real-time and for every instant. With the help of this data unswayed affective emotions are derived. For the measurement of the participants' feelings during the Egyptian demonstrations, the identifying of mental load (stress) with the help of physiological indicators is obvious. Stress can be understood as a product of anger and fear, both considered as highly negative emotions (Bergner et al. 2011). In this explicit situation the actual surroundings, the pressure of the crowd or the imminent danger of conflicts arising can elicit stress reactions.

A negative emotion is given, when the skin conductibility increases and shortly afterwards, the skin temperature drops (Bergner et al. 2011). The following graphical curves illustrate this process (Figure 3). The slope values of the curves can be used for statistical analysis. The mathematical function of these parameters and their curves is simplified with the first derivation. The method of using scoring points (increase in skin conductibility = Scoring +1; decrease in skin temperature = -1) was previously used in several studies (Bergner et al. 2011).



Figures 2 and 3: The SMART-Band (own source) and Physiological Stress Reaction (Bergner et al. 2011)

Due to recording the data for every second during the study, it can be coupled and synchronized with GPS- and video camera data without difficulty. This offers new perspectives to understand the participants' feelings and emotions in the context of their actual surroundings. This approach was already pursued in several project studies. First test series were done in the emomap-project (Zeile, 2010). Furthermore, the so-called EmBaGIS (Emotional Barrier-GIS)-studies were conducted in the context of urban spatial barriers for handicapped (Bergner et al., 2011). Only recently studies concerning the correlation of stress and noise load and also emotional sensing of urban green areas were carried out (Bergner et al. 2012). In all these studies, the SMART-Band (SMART-BAND by www.bodymonitor.de), developed by GESIS, the Leibnitz-Institute for Social Science in Mannheim/Germany (Papastefanou 2009), was used.

4.2 The selected path

While demonstrations in Cairo take place in El Tahrir-Square and neighbouring streets as an agglomoration space, in Alexandria the situation is different. Rather than staying in one place, demonstrators prefer walking in parades, circulation Alexandria's streets (Figure 4). During the first 18 days of the Egyptian Revolution, demonstrators marched from both east and west sides of the city (blue nodes) towards the small square across Sidi Gaber train station in the centre of Alexandria (green node). Another path, but less frequently used, was from Quaed Ibrahim Mosque towards Ras El Tin Palace (one of the Presidential Palaces in Alexandria) located further to the west edge of the city.

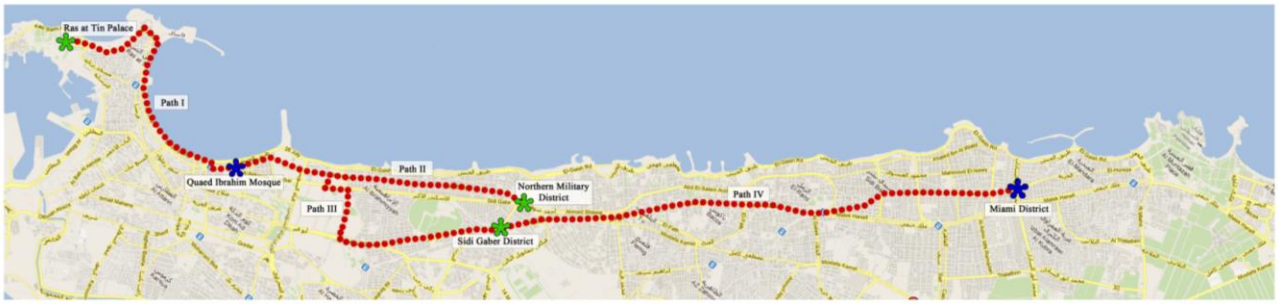


Figure 4: Map of Alexandria Showing the Different Paths Demonstrators Took During 2011/2012

However, after Hosni Mubarak stepped down, demonstrators switched their destination towards the Northern Military District, since their dispute switched from being directed to the former ruler of Egypt (i.e. Hosni Mubarak) towards the current one: the Supreme Council of Armed Forces (SCAF), which is represented by the Northern Military District. Hence, demonstrators switched to the path studied by this research, a 4.34 Km strip stretching from El Quaed Ibrahim Mosque in El-Ramleh Station and ending by the Northern Military District in Sidi Gaber District. For research reasons, this path was sub-divided into ten sections (Table 1 & Figure 5) according to major intersections and presence of squares along the path.

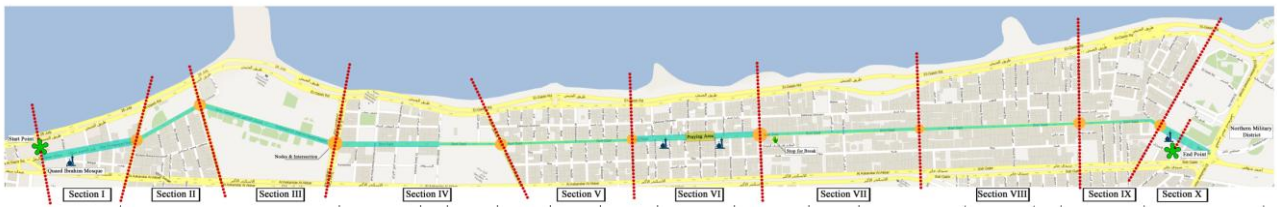


Figure 5: The Study Area Divided in Sub-Sections

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	From	To	Length (m)
Section I	El Quaed Ibrahim Mosque	Champollion Str.	380
Section II	Champollion Str.	Ali Mustafa Mosharafa Str.	277
Section III	Ali Mustafa Mosharafa Str.	Suez Canal Str.	520
Section IV	Suez Canal Str.	Mohamed Shafeek Ghorbal Str.	617
Section V	Mohamed Shafeek Ghorbal Str.	Ismail El Fangary Str.	485
Section VI	Ismail El Fangary Str.	Abbas El Halwany Str.	480
Section VII	Abbas El Halwany Str.	El Delta Str.	600
Section VIII	El Delta Str.	Medhat Seif El Yazal Str.	590
Section IX	Medhat Seif El Yazal Str.	Abdel Latif El Soufani Str.	295
Section X	Abdel Latif El Soufani Str.	El Zananiry Str.	100

Table 1: Street Sections and their Lengths

4.3 The event description

Similar to previous calls for demonstrations that take place on Fridays, this experiment took place on Friday, 18th of November 2011. It was another call for a million-participants-demonstration, where Moslem Brothers and Salafis were joining as well. Demonstrators agglomerated after noon prayers at the place across El Quaed Ibrahim Mosque and started their march around 1:15 pm towards the Northern Military District. The march lasted for almost three hours, with one pause made during that period for after-noon prayers. The weather was pleasant at the start of the march, but it started to drizzle after 2.5 hours, and to pour in the last 20 minutes. Two female participants took place in this experiment. They were equipped with one video camera and one GPS tracker for them, as well as one SMART-Band for each. Only one video camera was used, although two were available due to the long duration of the march and the fear that the capacity of one video camera might not cover the whole duration.

5 FINDINGS AND ANALYSIS

	From	To	Length (m)
Section I	El Quaed Ibrahim Mosque	Champollion Str.	380
Section II	Champollion Str.	Ali Mustafa Mosharafa Str.	277
Section III	Ali Mustafa Mosharafa Str.	Suez Canal Str.	520
Section IV	Suez Canal Str.	Mohamed Shafeek Ghorbal Str.	617
Section V	Mohamed Shafeek Ghorbal Str.	Ismail El Fangary Str.	485
Section VI	Ismail El Fangary Str.	Abbas El Halwany Str.	480
Section VII	Abbas El Halwany Str.	El Delta Str.	600
Section VIII	El Delta Str.	Medhat Seif El Yazal Str.	590
Section IX	Medhat Seif El Yazal Str.	Abdel Latif El Soufani Str.	295
Section X	Abdel Latif El Soufani Str.	El Zananiry Str.	100

Table 2: Average Pedestrian's Speed & Stress Response Count and Values per Street Section

Generally, participant A showed a higher amount of stress responses than participant B. Although the minimum and the average values of stress responses of both participants are pretty close, participant A again showed a higher maximum response during most of the demonstration path, except at the start and while approaching the destination. This can be due to different reasons; if the test person knows that she is approaching the destination, this can reduce the stress. Another reason might be that the test person got used to the situation and stopped showing high stress responses; or that the situation was not as stressful itself as in the middle of the path. Since there was only one test conducted during that research, one cannot determine which of those reasons caused the relaxed stress levels.

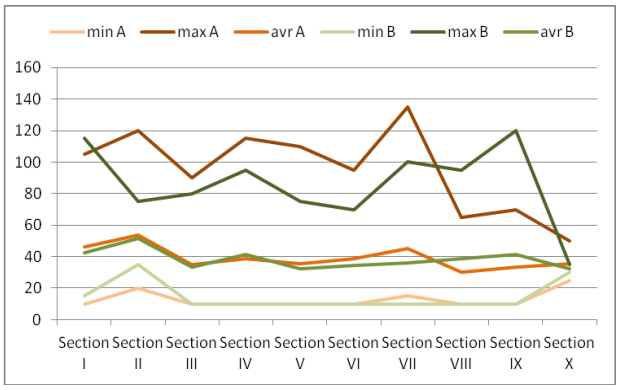

Figure 6: Min, Max, and Average Stress Values

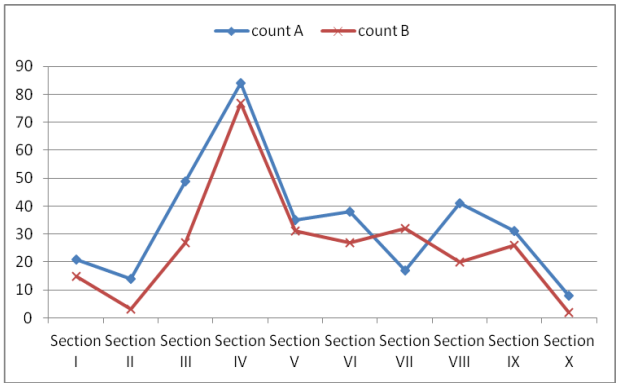

Figure 7: Amount of Stress Points within Each Street Section

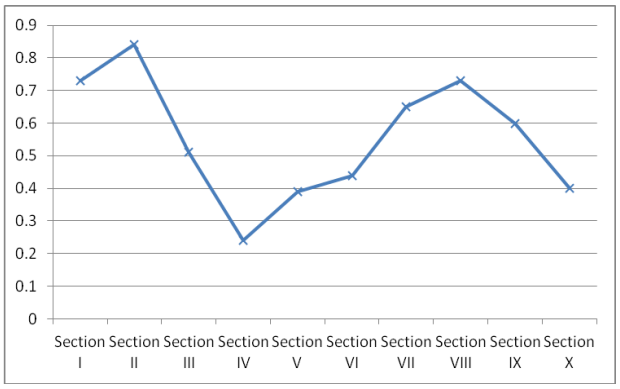

Figure 8: Average Pedestrian's Speed for Each Street Section

By comparing the amounts of stress points (Figure 7) with the pedestrians' average speed (Figure 8) within each street section, it is noticeable that generally whenever the amount of stress points rises, the slower the pedestrians' speed gets. For example, street section IV has the highest amount of stress reactions for both participants: 84 and 77; it also has the slowest speed: 0.24 m/s (Table 2). From reviewing the video data for this street section, it was noticed that during the 42 minutes needed to pass this 617m section, the density of the crowd got higher. This was due to the street profile getting narrower than the preceding section (Figure 10), as well as due to the parked cars on at least one side of the street. Hence, the demonstrators were slowed down, and sometimes even completely blocked, which caused the stress charted in street section IV.

If we neglect the first two street sections, where demonstrators were still fewer in number and still physically fitter, section IV showed the highest amount of stress reactions, while sections VII and IX showed the highest values of stress response (Figure 6). As clear from Figure 8, sections VII, VIII, and IX also represent the highest pedestrian speed: 0.65, 0.70, and 0.60 m/s respectively (Table 2). During this phase, the weather had changed dramatically and it was raining. This caused several things: first, many of demonstrators left due to the bad weather and the streets started to get less crowded; second, the remaining demonstrators had better chances to walk faster because of the less crowded street and also to get away from the rain, as well as people usually getting a boost of power while approaching their destination.

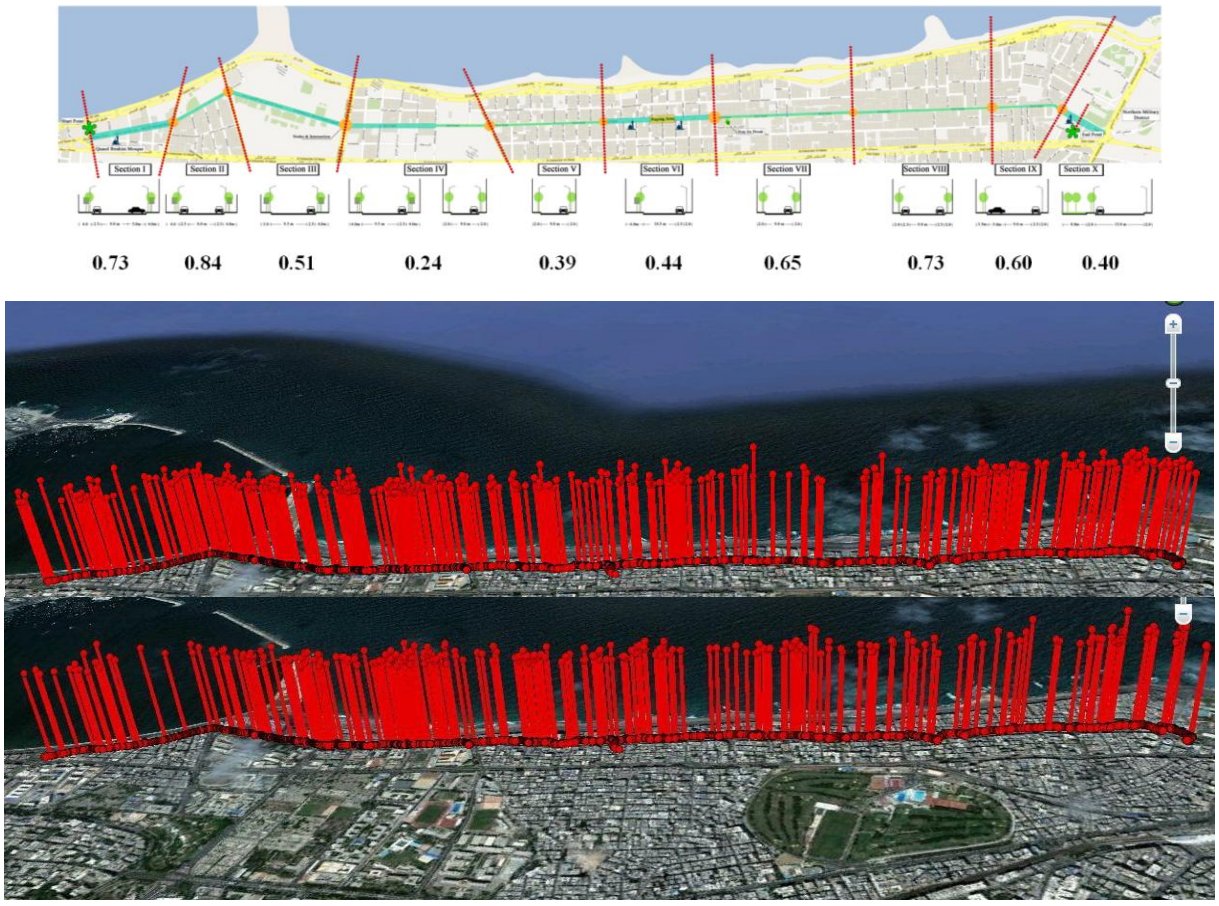

Figure 9: Street Profiles and Pedestrians' Speed at the Different 10 Street Sections along with Stress Profiles for Participants A & B

It was also clear that the pedestrian's average speed was proportional to the width of the path. The narrower the street the slower pedestrians got and vice versa (Figure 9). The only exception is in street section VI. Although the Street was 13m wide, with sidewalks of 6 and 2 meters width, the average speed was only 0.44 m/s. This is due to the time the demonstrators came to a complete stop for after-noon prayers, which drastically increased the amount of time for crossing this 480m stretch of path.

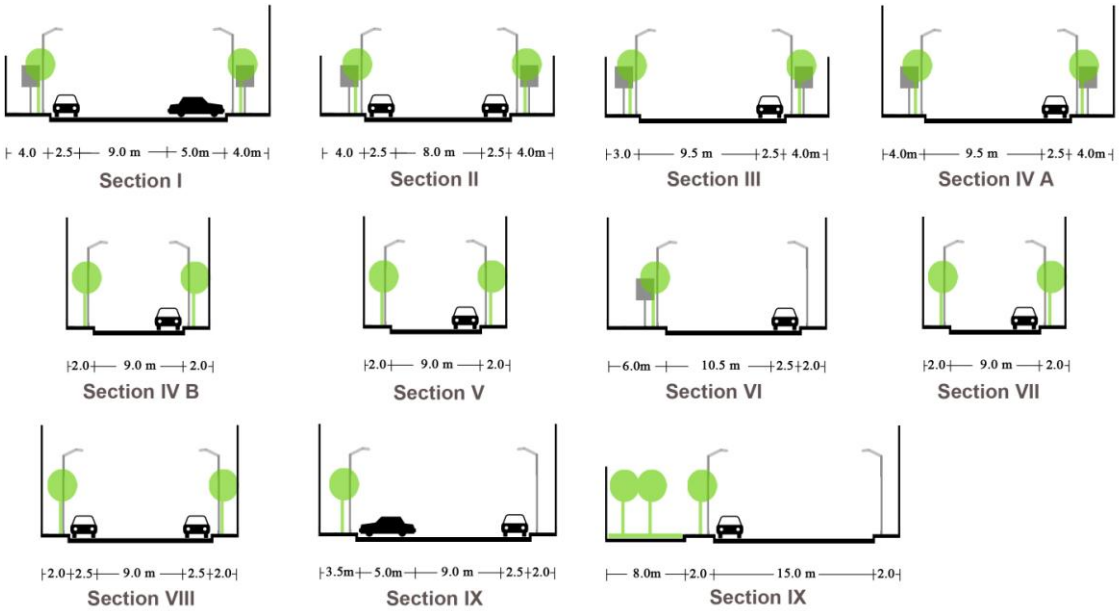

Figure 10: Detailed Street Profiles at the Different 10 Sections

Obstacles faced on the path also triggered stress responses. Such obstacles can be water patches on the streets due to bad pavements, clusters of garbage partially or completely blocking the sidewalks, shops

trespassing on sidewalks and hence reducing the usable part for pedestrians, as well as bad or missing pavements of sidewalks (Figure 11).

Figure 11: Different Obstacles that Trigger Stress Responses along the Path (author)

Just before major street intersections as well as right after squares, there were always high valued and high intensity stress responses charted (Figures 12 and 13). Both situations triggered stress reactions due to the increased intensity of crowds at those points. In the first case, cars crossing the intersections blocked the path of the demonstrators, forced pedestrians at the front to a stop and therefore blocked the rest of the march. In the second case, streets get almost triple in width at squares, so pedestrians spread out over the whole square, and then they had to squeeze again to fit into the regular street width, if not moreover blocked by any trashcans, street vendors, or parked cars.

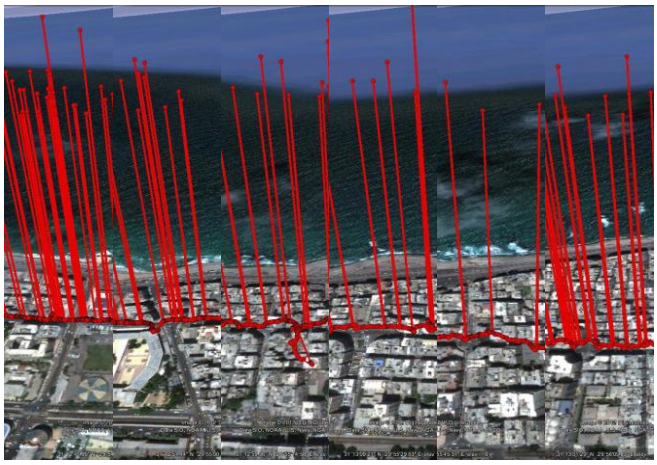

Figure 12: Stress Responses for Pedestrian A at Street Intersections and Squares

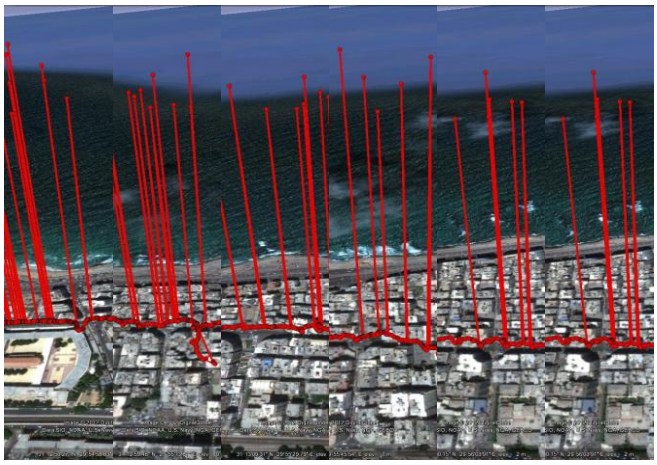

Figure 13: Stress Responses for Pedestrian B at Street Intersections and Squares

6 CONCLUSION

Unlike Cairo with its El-Tahrir Square, Alexandria lacks an open space of a proper size and a central location. Hence Alexandrians tended to marching demonstrations rather than agglomerating ones. The walk itself, along with the street conditions and people densities had their effects on demonstrators.

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The personal space is defined as an invisible bubble that surrounds an individual, and serves to maintain proper spacing between individuals. The size of this bubble varies according to different cultural, social, personality, and environmental dimensions (Hall, 1966). Stress values rose proportionally with the density of surrounding demonstrators. These rates rose higher, when the surrounding crowd was basically of the opposite sex due to the conservative culture still dominating in the region. Other reasons for triggering stress responses were the various types of obstacles blocking the path, the bad weather condition by the end of the path, as well as getting enthusiastic and cheering along with the rest of the demonstrators.

Because this experiment was limited in its number of testing subjects and testing locations, no definite results can be reported from it in a final manner, but it still provides useful knowledge about the usefulness of "SMART-Bands". It was adjudged that these devices are easy to handle, to wear comfortably during outdoor use, and provide useful information concerning how people perceive and react towards their built and non-built environments.

7 ACKNOWLEDGEMENT

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The Evaluation of Daily Urban System in the City of Rasht

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1 ABSTRACT

Developments of transportation system and asphalt roads network during the recent years, has been resulted in simple and quick accessibility toward Rasht city. Along with unique placement of population centers in this region, these developments have led to modern urban communicational systems between central city and these population centers. It considers that lots of daily traffics are flowing as "home-work-home" so that major structural changes have been arisen in communications and interaction among them. After evaluating and surveying daily urban system of Rasht city, it has been concluded that existing traditional planning such as Master Plan of Rasht City do not practically benefit from required function as strong interactions have not been considered among Rasht city and other urban and rural areas located in this region. Thus some suggestions have been proposed, so that all areas affected by this daily urban system may be controlled by a unified planning and urban management as well and also they may be managed and planned as an integrated complex in all cities whose populations are not as much as metropolises' but they have functions beyond a city.

2 INTRODUCTION

Generally, central region of Guilan province is a smooth and flat plain and Rasht city is located in this region so that it benefits from a very suitable condition for trafficking by individuals and vehicles. Short distances along suitable topography led to particular and unique condition for this region so that it exceptionally has linked population centers located in this region together during a gradual process unlike qualitative and quantitative development of asphalted road and considerable increase of vehicles as well. This process arose structural changes in urban system of the considered region. The present research has attempted to evaluate this daily urban system. It shows that function of Rasht city in this system is beyond a central city exerting a metropolitan impact and a strong traffic process in its periphery. Thus, it is significant to present a new definition for such cities in the state urban planning system.

3 METHODOLOGY

The research method is descriptive-analytical and data collected through different recourses. The data have been employed in this research including reports and literature reviews after extracting data, they were classified and organized in forms of maps, images and so on. Finally, data were analyzed as descriptive statistics, inductive test and so on.

4 THEORICAL FRAMEWORK AND DEFINATIONS

Urban system is, generally, "a set of related cities which creates structure of urban settlements system in an area, region, land and world". Urban system is not limited to a physical set of urban settlements but it also includes streams and relations among these settlements. These streams are population, investment, factors of production, ideas, information and innovations. Based on this definition, studying about urban systems which are open systems requires studying on their extensive relations with their surrounding area (Azimi, 2002).

4.1 Daily urban System

This system includes daily commuting (home-work-home), thus hierarchical system is not concluded. This kind of urban system includes a wide range of central city and all its surrounding and rural areas which are daily in relation with them regarding social-spatial or in other word functional issues and it also includes a wider range of urban assembly (Bertangolle et al, 2002). Laan has proposed a distinct classification of multi core urban structure use a classification of daily urban systems in four categories rather than drawing a distinction between mono centric or polycentric urban areas

(1) *Centralised*: these resemble monocentric systems in which morning peak-hour commuting is primarily directed towards the core city of the DUS.

(2) *Decentralised*: many morning commuters are attracted to the suburban parts of the system, where much employment is located.

(3) *Cross commuting*: these structures resemble the classic polycentric region consisting of relatively independent, self-contained development nodes. Suburban commuters tend to work in the suburbs; core-city residents often work in the core city.

(4) *Exchange commuting*: these systems have many reciprocal relationships between the suburbs and the core city. Many suburban commuters work in the city, while many central-city residents work in the suburbs (Laan, 1998).

4.2 Christaller Classic Urban System

The theory of core-periphery considers each geographic system as two spatial subsystems which one of them is dynamic core and the other is periphery centers which are dependant and submissive to the center. Theoreticians assert that these relations exist in intra-region areas and even in continental and global levels. According to this theory two forces are received by periphery from the core; favorable force that involves movement of investment from core to periphery and providing first materials for industries by the core.The consequence of this force is emergence a new core and its peripheries.(Andrew K. Copus 2001; Christaller, W 1933).

4.3 Definitions in Existing Theoretical Texts:

4.3.1 Central City

The largest city within a limited area of an urban system enjoying from a population of at least 200,000 inhabitants according the last census. It has a high economic, social and service integration with at least 2 other cities within its functional area as well. Functional area of a central city is at least 35 km.

4.3.2 Urban system

It is a geographical area that is made up of a central city and at least its 2 surrounding cities and rural areas around them. All surrounding areas have high economic, social and service integration with the central city.

4.3.3 Metropolitan Area

Metropolitan area refers to a large population center comprising a large city and its immediate sphere of influence or several cities and town and areas connected to them so that one or more large cities act as its center. Metropolitan areas usually comprise conurbations (areas constructed near each other) and its surrounding regions which do not have necessarily urban nature but are highly depended on central city regarding employment or business.

4.3.4 Urban Region

Urban region is urban centers' sphere of influence which is created from total influence sphere of various functions of an urban center. Range and form of an urban region for a particular function are depended on the following factors:

- Closeness of considered settlements to those settlements with the same function, especially settlements with the same size or larger.
- Nature and pattern of existing communication and transportation system and as a result accessibility of surrounding areas to central city.
- Number and size of existing functions in central city.
- Geographic status of central city and physical geography of surrounding areas.

4.4 Classifying Urban System in Iran

Urban system are classified in 3 main groups in Iran:

- While population of central city of an urban system according to the last official census is between 200,000 to 500,000 inhabitants, the urban system is called median urban complex.
- While population of central city of an urban system according to the last official census is between 500,000 to1,000,000 inhabitants, the urban system is called large urban complex.
- While population of central city of an urban system according to the last official census is 1,000,000 inhabitants or more, the urban system is called metropolitan region.

4.5 Background of the Research

Rasht city and the limited area which is presently interacting with it under a daily urban system were considered about more than 30 years ago in studies conducted in the second period of long-term strategy of land preparation in 1977 by Setiran consulting engineers and was called "SEFID RUD URBAN REGION".

"Delimiting an urban region is arbitrary to a large extent. The territory of the present study is lands of Guilan which includes Rasht, Bandar Anzali and Lahijan. Also it includes west of Fouman and Someesara and it is extended near langroud from east as well. Therefore, order of geographic field in the present study is an area which neither is beyond 90 km from east to west nor 45 km from north to south. This area covers approximately a total area of 3300 square kilometers and it is almost conform to divisions of the civil: Rasht city, Bandar Anzali city, rural districts of Tolam and Someesara (from Someesara city), Fouman city except rural districts of Masouleh, Gasht, Ahmad Sar Goorab, Lahijan city except a large part of Siahkal district (rural district of Siahkal, Fararoud) and Shir Jo Posht rural district. As cities located in this area are complementary for each other and due to closeness of the cities, expression of "Urban field" is induced: Rasht: administrative center, Bandar Anzali: Port and tourism center, Fouman: rice farming center and Lahijan: Tea farming center.

In 2008 we studied daily urban system rules in central region of Guilan and its limited areas. Firstly, entry and exit stations of Rasht city that were the major places of entrance and exit for daily passengers were identified for initial field research. Then mentioned stations were referred and data were collected. This stage cleared a general view of limited area of DUS (Daily Urban System). In addition, it showed that to continue research and to complete data it is possible to go directly toward daily passengers' place of employment so that the second stage of the research were conducted through direct refer to some of offices, companies and factories and so on where had daily passengers. By the help of people, some of daily passengers were identified and research was conducted without administrative process.

In the third stage of census in 2006 and based on raised question all villages of Guilan province which provide their basic requirements from a city or other village and finally all villages of Rasht city which introduced Rasht as the first provider city for their basic requirements, considered as DUS region. Based on studies in these three stages, it was clear that DUS region generally includes Shaft, Fouman, Someesara from East, Lahijan. Langroud, Koomleh, Siahkal, and … from West Bandar Anzali, Khoshkebijar and … from North and Sangar, Shaghaji and … from South.

At the end, in order to determine accurate DUS area whose general view was obtained at the end of three previous stages, it was directly referred to likely borders. In this regard, based on obtained experiences from the previous stages and also based on knowledge obtained from the region and also by referring to Islamic Councils of Villages, departure of daily passengers to Rasht or from Rasht were dealt with. Therefore, limited area of DUS region was completely determined at the end of this stage of the research. In the Fig 1, total DUS region is depicted and curves of stimulus accessibility and accessibility to central city based on time limitations, through personal car, in route without traffic and also the starting point were drawn from exit ways of Rasht cities.

DUS region identified in this research covered a total area of approximately five thousand square kilometers. Regarding total area of Guilan province, DUS covered about 36% of total area of it which is more than 1/3 of the province's total area. This is while that, based on obtained population for DUS region which is more than one million people, this region has 73% of total population of Guilan province that is more than 2/3 of the population of Guilan province. Therefore, based on statistic of DUS region and in compare with the province, DUS region has twice as much population as its area. This region has 24 cities which are 50% of total cities of Guilan province. These cities cover 80% of urban population of total population of Guilan province.

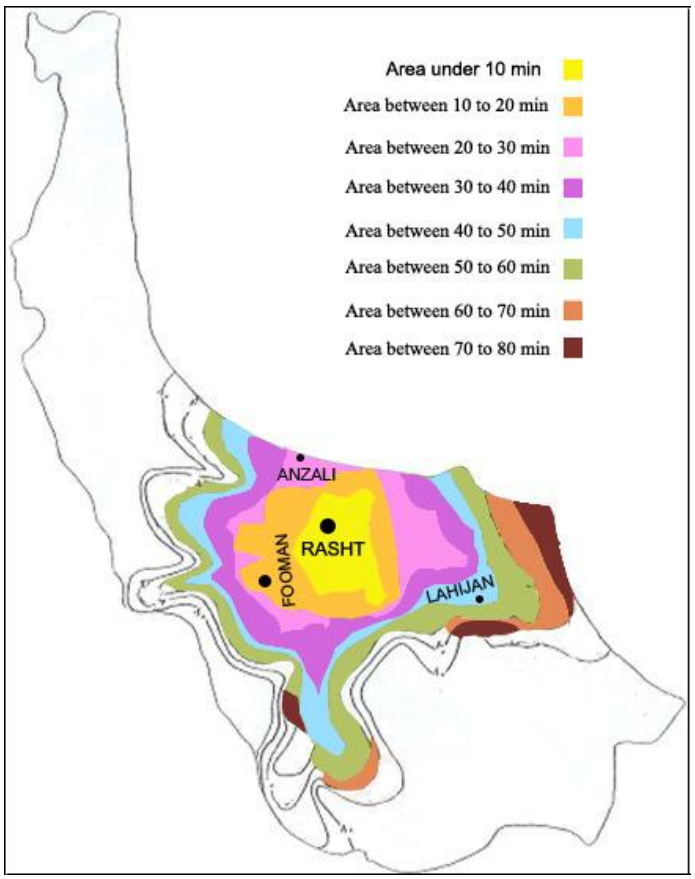

Fig. 1: DUS region and drawing curves of stimulus accessibility on it.

5 COLLECTING DATA AND ANALYSING

5.1 Introducing the Study Area

Guilan province is one of the northern province of Iran with an area of fourteen thousand square kilometers. Its length is 235 kilometer from northwest to southwest and its width varies from 25 to 105 kilometer. Based on the last division of the civil in 2006, Iran has 49 cities, 43 districts, 109 rural district and 2935 villages. Guilan province has 16 cities including: Astaneh Ashrafieh, Amlesh, Bandar Anzali, Talesh, Rasht, Rezvanshahr, Roudbar, Roudsar, Siahkal, Shaft, Soomesara, Fouman, Lahijan, Langroud and Masal. Guilan economy is based on agriculture and it has 253,403 hectares agricultural land so that 198,456 hectares of them are arable land and 54,946 hectares of them are gardens and nurseries.

In order to survey limited area of the considered region and its geographic particulars, it should be said that Guilan province, generally, has two complete different areas (plain areas and mountain areas). If we consider that up to 150 meters height from sea level are plains of Guilan, about 1/3 of total area of Guilan will be plain areas (Fig. 2).

As we described, plains of Guilan (and more cities of Guilan) are almost smooth and flat, it means that they have a very little slope. We could say that slope of the land in all plain areas of Guilan province is approximately less than 1% (Azimi, 2002).

Regarding that, we proposed to survey and evaluate daily urban system of Rasht city and its planning and management and generally surveying these kind of cities, we just study limited areas where this daily urban system is going on and almost all of this limited area is located on plain area of Guilan (only some parts of a few rural districts are located on mountain areas). Limited area of this daily urban system, as it was mentioned above, is a smooth and flat land which has provided a suitable condition for commuting peoples and vehicles. These short distance and suitable topography is by itself a main reason of creation this daily communicational system. As it is clear, this communicational system has been not able (or hardly) to effect mountain areas. Of course, creating and constructing bridges in mountain areas were a great help for communications and transportation systems. However, in fact, this daily system is limited in mountains which surround south, east and west of this smooth and flat land.

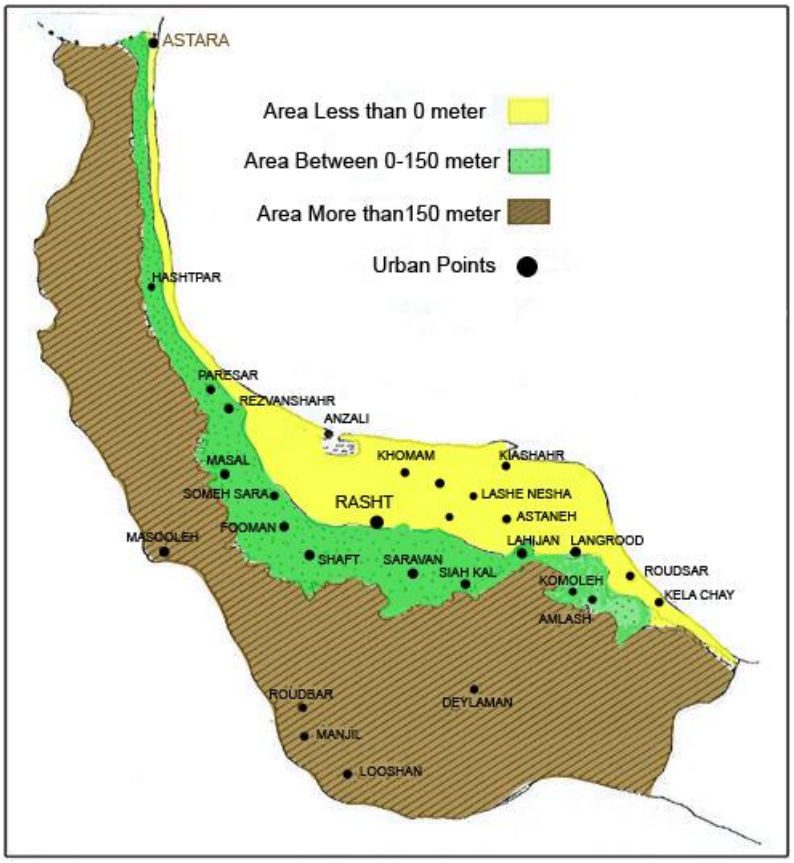

Fig. 2: Urban areas and plain areas of Guilan Province

5.2 Urbanism pattern of Rasht and its interactional region

Generally, based on existing evidences, the study area which had previously pre-industrial economy relying completely on agriculture and running fully by self-reliance followed classic hierarchical system. In fact movement system of people toward applying required facilities and services was hierarchical so that those who were resident in a village or a small city came to more intermediate cities in which they could benefit from higher facilities in compare with their place of residence to meet their basic needs. They also traveled to more important cities to meet their more important and rare needs and they finally traveled directly to central city for specific issues. However, there were two important events from late of 1990s. The first was that qualitative and quantitative daily growth of asphalted road in one hand and increasing personal and public cars which bring quick, inexpensive and simple accessibility to central city which practically transformed existing communicational system to Daily Urban System (DUS) on the other hand. The second event was related to quick growth of rural asphalted roads and also qualitative improvement of asphalted roads and highways construction which increased demands for daily trips to central city. As a result of increasing demands for daily trips to central city, regular commuting service systems to central city and vice versa were arranged so that it assured passengers about daily trips regarding accessibility to vehicle.

Therefore, regarding to the four kinds of Daily Urban System discussed in theoretical principles (Centralized, Decentralized, Cross commuting and Exchange commuting) this system in Rasht daily urban system is a compound of Cross commuting and Exchange commuting which represents interactions among central city and other existing cities and villages in target region in one hand and interactions among suburbs in the other. In fact, modern communications dismantled previous hierarchy and has replaced it by direct and mutual communication between central and other population areas located in this region. Current daily system is not certainly the previous hierarchical system, although it is not completely consistent with a daily urban system. However, this consistency is relative and is integrating day by day. In fact, it does not yet portray a complete real and virtual communicational network but this performance is going toward more integrity and this integration and its performance system are completing day by day to be a very compact and integrated daily system through qualitative and quantitative development of asphalted roads. If we survey curves of stimulus accessibility to central city (Map 4-1), in order to understand better and to analyze daily

urban system in Rasht city, we find that an area which has a distance of less than 30 minutes to Rasht and is almost consistent with Rasht functional area (a 35-km distance), has about 16% of total area of Guilan province measuring 220 km/sq and has more than 50% of total population of Guilan province it means more than 1,200,000 inhabitants whose 70% is city dwellers. It also surrounds 30% of total cities of Rasht. What is obvious is that, all settlements located in this 30-minute area have a unique potential for common economic, social and … performance. Obviously, this area has a powerful interaction with central city and Rasht city is immediate center of urban system of the study area which at least is not considered or performed in urban-regional planning.

5.3 Suggestions:

5.3.1 New definitions have been proposed for central cities of daily urban system considering existing definitions and current structure of Iran urban planning system:

- While a metropolis is considered as a center of an active daily urban system so that its total population of functional area along with population of the central city is not less than two million inhabitants, the region is considered as a metropolitan region. For example, Tehran will be a metropolitan region because it places unlimited daily trips in one hand and in the other hand, cities of Damavand, Rey, and Karaj are located in this area and the total population of it is approximately nine million inhabitants.
- While population of central city in any urban system according to the last official census is between 500,000 to 1,000,000 inhabitants, the urban system is called large urban complex. If these systems meet the following particulars, they will be considered as urban region:
- If central city of a large urban complex has a population of 750,000 to 1,000,000 inhabitants and is located in distance of 35 km from legal boundary or census boundary of central city (the minimum functional area of a city according to the description), and has at least 2 cities with more than 10,000 inhabitants, it is called urban region.
- If central city of a large urban complex has a population of 500,000 to 750,000 inhabitants and it is located in distance of 35 km from legal boundary or census boundary of central city and has at least 5* cities with more than 10,000 inhabitants, and total population of the 35-km area along with population of central city is not less than 1,000,000 inhabitants, it is called urban region.

It the mentioned above suggestions come to implementation, Rasht city will be subjected in Paragraph 2 of the suggestions because based on census of 2006, Rasht has a population of 550,000 inhabitants and 13 cities are located in its 35-km area which 6 of them has a population of more than 10,000. These six cities are Khomam (12,901 inhabitants), Lashtenesha (10,871 inhabitants), Bandar Anzali (109,687 inhabitants), Astaneh Ashrafieh (36,298 inhabitants), Fouman (27,763 inhabitants) and Someesara (36,522 inhabitants). In addition, total population of this area is more than one million inhabitants. In this case, Rasht and its 35-km area would be an urban region.

*The average number of surrounding cities in functional area of current central cities (2008) in Iran is 5.85.

5.3.2 Obviously, these kinds of urban regions will require a new form of urban planning and management.

In fact, Iran urban planners are faced with metropolitan populations which are settled detachedly and different from what they knew. Therefore, we need an urban management different from management of a usual city or even a metropolis. What is suggested is arranging a responsible system for urban region. This unified urban management could be held as a council including authorities of a central city and other existing population centers in this urban region chairing by the highest executive authority. Planning system of an urban region is in fact a strategy to reach proportional distribution of urban development among different cities and generally parallel growth of all regions. It is obvious that this aim will not be achieved unless total urban region is permanently considered by a system which exclusively concentrates and regards toward this urban region and issues such as all new industrial settlement, projects to determine paths of transport infrastructures and large separation of lands must be consulted. In fact this regional council must firstly deals with studying and ratifying regional plans as a superior project for its urban region so that all comprehensive and directory projects for cities and villages located in the considered region are formed and ratified within

their framework considering particulars of total urban region in order that no existing population system in this urban regions being planned and managed as a single member and separate from its family.

6 CONCLUSION

Authorities, planners and specialist believe that as physical differences between these kinds of cities exerting metropolitan impacts, with other known cities and metropolises in Iran were hidden up to now, urban problems and difficulties of these population centers surpass specialists and planners regarding time and facilities. It is obvious that if this negligence continues, the city and citizens will be subjected to all-embracing damages. This issue, at first, declines citizens' quality of life which is certainly the most important issue for planners and specialists in urban affairs. Therefore, it is required to consider this fact in planning as soon as possible as it seems necessary particularly in the region's spatial arranging and especially in its communicational network and in arranging its settlements and so on. It also may be the purpose of experts and planners. In fact, all planning up to now and in future regardless the revolution taking place and consuming time and money, will be incorrect and we have uselessly have consumed our time and resources as the special condition of this region has not been regarded. For example, all planning arranged for Rasht city and its complementary system, regardless to structural revolution have considered it as a single city while its requirements, facilities and other conditions are completely different in two classical and daily systems so that planning considering classical system will deviate the city far from direct way and finally creation of abundant problem in the future which are glaring by now will lead us to acceptance. It is necessary to propose a new description for planning system of those cities located in centrality of a daily urban system having large commuting (or will be developed in the future) and then a new type of urban and regional management and planning may be considered for them.

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The Netherlands in Transition. The Planning of Low Carbon, Sustainable and Liveable Cities in the Utrecht Region

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1 INTRODUCTION

The Netherlands is world renowned for the way in which urban planning, infrastructure, ecology and the environment form an integral part of the practice of spatial planning and urban design. The country has a vigorous and open economy, an entrepreneurial society with its metropolis situated on a compact delta which is vulnerable to climate change. The Netherlands has four layers of public administration, the State (central government), the provinces and the municipalities which, together with the regional water boards, are responsible for spatial planning and the future development and structure of the Netherlands' cities, infrastructure and national landscape. At the start of 2011 and following a change of government the responsibilities of each of the three tiers of government and how they can work together was re-evaluated and set out in the 'Administrative Agreement 2011-2015' . Central government, the provinces and the municipalities are almost constantly working on strategies, policies and plans for the development and redevelopment of low carbon, sustainable and liveable city regions and cities for the coming decades.

All three tiers of government are charged with the task of making Dutch cities ready to face the future: less dependent on fossil fuels, with reduced emissions of greenhouse gases, and able to cope with the expected rise in sea level and climate change. Policy and targets in the area of reducing CO_2 emissions and energy transition are more likely to succeed when they become an essential part of spatial policy and planning. The Province of Utrecht and the larger cities in this region, in particular, are taking major steps in this area. This article describes how the newly elected central government, the Province of Utrecht and the six larger towns in Utrecht are turning their climate and energy targets into spatial policy, strategy and physical planning. This stands in sharp contrast with the situation as reported in the ISOCARP Review 05 Low Carbons Cities , especially in the way the responsibilities between the state, provinces and municipalities are redefined and redivided.

2 THE ADMINISTRATIVE AGREEMENT

The Netherlands faces a major challenge: cutting government spending while at the same time strengthening the economy. The Administrative Agreement between the State, provinces, municipalities and regional water boards is supposed to help to create a government apparatus which is lean and efficient with a clear division of tasks between the four levels of administrative authority. The underlying principle of the Dutch Government apparatus of the last decade 'decentralize whatever can be, centralize whatever has to be' is put into practice. This means that, wherever possible, the implementation of tasks is devolved to the municipalities or provinces. Central government is responsible only for national concerns such as national defence and foreign policy, but is also involved, alongside other levels of administration, in the spatial economic structure, public health, flood defences, the nation's unique landscape features and cultural heritage, plus the national and international transport networks. Central government set out this vision in the draft National Policy Strategy for Infrastructure and Spatial Planning .

The core tasks of the provinces will lie in spatial development and the physical surroundings. The provinces will act as regional coordinators for the development of integrated development strategies, the interplay of interests as well as promoting and safeguarding complementarity between the cities and city regions within the province. The municipalities will be responsible for creating a safe and pleasant environment in which to live and work, and their tasks will lie in the social, economic and spatial domains. In the spatial domain this will be spatial planning in the widest sense, in which it will be important to find the right balance between the environment, nature, water, the economy and housing, etc. This policy will be laid down in policy strategies and zoning plans. The task of the regional water boards is to manage water quality and quantity in the regional water systems. As part of this task the water boards are responsible for the flood defences and for ensuring that there is sufficient clean water.

The Administrative Agreement states that the public authorities will work together to ensure coherent spatial policy and task allocation across the administrative layers and levels of scale in the areas of housing, water, mobility, economic activity, the climate, energy, the environment and cultural heritage. This spatial policy must ensure that the Netherlands:

- Can develop further economically, so that investing in the Netherlands continues to be attractive to national and international businesses;
- Continues to be accessible by land, water and air;
- Puts its energy supply in order and ensures that energy is available for the future;
- Is protected against flooding and surplus water, and continues to be safe even under climate change;
- Is a pleasant, healthy and attractive place to live and work, where people can enjoy nature, culture, and recreation, with a good balance between all these functions .

3 THE ENERGY REPORT 2011

The Administrative Agreement refers to the goals set out for economic innovation and making the energy supply more sustainable as formulated in the Energy Report 2011 published by the Netherlands Ministry of Economic Affairs, Agriculture and Innovation. Central government continues to work towards achieving the EU climate target, reducing 80-95 % of CO_2 emissions in 2050 by comparison with 1990. The provincial authorities, municipalities and water boards too are dedicated to creating more sustainable energy and achieving climate targets. Based on their own goals and resources, they are continuing to work towards energy conservation and increasing the share of sustainable power generation. The provinces and municipalities are adjusting the spatial criteria for this, while fostering economic innovation and change. The underlying principle of the Energy Report is a form of energy management which is more sustainable and less dependent on increasingly scarce fossil fuels. The state wants to benefit from the strength of the Dutch energy sector. This will bring growth, jobs and revenue. The energy policy has three main concerns: transition to a cleaner energy supply, the economic outlook for the energy sector and the need for a reliable energy supply.

The Energy Report sets out the aspiration of achieving a low carbon economy by 2050. It indicates that the best way of doing this will be through an international climate agreement and it will be necessary to make the transition to a more sustainable form of energy management. This transition should be good for the Dutch economy. Under the motto of "not 'green' or growth, but 'green' and growth" the Energy Report advocates capitalising on the strength of the energy sector and encouraging cooperation with research institutes and industry in the development of new energy technologies. This is the only way that the Netherlands will be able to further develop renewable energy and maintain its international position as an energy producing country. This will bring growth, jobs and revenue. The Energy Report further assumes a balanced mix of national and international green energy and grey (i. e. fossil) energy. It describes the present reality which, for the time being, means that Europe will continue to be dependent on fossil fuels and that the Netherlands' position as a gas producer and world leader in the technological field of capturing and storing CO_2 will be important for the Dutch economy. It further assumes that, in the near future, the Netherlands will also need nuclear energy because this will help to further diversify energy sources and does not lead to CO_2 emissions. The Energy Report sets out five main pointers for the future:

- A modern industrial policy based on innovation, the development and commercial viability of renewable energy technologies, the positioning of the Netherlands as a knowledge-based economy and as a gas exchange for North-West Europe. This will not only create jobs and economic activity, but also help to safeguard supply;
- Increasing the share of renewable energy, provided that the energy supply becomes more sustainable, in a way which is economically viable and that renewable energy becomes a standard part of the internal European energy market;
- Keeping all energy options open as we move towards a low carbon economy in 2050 with a balanced mix of green and grey energy in an integrated energy market together with CO_2 reductions brought about through an increased share of renewable energy, energy conservation, and nuclear energy, together with CO_2 capture and storage;

- Based on the principle of 'green growth', making a 'Green Deal' with society with the aim of taking real steps towards a sustainable society. A sustainable society will not happen by itself, it is a joint process involving both society and government. Energy conservation and renewable energy will be important elements in the Green Deal;
- Investing in a properly functioning European energy market with an adequate infrastructure which facilitates cross-border integration of national grid operators. An adequate energy infrastructure is vital for an energy supply which is clean, secure and affordable.

The Energy Report clearly shows that the built environment and transport take up a very large proportion of the total energy consumption in the Netherlands and that these constitute a major source of CO_2 emissions. There is also considerable potential for savings in both these sectors. Policy and targets in the area of reducing CO_2 emissions and energy transition are more likely to succeed when they are made an indispensable part of spatial policy and planning. However the Energy Report does not go much beyond the development of intelligent transport systems, promoting electric cars, and improving the energy labelling of new and existing buildings. The Energy Report keeps all the options open when it comes to green, grey and nuclear energy, and makes no credible choice. The Energy Report therefore falls short when it comes to formulating adequate and effective policy on the necessary changes to be made in the built environment. The aim of moving towards a low carbon economy and society in 2050 will require a revolution in the area of smart public transport and an entirely different way of organising and planning urban regions and cities.

4 NATIONAL POLICY STRATEGY FOR INFRASTRUCTURE AND SPATIAL PLANNING

In the spring of 2011 the Dutch Government presented its draft National Policy Strategy for Infrastructure and Spatial Planning. The subtitle 'Keeping the Netherlands competitive, accessible, liveable and safe' already indicates something of the document's nature and goals. After its adoption, this Policy Strategy will replace the Spatial Planning (2006) and Mobility (2004) Policy Documents and the Randstad 2040 Structural Vision (2008) in order to provide room for the provinces, municipalities, citizens and businesses to take the initiative and continue to develop economically. Central government has made it clear that it cannot and does not wish to continue to do and control everything. The Policy Strategy specifically notes that the spatial differences in the Netherlands are widening. The rapid population growth in previous decades is now behind us. In the next 25 years perhaps another one million or so Dutch citizens will be added to the cities, mainly in the west of the Netherlands. More than half of the country's municipalities will soon start to feel the effects of a shrinking population and an ageing one. In most areas the demand for more offices, industrial estates and residential areas will be much less than it has been in recent decades. As a result, obsolescence and vacancy levels will become an increasingly apparent problem.

In many respects, especially in the way the responsibilities between the state, provinces and municipalities are redefined and redivided, the draft National Policy Strategy for Infrastructure and Spatial Planning constitutes a break with the past and with the policy of the last few decades. Central government is focusing on strengthening the international position of the Netherlands and promoting the interests of the country as a whole. These interests concern the main networks for the transport of passengers and goods, energy and the environment, flood defences and environmental quality (air, noise, soil, water and external security) and the protection of world heritage sites such as the Waddenzee (Wadden Sea), and the Nieuwe Hollandse Waterlinie (New Waterline defences). These three main goals have been subdivided into 13 themes of national importance and included in national commissions for seven designated so called MIRT regions under the Long-Term Programme for Infrastructure, Spatial Planning and Transport, along with the North Sea coast. The seven MIRT regions are North-West Netherlands including the Amsterdam metropolis region (the northern wing of the western conurbation known as the Randstad), the southern wing of the Randstad, the South Western delta, Brabant-Limburg, East Netherlands, Utrecht and North Netherlands. In this way central government has indicated what it is responsible for and the results it wants to achieve. While at the same time, the state gives the provinces and municipalities room to act in response to their own regional and local situation, make their own decisions and tailor their activities accordingly.

It should be noted that developing low carbon, sustainable and liveable cities and regions will mainly become the concern of the provinces and municipalities, possibly in concert with one another. The stated ambitions and themes of the Energy Report 2011, such as a low carbon economy by 2050 and entering into a "Green Deal" with society are hardly, if at all, reflected in the draft National Policy Strategy for

Infrastructure and Spatial Planning. It is recognised, however, that the transition to more sustainable fuels will take up more space. To ensure that the Netherlands sets aside enough land for wind energy, central government, together with the provinces, has designated preferred areas for large scale wind farms. Alongside this, international energy relations will be strengthened and the energy infrastructure made more suitable for decentralised electricity generation.

The ex ante evaluation of the National Policy Strategy for Infrastructure and Spatial Planning by the Netherlands Environmental Assessment Agency (PBL) advocated careful steering of the energy transition. The evaluation further emphasized that the built environment can contribute to the energy targets. The heating and cooling of buildings demands a great deal of energy and a lot can be saved by connecting the heat flows between individual buildings, and using waste heat from industry. There is also an enormous benefit to be gained through better insulation of existing homes and commercial buildings, because a large proportion of the buildings that will be standing in 2050 have already been built. This means that it is vital to look at the restructuring of the existing building stock in order to meet energy targets. In other words, it is a matter of improving the heat management in towns and cities in innovative ways, with information and clear rules, such as energy labelling for buildings, and by linking projects, for example, in heating networks.

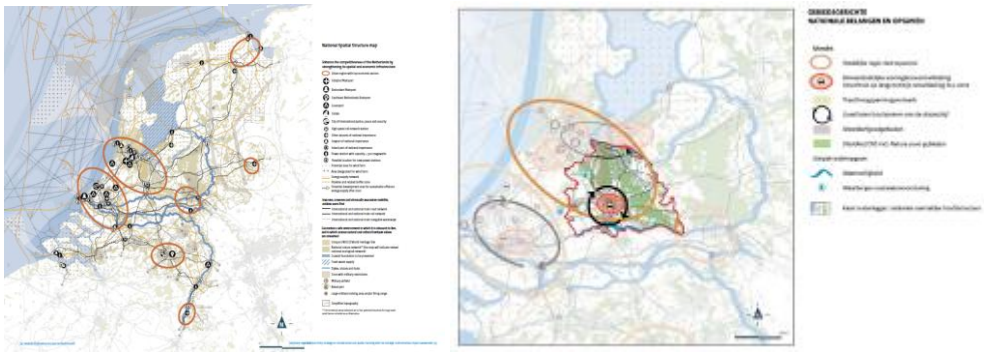

Figure 1 (left): The National Spatial Structure Map from the (draft) National Policy Strategy for Infrastructure and Planning illustrates the way that the Netherlands is enhancing its competitiveness by strengthening its spatial and economic infrastructure. Figure 2 (right): The Utrecht Region is part of the Amsterdam metropolis region. The (draft) National Policy Strategy for Infrastructure and Spatial Planning states that the proper functioning of the Utrecht region as the Dutch 'hub' with its complex intersection of road, rail and waterways is one of the primary tasks of national importance.

5 THE UTRECHT 2040 MISSION

With 1.2 million inhabitants, the Province of Utrecht is one of the most densely populated and at the central point of the Netherlands. It forms part of the northern wing of the Randstad, one of Europe's strongest economic centres. Utrecht lies at the centre of one of the country's largest metropolitan networks which will drive economic and social developments over the next few decades. It is here that the motorways, railway connections and waterways converge which connect other parts of the Netherlands with one another. In this way it acts as a logistical hub for the major development axes along the A1, A12 and A2 motorways. With the trend from 'main ports' to 'brain ports', the Utrecht region is increasingly becoming a meeting point for know-how and creativity. Utrecht owes this opportunity to the three mainstays of the region: its leading position in terms of knowledge-based activities and culture, its central position, and the quality of the cities and surrounding landscape.

In its strategy and mission 'Utrecht 2040: sustainable and attractive', the Province of Utrecht states that it intends to be a province which does not shift the burden to other places on earth and later generations. Making choices with a view to the consequences elsewhere and later is seen as a moral duty and a strategic task. Within the overall picture of maintaining and strengthening the three mainstay qualities of the region, six goals are set; these indicate where the major societal issues and spatial tasks will lie in the coming decades. The Utrecht 2040 strategy is the prelude to the draft policy strategy for the period 2013-2025 and describes a province:

- Where there is for room for a good quality of life (housing, work and nature);
- With an innovative knowledge-based economy;
- Which is accessible by car, bike or public transport in a better environment;

- Which is climate neutral and able to cope with climate change;
- Where everyone counts and can participate at school, in their neighbourhood and in their profession;
- With more diversified nature and an attractive landscape.

The economic strength of Utrecht lies as much in its central location as in its highly educated population, the knowledge-intensive sectors (such as Utrecht University, the Royal Dutch Meteorological Institute (KNMI) and the National Institute for Public Health and the Environment (RIVM) research institute) as well as the creative sectors, business and financial services and the life sciences (Utrecht Science Park). The particular features of the surrounding landscape, including key areas of the National Ecological Infrastructure (EHS) and the presence of cultural heritage features in the form of the 'Roman Limes', representing the border line of the Roman Empire at its greatest extent in the second century AD, and the Nieuwe Hollandse Waterlinie which are candidates for the list of World Heritage Sites, also contribute to this strength. On the edge of the Randstad, Utrecht acts as a buffer zone between the metropolitan dynamism on the one side and the peace and spatial tranquillity of the East Netherlands on the other. This position gives the region the relaxed urban atmosphere and quality of life which makes the area so attractive. These are its past and future critical success factors.

In the 2011-2015 Coalition Agreement of the Provincial Council of Utrecht, the provincial executive designated as its core tasks economic and spatial development, nature and the landscape, accessibility, as well as cultural and historical heritage. Sustainability forms an integral part of these core tasks. The Province of Utrecht is well aware of its position and responsibilities as a hub and its central position in the Netherlands. Policy tasks include restructuring and making more intensive use of existing work sites in combination with energy conservation and reducing CO_2 emissions, together with inner city development and strengthening the quality of the rural area, as well as the flood defences, energy transition and accessibility.

The Coalition Agreement also addresses how to make sustainable energy possible in the spatial context. The accommodation of wind power is thought to be constrained by landscape quality considerations. The preliminary draft Provincial Spatial Planning Policy Strategy 2013-2025 document nevertheless includes wind energy sites. If accepted by the municipalities and if the market takes the lead, the plans for wind energy could be further developed. However, other forms of sustainable energy are preferred, such as solar energy, waste heat, thermal energy storage, geothermal energy, biomass and farm energy, which have less impact on the quality of the landscape.

The draft National Policy Strategy for Infrastructure and Spatial Planning states that the proper functioning of this Dutch 'hub' with its complex intersection of road, rail and waterways is the primary task of national importance. Other tasks in the draft Policy Strategy include building and maintaining the flood defences along the Lek and Lower Rhine rivers and the freshwater supply via the main water system, implementing and protecting the (revised) National Ecological Infrastructure (EHS), including the Natura 2000 areas, making the main energy network robust and complete and accommodating the exploitation of geothermal energy and thermal energy storage in the region. The redevelopment and urbanisation of the A12 zone in the urban landscape between the towns of Utrecht, Nieuwegein and Houten is also designated as a task of national importance. The Utrecht region experiences considerable pressure on its space because of the heavy demand for housing in combination with the limited space available for this.

The economy and the number of households in Utrecht is expected to continue to grow until 2040. Until 2040 there will be continuing demand in the Utrecht region for more than 100,000 homes, alongside the need to replace some 20,000 homes. Given the complexity and scale of the inner city task and the relationship between this task and the function of the 'Utrecht hub', central government and the region have reached agreements about this. They have furthermore agreed that, in principle, some of the demand for housing in the Utrecht region (15,000 homes) will be met in Almere.

Box: Definitions and Ambitions

The following three ambitions are often voiced in the Netherlands: CO_2 neutral, climate neutral and energy neutral. These terms are often used interchangeably as if they mean the same thing, though this is most certainly not the case. CO_2 neutral is understood to mean: a situation where fossil energy consumption (and related CO_2 emissions) measured throughout a year is no more than zero and no energy is consumed that is

not put back into the system from a renewable source. Climate neutral refers to a situation where the above definition of neutrality encompasses all greenhouse gasses. Energy neutral goes one step further because in this case the total energy requirements of a company or a whole area must come from renewable sources and the storage of CO_2 in new forestry areas or underground is not permitted.

6 THIRD INDUSTRIAL REVOLUTION

For the further development of the task set out in the Utrecht 2040 strategy as well a climate-neutral and climate resilient province which is dependent only to a limited extent on fossil fuels, the Province of Utrecht in 2010 called in the US economist and energy strategist, Jeremy Rifkin. In his report Rifkin outlines a path in which economic development and the realisation of climate goals go hand in hand. Rifkin expects that, given the finite nature of fossil fuels, in the longer term a worldwide energy transition will start to take place, together with a huge demand for all kinds of products and services. Rifkin, who is also an advisor to the European Commission, makes a clear link with the economy and for his reports and recommendations draws on a large network of people in the private sector, such as Philips, Cisco and Kema. Rifkin's recommendations, with the grand title 'Utrecht Roadmap to a Third Industrial Revolution', provides building blocks for a clean economy in 2040. These involve the consistent pursuit of an energy conservation policy and the application of new, sustainable energy sources. Rifkins 'Third Industrial revolution' is based on five principles:

- Energy efficiency;
- Use of renewable energy resources;
- Use of buildings as power plants;
- Development of hydrogen and other energy storage technologies;
- Shift to smart grids and electric plug-in vehicles.

According to Rifkin, it will be impossible to end CO_2 emissions in Utrecht completely within 30 years. This is because a large proportion of these emissions are related to the old housing and building stock and the infrastructure. Only at extremely high cost would it be possible to become completely climate neutral within 30 years for heating and other purposes. In addition, many new technologies would have to be applied and a new generation of technicians and engineers would be necessary to manage them. This is not something which can be achieved in one generation. To become climate neutral it will therefore be necessary to find compensation elsewhere.

In his report Rifkin makes an important link between the energy transition and the economic opportunities which this offers. He even calls it an 'Economic game plan'. This is precisely the approach adopted by the Province of Utrecht. It is not a separate programme in which the province will steer the energy transition, but one linked to the economic policy of the Province of Utrecht. In the economic policy plan for the province of Utrecht three essential elements are identified: life sciences, the creative industries and economic sustainability. The last theme is still in its infancy, but with such centres of knowledge as the University of Utrecht, the University of Applied Sciences Utrecht, the Utrecht Sustainability Institute (USI), KNMI, RIVM and TNO, the Province of Utrecht has a lot to offer in terms of a starting point for an economic sustainability cluster. The focus of the province in the coming period will be mainly on creating the right conditions to strengthen this cluster, for example, by combining demand and creating economic added value by encouraging innovation. This means that the province intends to take steps to reduce CO_2 emissions in the restructuring of commercial estates and make sustainability and quality of life a visible part of the inner city task. Through the Ontwikkelingsmaatschappij Utrecht (OMU – Utrecht Development Agency), the Province of Utrecht will take part in projects to break the impasse surrounding these tasks. When it comes to the energy issue, the province supports initiatives with a team of energy experts that delivers first aid for technical, financial, legal and organizational bottlenecks. Other examples in which the province is involved are knowledge and innovation in the area of deep geothermal energy, facilitating biogas hubs to support transport and supply of biogas, project management group for smart grids and administration for a guarantee fund.

In his report Rifkin also makes another import link between the issue of the energy transition and its spatial impact. He has made a rough estimate of what would be required to achieve a climate neutral region by

2040: importing 120,000 freight vehicles a year carrying biomass or 1600 large-scale wind turbines in the beautiful open landscape. Given the spatial complexity of the Province of Utrecht previously referred to (densely populated intersection of road, railway and waterway network, nature/landscape) this is not a realistic prospect. But providing the room for energy and other forms of innovation and for large scale generation of sustainable energy is probably the most important pre-requisite in relation to the province's core task in the spatial domain. The province itself cannot develop any sustainable or conventional energy projects. It will be the market players, such as project developers, power generation companies, housing associations and groups of residents who will do that. The task of the province will be to provide clarity at an early stage for these parties regarding where they can develop their initiative. This is what the Provincial Spatial Planning Policy Strategy is intended to do.

Figure 3 (left): This diagram of a smart grid illustrates in which way local energy sources, buildings and electrical vehicles are interconnected. Figure 4 (middle): The common situation of a house that is connected to the power grid only to consume energy might be outdated in the near future. A smart home connected to the smart grid will be able to upload, store and download energy in a way similar to the internet. Figure 5 (right): According to Rifkin, geo-thermal energy is one of the renewable energy resources necessary for a clean economy in the Utrecht Region 2040

7 UTRECHT'S SPATIAL PLANNING POLICY STRATEGY

The preliminary draft of the Provincial Spatial Planning Policy Strategy sets out spatial policy for the period 2013-2025. This document centres around the question of how to ensure that the region remains an attractive place to live and work and for recreation, while maintaining the balance between people, the environment (planet) and the market (profit). The spatial planning policy strategy sets out three main development themes: a sustainable residential environment, bustling villages and towns and an attractive rural area. These themes will contribute most to the attractiveness, liveability and spatial quality of the province.

With the development of a sustainable environment in which to live, the province is preparing for climate change. The spatial planning policy strategy restates the province's goal of being a climate-neutral province and climate-resilient by 2040. To achieve this goal the province already needs to take this into account in its spatial planning. Part of this will include increasing the share of sustainable energy sources. This is desirable not only to achieve this aim, but also from the point of view of becoming less dependent on fossil fuel sources. To cope with climate change it is important that the soil, water system and flood defences are sustainable and robust. Where water levels are too high, the excess has to be safely channelled away and the dikes are intended to further reduce the likelihood of flooding. The Province of Utrecht wants its towns and cities to continue to be attractive, healthy and safe places to live and work and recognizes that a sustainable living environment is also a factor in the decision where to locate a business, one which is expected to become even more important in the future.

Sustainable energy is considered to be a 'provincial concern'. This means that the province can address this concern in various ways. The goal of making the territory of the Province of Utrecht climate neutral by 2040 not only involves reducing CO_2 emissions but also achieving a situation where the province is no longer dependent on the finite supply of fossil fuels. The spatial task here is to provide space for the sustainable generation of energy and the facility to bring together those functions which supply or demand heat or energy. For this purpose the Province of Utrecht will aim for energy self-sufficiency in its regional development. The province will ask the municipalities and developers to include a section in spatial plans on how the plan takes energy conservation and the application of sustainable energy sources into account. The province also intends to stimulate the use of all forms of sustainable energy: wind energy, biomass, deep geothermal energy, thermal energy storage, solar energy, hydropower and the use of waste heat. Spatial frameworks have been drawn up for wind energy and biomass. The basic principle here is that, in view of the spatial impact of wind turbines, preference will be given to other forms of sustainable energy. Besides the

Spatial Planning Policy Strategy, the province will also draw up a strategy on the theme of the subsoil which looks at the opportunities for and threats to thermal energy and geothermal energy storage.

Besides low carbon and fossil fuel independence, a territory which has been organised to be climate-neutral by 2040 has the added benefit of better air quality. It further provides opportunities to maintain and even improve the quality of the physical surroundings. Energy conservation and the generation of sustainable energy also offers opportunities in relation to Utrecht's sustainable economy. To attain climate neutrality the task is to greatly reduce energy consumption through conservation and innovation on the one hand, and to generate the energy that is needed in a way which is sustainable on the other. This relates to both central power generation of large amounts of energy as well as bringing together various functions which demand heat and energy and can supply heat and energy. The province has estimated the spatial capacity for the production of sustainable energy until 2020. If all the realistic options for biomass, solar energy, geothermal energy, etc. were to be used and the province achieves the nationally agreed goal of 50 MW in wind energy, then this will provide for the sustainable generation of 10 % of the Province of Utrecht's energy needs. This means that the province will not meet the goal of 20 % of sustainable energy generation as intended in the Spatial Planning Framework . The transition to a sustainable energy supply is expected to progress slowly during the period of the Policy Strategy document (2013-2025). The Province of Utrecht does not expect that this will influence the objective for 2040 to be climate neutral. A characteristic of a transition is a slow start with several small scale innovations, followed by a 'take off' and acceleration phase where visible structural changes take place. In the period between 2025 - 2040 the province expects the many innovative initiatives and projects that already take place, to develop into a fully grown sustainable economy that is independent from fossil fuels.

The Province of Utrecht does not consider wind energy to be the most suitable option in this transition. The goal in itself and the related sites for wind energy are limited essentially to the agreement made with central government to provide for 50 MW of wind energy on land. When it comes to biomass the province is much more generous. Considerations such as fitting the necessary plant into the landscape and the effect of increasing traffic are, of course, also critical factors. The province wants to make the processing of biomass spatially possible based on a positive land use ratio. In the urban regions the responsibility will rest mainly with the municipalities and the same goes for energy conservation and the application of sustainable energy.

8 PLANS AND INITIATIVES IN THE LARGER TOWNS AND CITIES OF UTRECHT

More than half the residents of the Province of Utrecht live in the six larger towns and cities of Utrecht (311,250 inhabitants), Amersfoort (146,500 inhabitants), Veenendaal (62,250 inhabitants), Nieuwegein (61,000 inhabitants), Zeist (61,000 inhabitants) and Houten (49,000 inhabitants). Utrecht and Amersfoort are the larger and older cities with a historic centre. Nieuwegein, Houten and Zeist are satellite towns of Utrecht and the town of Veenendaal is more closely linked to Ede and Wageningen in the Province of Gelderland.

The two larger municipalities in the Province of Utrecht, in particular, are highly ambitious when it comes to the areas of climate, reducing CO_2 emissions and the energy transition. The municipality of Amersfoort has laid this down in a Climate Action Plan and the policy document 'Amersfoort: a city that cares about the future' , while the Utrecht municipality has this in its planning and implementation programme 'Utrecht's Energy'. These include the goals to make the municipality of Amersfoort a CO_2 neutral municipality by 2030 and Utrecht a climate neutral municipality by 2030 (see Box 1). These goals have not been plucked from the air, but are the result of preparatory policy and research over the years. The programmes of the two councils (last elected in 2010) see CO_2 reduction and sustainability not only as a necessity but also as an opportunity for the economy and a way to improve the environment we live in. The two programmes emphasise largely the same things, specifically the building and renovation of existing and new residential areas and commercial estates in a way which is CO_2 neutral, intensive use of space, the sustainable and local generation of power, clean air through sustainable mobility and creating a green and pleasant living environment.

The planning and implementation programme 'Utrecht's Energy' is solid and full of such aims and policies. Given that 80 % of CO_2 emissions come from the cities, the programme assumes that the emphasis of the drive to reduce CO_2 emissions will lie in the existing stock of housing and industrial buildings, in the private sector and in mobility in the cities. Major CO_2 reductions can be achieved by improving the relatively old stock of housing, offices and commercial premises. In mobility too, there are general opportunities for CO_2

reduction: in a compactly built city like Utrecht, those opportunities are even greater. The distances involved are small as a result of which quieter, cleaner, safer and more sustainable mobility options (e.g. bicycle, public transport, electric transport) would appear to be the more natural choice.

Thus, there is all the more reason to get to work at the urban level. This can be done, among other things, by improving and extending the district heating which started being laid as long ago as 1923, partly in the historic centre, and in 2005 provided for a quarter of the city's heating needs. The heat supplied is the waste heat from two power stations in the city, combined with auxiliary (stand-by) district heating plants. This results in a reduction of 50 % of CO_2 emissions compared with traditional individual heating systems in every building. The heating network has branches not only into the post-war residential areas of Kanaleneiland and Overvecht but also extends to the neighbouring municipality of Nieuwegein and the eastern part of the Leidsche Rijn urban development. By adding biomass as source of energy in the two power stations, the district heating network becomes more sustainable.

Figure 6, 7 and 8: Masterplan and artist impression for the redevelopment of Utrecht Central Station

Another key objective is to reduce energy consumption in the extensive historic inner city of Utrecht, where there are over 4.500 large and impressive historic buildings like churches, museums and university faculties. The municipality is investigating the feasibility of deploying a combination of interventions to reduce energy consumption without damaging the historic cityscape and the listed buildings. For the time being, the focus is on renovation and careful insulation, together with smart building services, smartly utilizing the district heating network and the use of thermal storage in the ground. In this way the municipality considers not only individual buildings but also looks at connected parts of the extensive historic inner city. It is working on a number of key sustainable projects, such as the Science Park on the Uithof university campus, the station area and the Rijnenburg urban development district with 7,000 homes, the master plans for which provide for them to be made more sustainable. These projects also derive to some extent out of the strategy policy for the period 2015-2030 drawn up by the municipality in 2004. This strategy sets out tasks such as optimizing and intensifying the use of the urban space and making the urban water system more sustainable, although measures related to the areas of climate, reducing CO_2 emissions and energy transition are more recent innovations.

Amersfoort municipality has a policy strategy for 2030 in preparation in which sustainability constitutes one of the important themes. Indeed, under the course which the municipality has set for itself, sustainability will be the guiding principle in the further development of this bustling city. Moreover, it is one of the main tenets of the 2010-2014 Coalition Agreement. This concerns the interpretation of the broad term sustainability: the coherence between socio-cultural, environmental and economic measures (people, planet and profit), such that the effects elsewhere and on later generations are recognized. The positioning and strength of the city of Amersfoort is at the heart of its ambition to further develop into a vital and sustainable city as part of the northern wing of the western conurbation known as the Randstad, with a central role for the Amersfoort region. Another related task is the renewal and more intensive use of the existing urban area.

The Steering Document which provides the essential starting point for the Amersfoort Spatial Policy Strategy 2030 sets out eight spatial planning goals and looks more closely at the context and dilemmas which will arise in drawing up the policy strategy. One of the eight spatial planning goals, a specific response to climate change, aimsto facilitate a CO_2 neutral city as far as is spatially possible by 2030. The municipality is fully aware of the scale of this task. To achieve this goal energy consumption will have to be reduced as far as possible. Realistically, however, the likely gains in that area will be limited. Most can be achieved in the built environment and through sustainable mobility. This is why an energy transition is needed, i. e. switching from the use of fossil fuels to the generation of sustainable energy. All promising forms of

sustainable energy must be utilized in order to meet this goal. Examples include solar roof panels, energy storage in the ground, utilizing biomass and wind energy. It is important to create the right conditions to ensure that optimum use can be made of these opportunities. Some forms of sustainable energy, such as wind turbines, are at odds with other spatial planning goals, such as the aim to create an attractive green city which is a pleasant place to live in.

Figure 9 and 10: Experimental low energy houses in Nieuwland in Amersfoort, built in the early 1990s, demonstrated all kinds of techniques and systems. The sustainable residential area Nieuwland in Amersfoort consists of 4,500 houses. One thousand of them are covered with solar cells.

In recent decades, Amersfoort has made a name for itself with its Nieuwland sustainable residential district with 4,500 homes. This residential area is one of the first of its kind in the Netherlands, where the principles of sustainability have been applied right down to the smallest details. The Nieuwland district was built in the period 1995-2002 and is the world record holder in the area of active solar energy. The electricity generated by some 12,500 m2 of solar panels on more than 1,000 homes and other buildings is enough to meet 40 % of the total demand of the households living in those 1,000 homes . The experience gained in Nieuwland was then applied to Vathorst, the urban district currently in development with roughly 11,000 homes and all attendant facilities, such as healthcare, education, sport, culture, shopping centres and its own train station. The focus over the coming years and decades will be on completing Vathorst and on the sustainable re-development of existing residential districts such as Soesterkwartier and Bergkwartier.

The four other major towns in the Province of Utrecht, the municipalities of Houten, Nieuwegein, Veenendaal and Zeist each have specific climate programmes and ambitions. These municipalities' goals in the area of climate, energy conservation and reducing CO_2 emissions are less ambitious and far-reaching than those of the Amersfoort and Utrecht municipalities. Nevertheless, all four of these municipalities have realised remarkable projects worth following or have such in preparation. The municipality of Houten is a world renowned new town, one of the satellite towns of Utrecht to meet the needs of the growing Utrecht region. From the start, in the 1970s, Houten is a classic and successful example of Transit Oriented Development (TOD). The urban design of Houten is entirely oriented towards cycling. The car infrastructure has been made subordinate to this. The new centre is closely linked with the modern transport hub for passengers by train, bus and taxi, and readily accessible too by cyclists and pedestrians. Its TOD role will be further reinforced by the track widening along part of the railway link between Utrecht and 's-Hertogenbosch. The new town has already started to retrofit its oldest residential neighbourhoods in order to make 8,000 houses more energy self-sufficient and healthier.

Nieuwegein is situated next to Houten, but actually its opposite with an urban layout mainly planned around car use. But like Houten, the municipality of Nieuwegein would like to become much more of a cycling town. The most notable project is its renovated town.centre, This is made up of the town hall, theatre, library, housing and retail outlets. The energy supply for heating and cooling the town centre is largely provided by heat pumps, together with underground thermal storage. Sustainability, climate programmes and ambitions are well integrated in the Spatial Policy Strategy 2030 of Nieuwegein. Its plans show the main pipeline routes of the district heating network with a connection to neighbouring Utrecht, and the areas around the stops and corridors of public transport that are to receive more intensive housing. Between Nieuwegein and the A27 motorway, there is to be a sustainable industrial district and a 13 MW windfarm, providing a quarter of the provincial target.

Sustainability is not specifically mentioned in either the Strategic Plan 2025 or the Spatial Policy Strategy 2025 of the Veenendaal municipality, although the documents do include the usual spatial planning goals and aspirations. The Veenendaal urban development 'Buurtstede' with 1,250 homes, the first part of a larger development of 3,200 homes in Veenendaal East, is being built with a sustainable energy system which

makes use of a combined heat and power plant, underground thermal storage at a depth of 85 metres and heat pumps. The heating or cooling is distributed to and from the homes via the pipes of the distribution system. The energy system also provides the necessary heat for warm tap water, together with the heating to five exiting apartment blocks nearby. One innovative element is that the Veenendaal municipality, two local housing associations and two project developers have joined forces to establish a local energy company that runs the energy system.

Zeist houses the office of the World Wide Fund for Nature (WWF) of the Netherlands. This renovated laboratory and office building dates from 1954 and in 2006 was converted to the first building in Europe that supposedly emits no CO_2. In the recently produced Spatial Policy Strategy 2020 of Zeist, sustainability is one of the principal themes, but it lacks any relation with climate programmes and ambitions. The main aims of the municipality are the sustainable redevelopment of the surroundings of the Driebergen-Zeist public transport hub and the sustainable and energy efficient redevelopment of Kerckebosch, one of the older residential neighbourhoods with 1.250 houses.

9 THE A-12 ZONE CONNECTING UTRECHT, HOUTEN AND NIEUWEGEIN

An overview and discussion of the most promising projects and activities in the field of sustainable spatial development and design across all the individual municipalities shows that these projects and activities surpass the administrative borders of the municipalities. The overview shows that a large proportion of these projects and activities is closely related to the central location and the national motorway, railway and waterway hub. To be able to accommodate the constantly growing demand for mobility in the Netherlands and the Province of Utrecht, central government, the Province of Utrecht and the six major towns of Utrecht are investing in various forms of infrastructure to meet future needs. This involves building the A2 and A12 motorways underground, so that the now divided urban areas are better connected, as well as expanding the light railway between Utrecht, Nieuwegein, Leidsche Rijn and the Uithof, the university campus, and improving the areas around the stations in Amersfoort, Utrecht, Driebergen-Zeist, Houten and Veenendaal.

Within the foreseeable future the underground section of the A2 motorway (Eindhoven-Amsterdam) will provide a barrier-free connection between the existing city (Utrecht) and Leidsche Rijn situated to the west, the largest urban development area in the Netherlands with more than 30,000 homes and 80,000 inhabitants forecast for 2025. A more urban-style underpass is envisaged for the A12 motorway (Arnhem-The Hague) for 2025-2040. The zone on both sides of the A12 offers good opportunities to develop an essentially mono-functional, extensively used, urban fringe area into a multi-functional, dynamic commuter area at the centre of a continuous metropolitan region. An area which is no longer only easily accessible by car, but also by tram and bike. The zone makes a substantial contribution to the economic strength of the region in the centre of the country and its positioning as a culture and knowledge-based region. The area lends itself well to the planned demands of the future. It is expected that in 2040 people will want to live and work in mixed urban areas, with spaces to meet and with multimodal accessibility. Some 2,500 to 7,500 additional jobs will be created, and there will also be room for 10,000 to 20,000 homes and a number of regional facilities.

There are four guiding principles underlying the development of the A12 Zone which is intended to link the municipalities of Utrecht, Nieuwegein and Houten. These are: Utrecht-like urbanity, meeting, sustainability and green/blue. Utrecht-like urban living represents the link with the essence of Utrecht, the qualities on which the success of the Utrecht region is based. Key concepts here include high density, mixed use, green corridors, the human dimension and meeting spaces. Meeting stands for the new way of working in the heart of the Netherlands. At the intersection of the A12 and the A2 between the urban centres in the region, in a compact and mixed urban area with tram, car and bike on the doorstep, a bakery in the neighbourhood and a pavement cafe around the corner. Sustainability is first and foremost about a more intensive and multifunctional use of existing locations, the choice of the location, the spatial planning and design of the zone, the economic basis as well as how the residents and visitors to the area act. The area will be designed such that users are continually invited to act in ways which are as sustainable as possible. Key concepts here are tram use, bike, CO_2 neutral, energy generation and climate resilience. As with sustainable economic growth, there is a new way of working and economic activity in low environmental categories. Green/blue refers to the specific features which make the region so attractive, such as the residential area and maximum use of the natural features already present in the A12 zone, the linking themes being the special elements of the Hollandse Waterlinie and the strength of the water corridors running through the area that were once

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flooded as defences. By connecting the Green Heart of the country with the greatly valued landscape features in a way which is environmentally-friendly, the green/blue concept can bring added impetus to the region.

10 CONCLUSION

The Utrecht region has made considerable steps in planning low carbon, sustainable and liveable cities. The Province of Utrecht and the six larger towns and cities in the Utrecht region are doing their very best in translating very tough climate and energy ambitions into special policies and a low carbon and sustainable build environment. The Province of Utrecht has wisely transformed climate issues into economic challenges and spatial policies. The cities of Amersfoort, Houten, Nieuwegein, Veenendaal, Utrecht and Zeist are doing the same, with smaller budgets and mixed success. The effort needed to meet the proposed reductions are greatly underestimated. Becoming a CO_2 neutral municipality by 2030, for instance, means an average reduction of 5 % CO_2 every year. The Energy Report of the WWF demonstrates that this can be done and that by 2050 almost all the energy we need (95 %) can come from renewable sources. The report shows that such a transition is not only possible, but also cost effective, providing energy that is affordable for all and producing it in ways that can be sustained by the global economy and the planet.

Climate and energy ambitions have spatial impacts and consequences. In order to actually fulfil these ambitions, we need to plan and built our cities in a more compact way and more based on public transport and high speed trains than on cars. It is generally accepted that we require almost a complete retrofit of the build environment, a transformation of the energy infrastructure, carpeting roofs with solar cells, harvesting geothermal energy and building wind farms in almost every possible location. And planning low carbon, sustainable and liveable cities requires a transformation of the planning profession.

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The Urban Risk Dilemma: Urbanisation, Modernisation and Disaster Risks in Ho Chi Minh City

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1 ABSTRACT

The future challenges for urban planning and urban governance are often far more observable within the context and complexity of urban agglomerations in countries of the Global South like Vietnam. Here urban development is dynamically changing both urban form and function. More attention therefore should be placed on documenting, mapping and comparing the spatial distribution of urban structures and population over time. This however would require conceptual and methodological clarity to go beyond simplistic assumptions and to arrive at spatial planning recommendations, which effectively direct urban growth and redevelopment priorities and patterns. Rapid urbanisation is a manifestation of the ongoing modernisation process in Asia accompanied by rapid economic and social development. The environmental dilemma, as the major risk component of urbanisation, stresses the negative side-effects of urban-environmental processes. Urbanisation and environmental change is seen to shape the basic prerequisites for urban resilience to climate related hazards. In one sense, the local urban environmental risks themselves can be seen to reflect the challenges of such changes through global climate change and its impacts on population.

2 URBAN GROWTH MONITORING - CASE STUDY HO CHI MINH CITY, VIETNAM

Coastal Asia is facing an urban century in which not only the growth of population in their cities will ultimately determine their resilience and sustainability, but also their patterns of development. The empirical interrelationship between rapid urbanisation processes in coastal Asia and the associated increases of risk to weather and climate-related disaster hazards cannot be fully explained solely in terms of changes in population. Much more important however, is the consideration of the spatial distribution of people and economic assets in risk-prone areas, primarily as a result of rapid urbanisation. Here the sensitivity of both the exposed population and assets—can be used as an indicator for the ability to cope with and reduce risk. There can be little doubt, that a dominant factor contributing to increased vulnerability is urbanisation itself. How this dynamic pattern of urban development assists or hinders risk adapted planning and management is the critical issue that will be highlighted in our indicator-based assessment.

The southern Vietnamese city of Ho Chi Minh City (HCMC) is a rapidly emerging megacity and represents one of the most dynamic examples of urban development over the last few decades. The city is precariously located on the banks of the Saigon River, 60 kilometres from the South China Sea and northeast of the Mekong Delta, in an estuarine area of Dong Nai River system. In a short space of time, the city has grown into Vietnam's largest and most populous settlement, becoming an important port city for Southeast Asia and beyond and contributing a dominant share to the national economy. The official population of the city as of 2009 was 7.2 million, spread over a total administrative area of 2095 square kilometres (STORCH& DOWNES 2011a).

Originally founded on relatively higher grounds, the city has densified through the infilling of open spaces or the redevelopment of existing buildings. However of greater concern is the rapid expansion into lower-lying and former wetland surroundings, primarily at the expense of urban greenscape and valuable multifunctional natural areas. The city is currently incised by a dense network of rivers and canals of around 8.000 kilometres in length, which account for 16 percent of the total area. These waterways are affected by a semi-diurnal tide. In coincident with annual rainfall peaks a significant percentage of the city's neighbourhoods regularly experience floods, due to a combination of tides, heavy monsoon rains and storm surge floods. The dimensions of this flooding are however constantly changing due to the ongoing rapid urbanisation (STORCH& DOWNES 2011b).

2.1 Urban development trends and problems in HCMC

The official population forecast estimates that HCMC will become a megacity and reach a population of 10 million by 2020. According to the official urban development strategy, HCMC will be developed in the future based on a multi-centre pattern along the northeast, south/southeast, north/northwest, southwest

directions. As a result, HCMC's planning administration has recently established so-called new urban areas as focal points for new satellite development, which will integrate fringe areas in the currently more rural outer city districts. The city's current radial development structure is still to some extent impractical, resulting in insufficient land available for public services and for open space.

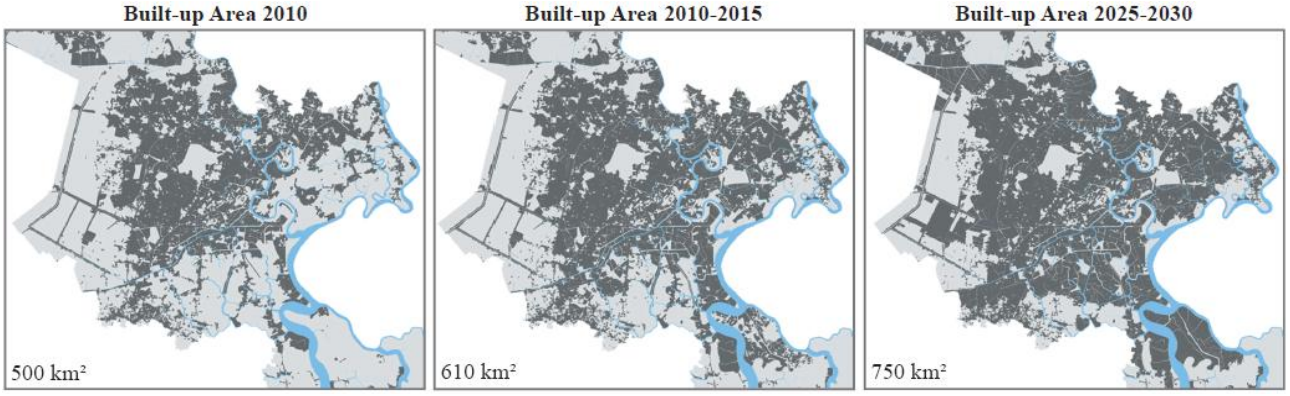

Fig. 1: HCMC's official urban development scenario up to 2025/30

Figure 1 illustrates the future urban growth process of HCMC based on the official land-use plans for the next planning period. The implementation of the land-use plans for the years 2010 up to 2025 will increase the total built-up area to 750 square kilometres (an increase of 50 percent). In order to accurately define the precise spatial extent of the current built-up area, the digitalised version of the official land-use map 2010 at a scale 1:25,000 provided the common spatial geometry based on which a 'current land-use' map for the year 2010 was compiled. Current land-use was determined from the visual interpretation of high resolution panchromatic satellite imagery; the classification was based on our urban structure type classification for the entire HCMC urban area (STORCH& DOWNES 2011b). A limitation of simple urban growth scenarios is that the simplified mapping of built-up areas over time fails to show real land-use densities, ignoring the structural changes and alterations of the current and future urban settlement typologies over time.

2.2 Urban structural indicators to analyse development patterns

Urbanisation is an extreme case of land-use change. For HCMC, rapid and dense urban expansion and inner-city redevelopment has primary direct impacts at the local scale in changing the visible urban structures and form and indirect secondary affects in for example alteration of the urban climate and increasing the need for indoor cooling or modifying the urban water-cycle. The following questions will be explored for climate-related impacts in the urban environment of HCMC (STORCH 2007):

- Where and how does urban development change the land-use pattern of the metropolitan area of HCMC, and to what extent does this affect climate change related impacts on the urban environment?
- Which urban structure typologies can be distinguished (DOWNES ET AL.2011), and what is the relation between their characteristics and the assessed level of resilience against climate-related impacts?
- How adequate are the existing land-use planning and urban-environmental management approaches to the relevant governance structures; to what extent do they contribute to an urban development that takes climate-related urban-structural indicators into account?
- Which hotspot areas can be identified for predominant climate-related impacts in HCMC, like inner-urban flooding caused by high-degrees of imperviousness, and affects to urban climate caused by high-dense building structures?

An important first step in the estimation of hotspot areas is to describe the observable indicators related to both urban form and structure (STORCH ET AL. 2011). The most dominant feature of the urbanisation process in HCMC is the rapid growth of the city itself and the surrounding urban agglomerations. Urban population growth due to birth surplus and in-migration has caused high land demands. In HCMC, urban growth and land consumption indicators are just about to be recognised in planning decisions, while a more regulating use of core urban indicators is still limited. Until recently the available information is often

inadequate or spatially not explicit enough for assisting urban policies like indicator-based planning regulations.

In general, the ratio between built-up and non-built land provides a good overall first impression of the spatial character of the city. Built-up areas typically include residential areas, industrial, and commercial areas. However, in emerging Asian megacities like HCMC, the monitoring of the building footprint alone is not sufficient. Therefore, in order to analyse urban land-use, urban density and spatial development trends over time typically a stepwise indicator approach is used. Here, an initial indicator framework is composed of core sets of indicators measuring different aspects of urban land-use and building density. The first step in assessing the existing urban structure and land-use efficiency is to evaluate changes of the urban form and housing structure and their relation to building densities and land utilisation efficiencies (GILL ET AL. 2008). The indicator framework leads from basic land-use indicators to building density measurements and finally to a combined analysis of population densities and land-use intensities. The most important efficiency indicator pattern is the ratio between built-up and non-built areas.

2.3 Urban Indicators describing the built-up structure of HCMC in 2005

The total area of HCMC is about 2095 square kilometres, divided into 24 administrative districts, hosting in the year 2004 an official population of 6.2 million. 5.2 million of which lived in the 17 urban districts occupying an area of 494 square kilometres and displaying an average population density of around 11,000 inhabitants per square kilometre. The inner-city urban areas are concentrating on an area of 140 square kilometres more than half of the population resulting in an average density of 26.000 inhabitants per square kilometre, with peak values in inner-city informal settlements with up to 80.000 inhabitants per sq km (GSO HCMC 2006).

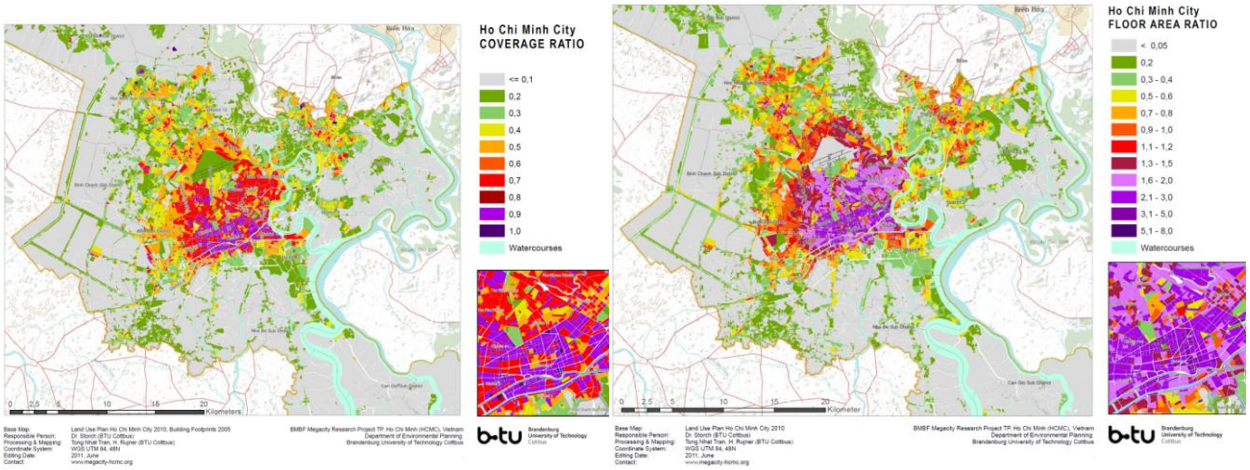

Fig. 2: Coverage ratio and floor area ratio in HCMC's urban core for the year 2005

The extremely high-dense inner city development, with built-up (coverage) ratios of more than 0.6 (i.e. 60% ground coverage) and floor area ratios equal or greater than 1.5 (Figure 2), is predominately realised by the infamous shophouse typology. This typology consists of a flat-roofed row house with a plot size of approximately 4 x 20 metres. The shophouse typologies are the dominant structure in HCMC, accounting for 95% of the seen residential urban structure types (Table 1). Furthermore, with typical building heights of between two and five floors (Table 2), very high density levels are achieved, while the remaining open space is often only represented by the public street areas.

Residential category	No. of sub-division into urban structure types	No. of blocks	Surface Area (km²)	Percentage utilisation category	Percentage of total HCMC surface area
Residential (total):	25	6.717	446	100	21
Shophouse-based	12	6.346	425	95	20
Villa based	04	107	8	2	<1
Apartments	05	103	5	1	<1
CBD	02	160	7	2	<1

Table 1: Classification of HCMC's urban structure types for the year 2010, defining residential land-use

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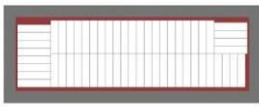
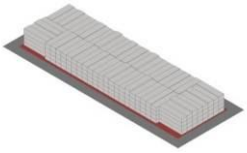
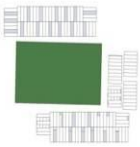
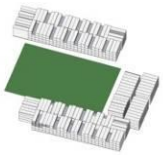
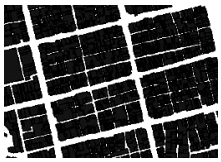
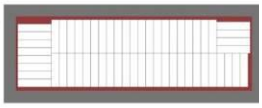
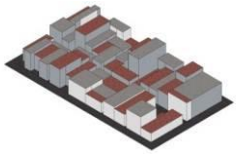
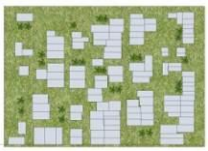
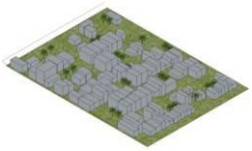
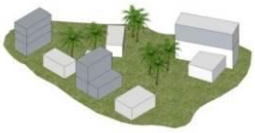
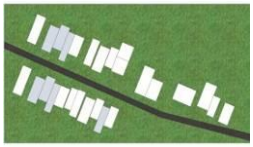
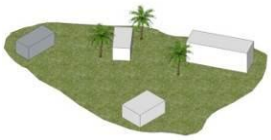
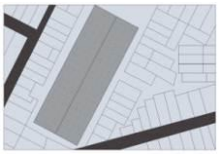
Code /Urban Structure Type Name	Building Footprint	Plan View	3D View	Built-up Ratio (%)	Floor-Area Ratio (%)	Avg. no. of floors
111 / Shophouse Reg. New				45	123	2.7
112 / Shophouse Reg. New Community				26	88	3.4
113 / Shophouse Reg. Alleyways				57	153	2.7
114 / Shophouse Reg. w/ Yards				28	64	2.2
121 / Shophouse Irreg. High-dense				58	154	2.7
122 / Shophouse Irreg. w/ Yards				38	88	2.3
123 / Shophouse Irreg. Scatt. (Peri-urban)				14	30	2.2
124 / Shophouse Irreg. Clust./Line. (Peri-urban)				15	29	2.0
125 / Shophouse Irreg. w/ lar. Fields (Peri-urban)				5	9	1.9
131 / Shophouse w/ Indust.				38	81	2.1

Table 2: Density related indicators of HCMC's shophouse-based urban structure types

2.4 Urban indicators describing the change of built-up structures of HCMC over time (2005-2010)

Our core indicator set (STORCH ET AL. 2007), measures the issues linked to the extent and growth of built-up areas and the efficiency of the land utilisation (floorspace), in relation to the common spatial unit of the

official land-use block. The following urban growth and (re)development oriented aspects are measured by comparison of the core-indicators themselves over time. This describes more specifically the growth rate at which built-up areas and floorspace have expanded and evolved over the time period of between 2005 to 2010.

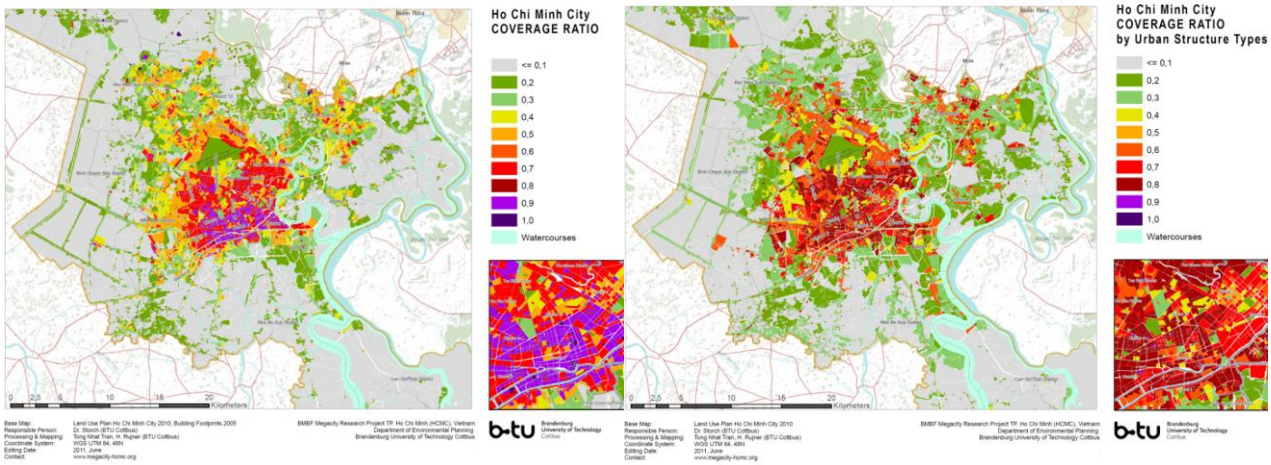


Fig. 3: Comparison of the indicator "coverage ratio" between the years 2005 and 2010 (Note: the map for the year 2005 (left), is based on building footprint data, while the map for year 2010 (right), is based on urban structure type mapping)

Figure 3, illustrates the urban development for the period 2005 to 2010 for built-up areas based on the indicator ground coverage ratio. Seen are the ongoing sprawl developments taking place along the main transportation routes on agricultural land, counteracting the official development according to the satellite urban model. Recent and current residential areas are dispersing towards eastern (District 2, 9 & Thu Duc), southern (District 7, Nha Be) and western directions (District Tan Phu, Binh Tan, Binh Chanh).

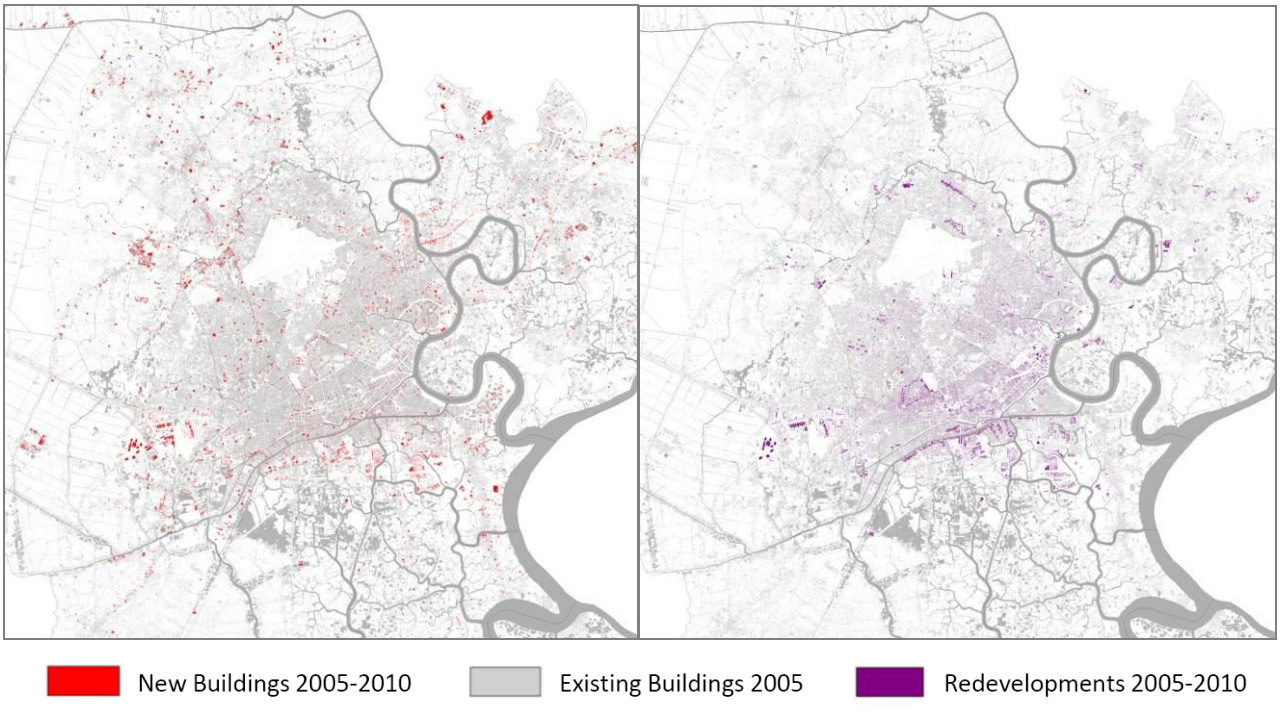


Fig. 4: New developments (left) and redevelopment Activities (right) between the years 2005 and 2010 (The Analyse is based on the detailed mapping of building typologies, shown in Table 3, at a scale 1:5000 in 2005 and 2010)

Interesting to note is that even within the existing urban core (District 6, Binh Thanh) (re)development activities are high. Caution should be exercised however as an overdevelopment in the existing urban core will result in an overload to the limited basic urban services and infrastructure. For a sustainable development scenario, it is important to understand and not lose track of the future urbanisation challenges and the requirements for the provision of basic urban services and technical urban infrastructure preparation. Besides sprawling new urban developments, the ongoing continuous compacting and densification,

horizontally as well as vertically, of the existing settlement structures is a visible trend in HCMCs recent development pattern.

Figure 4 illustrates that new developments and redevelopment activities—mapped on the level of building types (Table 3) —between 2005 and 2010 that lie within the current urban core. Visible are the concentrated new developments seen focused in new urban areas in the outer districts. However also visible and rather surprising, is the great number of construction activities on single construction sites at the building level in the inner city core. This activity is seen to counteract the official development strategy.

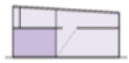
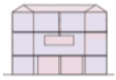
Building Type		Coverage (ha)	Floorspac (ha)	Height (flrs)	Coverage (ha)	Floorspace (ha)	Height (flrs)	Coverage (%)	Floorspac (%)	Height (%)
		2005			2010			Change 2005- 2010		
Apartment		113	569	5,0	166	890	5,3	48	57	6
High-rise		19	120	6,4	28	223	7,9	51	86	23
Detached		2149	2824	1,3	2872	5893	2,1	34	109	56
Semi detached		317	334	1,1	458	724	1,6	45	117	50
Temporarily-built and others		37	41	1,1	17	21	1,2	-54	-50	8
Terraced		3496	7001	2,0	7154	18001	2,5	105	157	26
Villas		893	1504	1,7	897	1777	2,0	0	18	18
Wood-framed, thatch- roofed		54	56	1,0	52	53	1,0	-5	-6	-1
Markets		8	29	3,5	17	66	3,8	108	126	9
Hotels		39	160	4,1	45	226	5,0	16	41	22
Office building		113	593	5,3	131	777	5,9	16	31	13

Table 3: Urban structural changes in HCMC from 2005-2010—Core indicators for dominant building types.

Table 3, additionally underlines with the comparison of urban structural indicators (ground coverage and floorspace) the ongoing densification trend between 2005 and 2010. Except for the more informal building types, all building types have significantly increased in both built-up (coverage) and in floorspace density. Particularly the dominant shophouse-related building types show a doubling of their total ground coverage and—due to an increase in their average heights – the floorspace for this type can be seen to have increased by more than 150% in only 5 short years.

3 CONCLUSION

Planning for risk and uncertainty for future urban growth will not just be a challenge for high-flood prone areas; it will be a broader challenge impacting on the very nature and location of future urban developments, particularly when planning for climate change. There is a strong correlation between urban vulnerability and physical exposure. Here land-use planning that takes into account disaster risks can be seen as the single

most important adaptation measure for minimising future disaster losses. The spatial planning frameworks and subsequent urban planning decisions, as currently applied, do not attach sufficient importance to both the physical exposure and the actual rate of urban growth. Urban growth does not increase exposure of population to risks per-se. In general, urban governments are responsible for regulating either building or development in a way that reduces risks. For high-dense Asian megacities, the complexity of risk and vulnerability requires high resolution spatial information systems, in order to identify hazard patterns, vulnerability and risk at a scale that can provide information for urban land-use and development planning. Urbanisation does not necessarily have to lead to an increasing hazard portfolio and can, if managed properly, contribute to reduce risk. Yet, there are a number of key characteristics of the urbanisation process that do directly contribute to the configuration of risk. Spatial and physical exposure alone does not explain nor directly lead to increased urban risk. If urban growth in risk-prone locations is redirected by adapted land-use zoning and guided by adequate building standards, resulting risk patterns can be effectively managed and reduced. It is the very 'spatial dimension', the form and structure of urban settlements that concerns urban and regional planning.

4 ACKNOWLEDGMENTS

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The Way to Plan a Sustainable "Deep City": From Economic and Strategic Aspects

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1 ABSTRACT

Facing the challenges of population growth, energy crisis, land pressure and environmental deterioration, modern urbanization is calling for governance innovation to facilitate flexible spatial transformations and to promote creative city redevelopment. Developing Urban subsurface as a sustainable option for renewing congested urban centers and for updating public infrastructures, should be economically viable and institutionally feasible.

Optimization of urban underground space use has to take into account social-economic demand and supply capacity of geo-space resources. A framework research is put forward, with a functional classification of subsurface project typology, as well as a zoning system of subsurface integrated quality, which includes engineering constructability and development value. Based on the macro-zoning of urban underground space (UUS) at a city scale, an economic model is developed to perform micro-analysis for specific project evaluation. The economic analysis will take into account direct and indirect costs generated along the project life cycle, business benefits and social benefits for the whole community, opportunities for synergetic resources exploitation (e.g. geothermal energy use), and risks induced by sectorial development pattern (e.g. groundwater damage). These main criteria of cost, benefit, opportunity and risk are useful for decision-makers to plan urban subsurface projects in a sustainable way. At the end, a multi-criteria decision-making process will be demonstrated, in order to guide strategic development and policy making.

2 INTRODUCTION AND PURPOSE

2.1 Urban problems and integrated solutions

Cities are economic growth centers hosting nearly 50% of world population and having the capacity to provide best services for high quality of life. These centers, in forms of different scale of metropolitans, are getting more and more congested with expanding occupation of production, service, living space, public infrastructures and decreasing greenery amenities. While the era is going from industrial style to post-industrial trend, the quality of urbanism is playing an important role in city development and governance. While maintaining the basic service of infrastructures, investing on urban quality is becoming an essential concept among city governors. Big cities facing population immigration have to provide more living space and related services, making urban land and other resources more and more valuable and scarce. In order to enable a city to survive and to sustain economic growth, a rational management pattern of land and other resources should be on urban development planning agenda. Urban sprawl is a signal to constrain a sustainable growth, causing higher infrastructure investment to maintain the sprawling area function (larger transport and utility networks), as well as higher energy consumption for low-density living (enhanced use of cars). Obviously, cities are facing "limits to growth" and calling for innovative development strategies and sustainable renewal.

Urban growth is facing two problems: 1) shortage of resources, due to unsuitable exploitation process; 2) lack of value chain to create growth, due to inappropriate policy making or insufficient capacity building. Therefore, ways to support urban growth could be resources-oriented or institution-oriented. *Resources-oriented management* focus on protection and optimal exploitation of basic resources (land, water, energy, material), establishing a self-sufficient society and value-protected environment. Resources-oriented management is a development pattern giving priority to respect "supply limit of resources". On the other side, *Institution-oriented management* focus on value creation and revenue generation by enabling project opportunities, facilitating participation of all interest groups and implementation of constructive action plans. Institution-oriented management is another development method which gives the importance to "satisfaction of people's demand". Since the concept of "sustainable development" goes beyond the simple environmental protection or the sectorial economic growth, our urban governance in the new era has to combine resources-oriented management with institution-oriented management. This integrated approach meets the need of sustainable urban growth.

2.2 New urban forms with "undergroundisation"

2.2.1 Underground infrastructures

Along with the rapid development of metro systems in big cities, urban underground space (UUS) has been exploited as part of urban land resources, providing protective space for infrastructures such as road tunnels, water system, sewage system, energy supply network and cable network. With technological advancement on renewable energy utilization, deep geothermal system will begin to emerge in urban area (Figure 1).

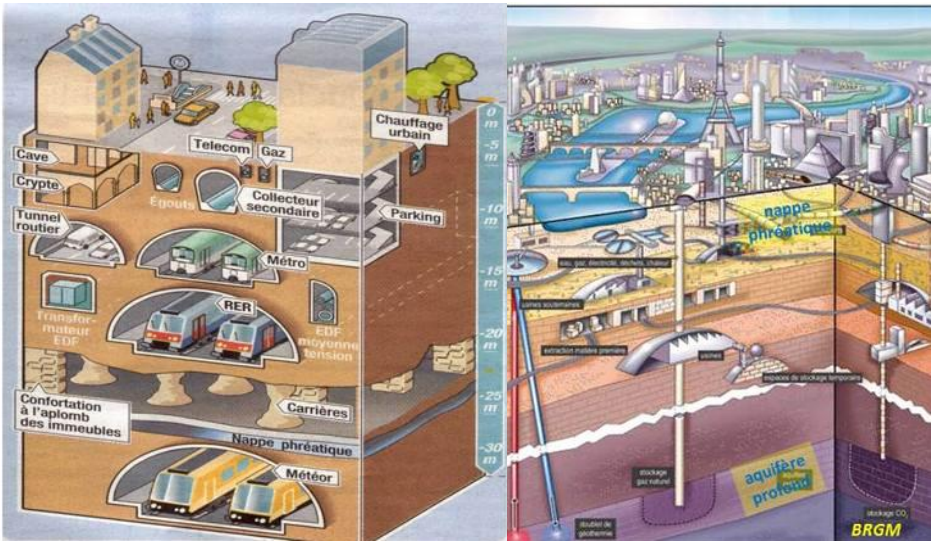


Figure 1 underground space functions illustration for the city of Paris, France (Duffaut 2010)

"Undergroundisation" trend of urban infrastructures is driven by various surface development forces:

- *Land use pressure:* the unbalanced allocation of construction land and facility land forces more and more facilities to be placed underground, since they are often large scale facilities, being underground can release more freedom over ground (Don V 1996; Tajima 2003). The "undergroundisation" volume is highly related to the urban population density causing increasing demand for land, as show in Figure 2.

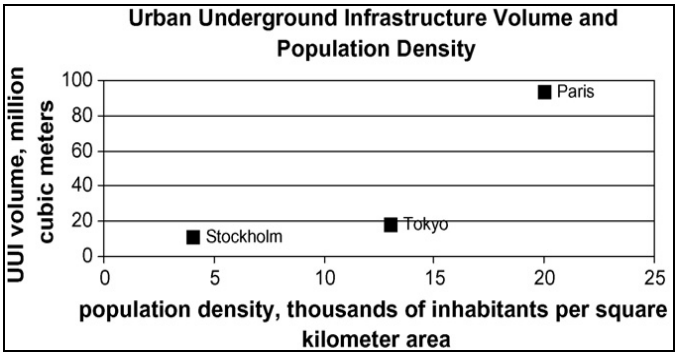


Figure 2 Relationship between population densities in urban areas and volumes of Urban Underground Infrastructures (UUI) (Bobylev 2009)

- *Increasing land prices:* real estate property development is creating huge cash flow in cities and making less and less land available for public use. Moving public facilities underground helps to reduce the land costs, sometimes even no land costs for deep facilities (Figure 3). The price factor has also contributed to the emergence of new legal system for deep space (50m depth) in Japan (Nishioka, Tannaka et al. 2007).

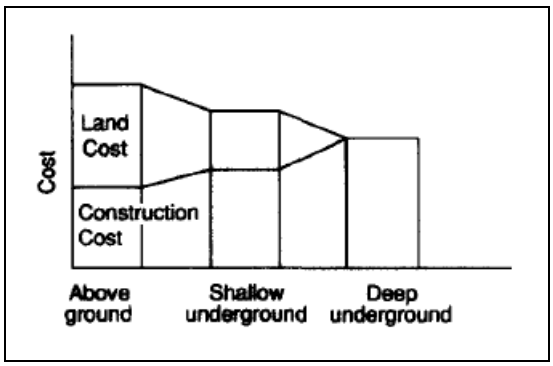


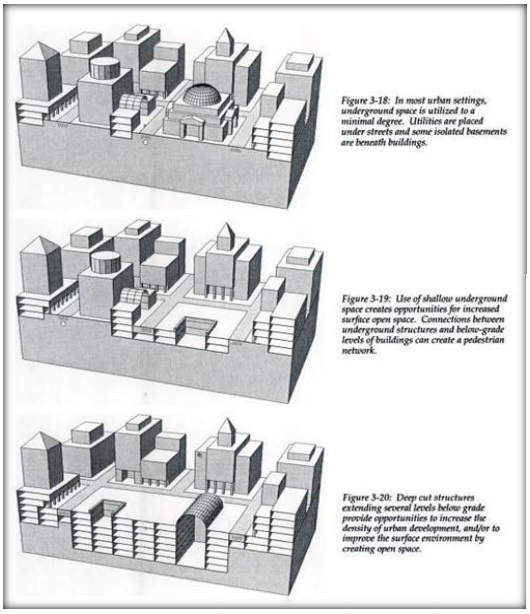
Figure 3 Comparative land and construction costs of above-ground, shallow underground and deep underground facility, Japan.(Tetsuya 1990)

- *Environmental impacts:* due to high isolation capacity in the subsurface, belowground transport system causes less noise and less smoke than surface transport (bus, car) during its operation time, reducing pollutions in the city (Girnau and Blennemann 1990)

2.2.2 Underground buildings

Underground commercial centers become common in central business districts, for example, subterranean shopping centers in Japan have become its major business space (Japan Tunnelling, Takasaki et al. 2000). Montreal city's "indoor city" network connects subterranean commercial area with metro stations, its comfortable underground pedestrian network enable citizens to pass through the center freely during severe weather (Daniel J 1991; El-Geneidy, Kastelberger et al. 2011). Although the construction cost for construction subterranean space is higher than the surface building, it can offset a great part of surface land investment, creating more commercial and service space while saving land occupation costs. Revealed by several empirical researches, external benefits of these spaces could be considerable (Nishi, Tanaka et al. 2000; Lin and Lo 2008). Driven by increasing urban demand, "undergroundisation" process of buildings in business districts is illustrated by architects and planners (Figure 3).

Energy consumption of underground building during operation will be lower than surface building (heating and cooling consumption), due to better thermal isolation capacity (Monnikhof, Edelenbos et al. 1999; Maire 2011). This long-term benefit will encourage the future promoters to invest on underground building projects, for the reason of reducing considerable power expenses.



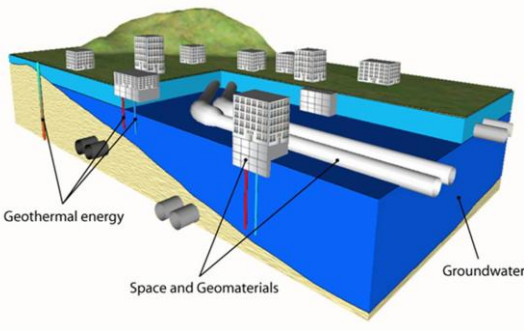


Figure 3 Underground space configurations in urban center (Carmody and Sterling 1993). Figure 4 "Deep City" model (Parriaux, Blunier et al. 2010

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2.3 Subsurface development integrated with surface city growth

The aim of this research project is to put forward a new management methodology for urban underground space (UUS) development, taking into account its economic potential and its global benefits to urban quality. As subsurface is part of urban land resources, a new approach of "3D land use" is the primary idea of implementing 3D urban projects. "3D urbanism" concept is to couple resources-oriented management with institution-oriented management, integrating the supply scheme of resources with the demand scheme of human society.

Resources-oriented 3D urbanism is to give priority to underground resources protection (including land, water, energy and material Figure 4), by identifying future resources use potential and zoning to a "development reservation area". For example, reserved area for drinking water exploitation, reserved area for material mining, and reserved area for deep geothermal system. These legalized areas are out of construction authorization scheme.

Institution-oriented 3D urbanism is to focus on social demand of development projects, located outside "development reservation area". The aim is to find an optimal way to develop underground projects. By analyzing economic values and social values, decision indicators will be developed to lever the interests of different stakeholders in public sector and private sector. Through multi-criteria decision making process, project scenarios will be evaluated and assessed for their performances. Feedback from the decisions will give implications on policy making, in order to adapt the development demand.

3 CONCEPT AND METHODOLOGICAL DEMONSTRATION

3.1 Interdisciplinary basis

(a) Information gap:

Subsurface environment is known by geologists and civil engineers, whose knowledge and experience give supports to resources mining and underground construction. However, there is a gap between geological sciences with modern underground construction practices. Examples can be seen from tunneling accidents due to insufficient geological survey (Paul, Chow et al. 2002). Information and expertise regarding risk management are also critical factors to succeed larges underground projects such as subway construction (Degn Eskesen, Tengborg et al. 2004). "3D urbanism" requires a new representation of urban territory with a three-dimensional form, in order to visualize real potentials and clear development visions for deep urbanization.

(b) Capacity building:

Different from conventional urban planning, subsurface urbanization needs a profound understanding of deep environment and an integrated approach linked to surface development demand. In another word, capacity of urban planning is supposed to extend to a "3D urban planning" level, by engaging the competences of environmental management, economic planning, and infrastructure construction bodies. The action plan of surface-subsurface codevelopment can be materialized into existing Master Planning practice by introducing strategic procedures (Bobylev 2009).

(c) Urban land market restructuring:

The value of underground in cities has not yet been incorporated into the existing land market system, for the reason that the quality of these exploitable deep spaces is unknown among city governors and land owners. Their future value for complementary land development can not be forecasted without holistic research of resources' supply capacity (relatively static) and urbanization's demand context (variable along time).

(d) Business scenario analysis:

Existing best practices for underground space development can be collected to form an urban case catalogue, to show success factors and to give future improvements. Urban underground projects can be divided into typologies as: typology by depth (shallow independent use project; deep public use project) and typology by aim ("exclusive type", e.g. metro, utility; "density type", e.g. multi-use building; "revital type", e.g. building under parks). Business cases could be simulated and analyzed, using performance evaluation.

(e) Policy-making:

Urban policy aims to facilitate good development practices. Understanding interactions between public sector and private sector help to reformulate positive instruments and to improve the existing governance mechanism. Underground urbanism should be initiated through public sector by introducing instruments promoting development synergies; independent underground projects could grow from the policy framework by applying sustainable investment scenarios (e.g. densification or revitalization).In addition, these interactions enable the policy-makers to go around the management improvement loop (Table 1), making demand dynamics incorporate into the contextual big picture.

3.2 Process-oriented management system

Current development of underground space in cities is facing coordination dilemmas: on one side, public infrastructures are growing fast and going deep, congestions and disorder hinder future development (Sterling 2005); on the other side, private developers play a major role in property development but lack of cognition of subsurface potential and comprehensive decision-making. The process proposed below (Table 1) is an ideal facilitating procedure to frame a comprehensive decision platform, linking public and private sectors into new subsurface urbanism plans. It is also an "undergroundisation value chain" to reorganize multi-disciplinary functions for creating economic growth, meeting urban demand while optimizing the use of underground space in the city.

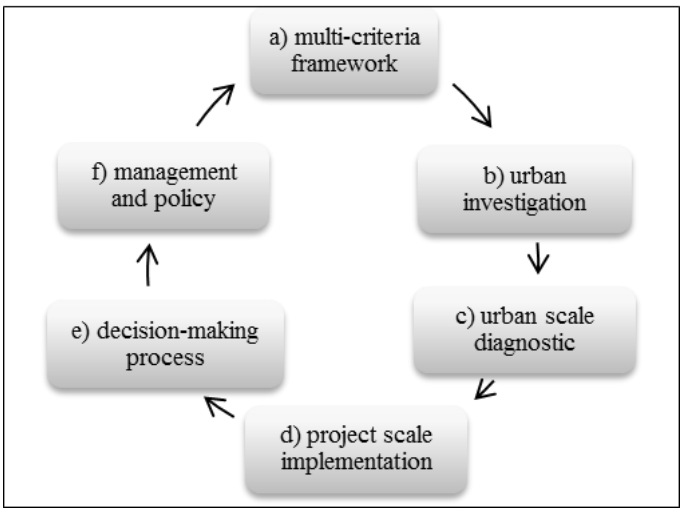


Table 1 Analysis improvement loop of research steps

3.3 New management methodology for subsurface urbanism

3.3.1 Macro-criteria system for land valuation (at urban scale)

Urban projects are developed based on economic attraction and social demand. For real estate projects, locating on high price land indicates higher property price for commercialization, if construction prices remain the same. However, if we take into account the economic potential of urban underground space (UUS), the existing land value distribution will be different. Underground land quality determines construction costs, meaning that, a parcel of high price land can have lower value for "undergroundisation", due to bad quality for excavation engineering. For abandoned industrial land with low land price, it can be exploited by developers for its good soil quality, who built underground parkings or subterranean logistic centers with creation of a green park above, bring revenues for the land owner and good renewal environment for the community. Two macro-indexes (supply and demand) will be integrated through multi-criteria evaluation to map the different levels of urban land parcels (Table2). Detailed procedure with a considerable number of parametrs can be found in another paper of the author (Li, Parriaux et al. 2011).

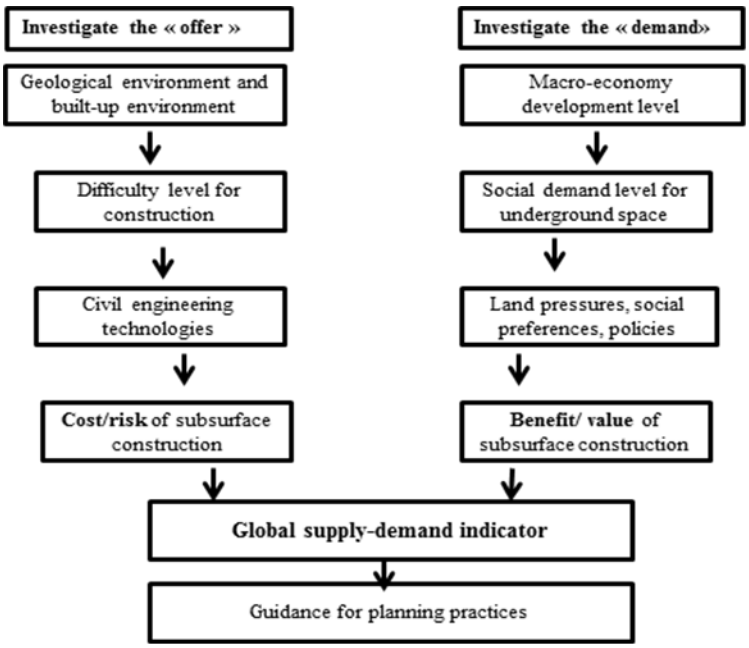


Table 2 Multi-criteria (macro-index) framework for UUS potential evaluation

This macro-zoning system is to classify the urban land into development levels: high potential, moderate potential and low potential. *High potential area* can be short-term development target, using underground to create more urban growth; *moderate potential area* can be reserved for long-term exploitation land resource; *low potential area* is prohibited zone due to sensitive condition or highly protected resource reservation (e.g. water, mine). With future demand dynamics, distribution and mapping of these zones can vary and can be re-affected.

Results of case study: central city of Suzhou, Yangtze region, China (Figure 5, blue color for high potential area)

The structure of macro-zoning favors rational selection of priority development zone to be investment target. As different land use type has different underground use value, commercial land and mixed use land having higher development potential for "undergroundisation". The tradable land parcels on the market can be restructured according to their land price and their exploitable underground potential, a coefficient can be created to lever the integrated value variation (explained in session 2.3.2).

This land value restructuring helps to incorporate the economic potential of using underground space into market land price, and gives implication to the land owners about how to develop an underground property project in a rational way.

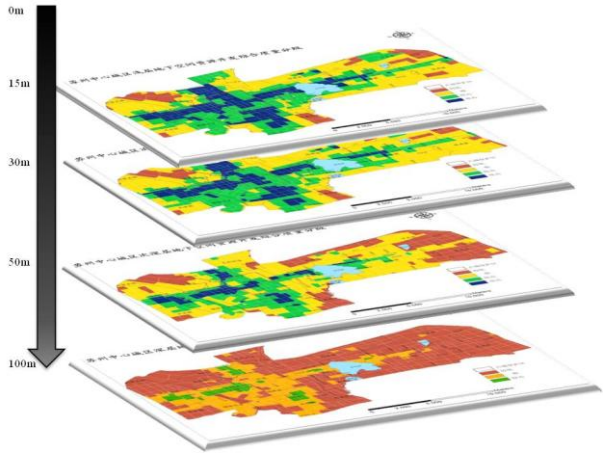


Figure 5 macro-zoning of UUS, layered approach (Deep City project in China (Li, Parriaux et al. 2011))

Analysis of case study: Forecasting exploitation of urban underground space (UUS) along with urban growth

Evaluation of central city area covers 280km2, including a famous historic town, a CBD and a new development district. Current state of deep development reaches 15m below the surface, and short-term growth of its UUS is supposed to extend to the depth of 30m below ground level. With contribution of *underground densification*, city can afford more future construction space without causing urban sprawl.

Status of 3D land use supply: for the 30m deep urban land, total effective constructible floor space is about 413km2, designing sub-floor height of 4m for better architectural effect (Ernst von Meijenfeldt 2003). (Table 3)

integrated supply-demand indicator	0-15m	use coefficient	15-30m	use coefficient	total volume by level	useful ratio by level
very high potential area	3.11	0.6	2.50	0.4	5.61	8.03%
high potential area	3.54	0.4	2.78	0.2	6.32	9.04%
moderate potential area	2.30	0.2	1.89	0.1	4.19	6.00%
low potential area	0.24	0.1	0.15	0.05	0.39	0.55%
useful volume_100mio m3	9.20		7.31			
total volume_100mio m3	27.95		41.92		69.87	
useful ratio by depth layer	32.90%		17.43%		50.33%	
equivalent floor area_km2	230.00		183.75		413.75	*(if floor height = 4m)*

Table 3 forecasting the exploitable UUS supply in short-term, development to 30m below

Variation of 3D land use demand: densification helps to rebuild a compact city (Jenks, Burton et al. 1996), a density index (floor area ratio [1]) can represent this urban trend. Step-forward "undergroundisation [2]" helps to alleviate land use pressure by high-density development. Under proximate simulation, by attaining density level of 6, a 47% "undergroundisation" share needs to place nearly 400km2 construction spaces below surface(Table 4).Compared to the supply quantity of 413km2, this demand can be met.

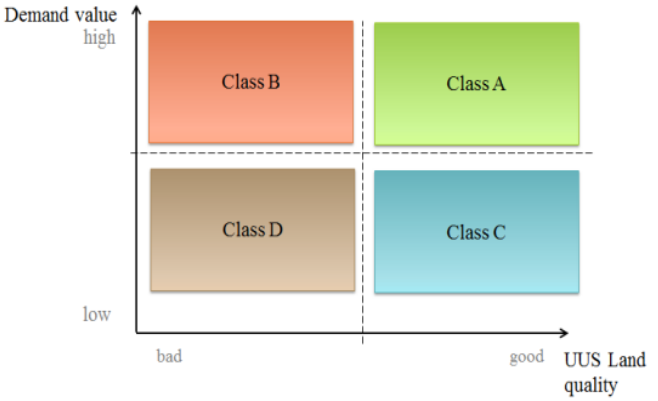
Floor Area Ratio	1.00	2.00	3.00	4.00	5.00	6.00
total urban area (km2)	279.50	279.50	279.50	279.50	279.50	279.50
construction land use (50%)	139.75	139.75	139.75	139.75	139.75	139.75
floor space demand (km2)	139.75	279.50	419.25	559.00	698.75	838.50
"undergroundisation" rate	0.02	0.10	0.20	0.29	0.38	0.47
underground floor space (km2)	2.80	27.95	83.85	160.25	263.20	391.30

Table 4 forecasting the UUS demand in short-term, density development for a compact city

3.3.2 Micro-analysis with business scenarios (at project scale)

The careful diagnostic at urban scale leads to identify high potential area for priority development planning of underground space. Further economic analysis can be performed based on land valuation and project assessment:

Step 1 Land valuation:



Class	A	B	C	D
Land price	10'000	10'000	5'000	5'000
UUS quality included value	+(10%) 11'000	-(10%) 9'000	+(10%) 5'500	-(10%) 4'500

Figure 6 integrated land valuation approach

[1] Floor area ratio = floor space area / land area.
[2] "Undergroundisation" rate = total underground floor space/total urban construction floor space.

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For high potential area in general, their land parcels to be developed can have different interpretation of real value. The hidden value of developing subsurface can be incorporated into existing land price (here is about commercial land or mixed use land), with a coefficient/premium to reveal the differences of integrated value. Low "UUS land quality" indicates higher construction costs for underground space, decisions on land acquisition can combine UUS quality indicator with business potential of the location, developers can also adapt the real estate project plans to the land value class (Figure 5). With regulated building height, a deep commercial center in the CBD should be built on land class A rather than B, whose subsurface maybe congested, inducing compensation in utility relocation.

Step 2 Project scenarios:

Project type / Land class	Density type	Revital type
Class A	Scenario 1	Scenario 2
Class B	Scenario 3	Scenario 4
Class C	Scenario 5	Scenario 6
Class D	Scenario 7	Scenario 8

Table 5 Project scenario analysis scheme

The research scheme will only focus on underground building in urban area, as its project viability has not been well researched in academic world, although its value to renovate urban centers has been documented (Barles and Jardel 2005; Maire 2011). A sustainable city is an efficient compact city and a livable city. Development of underground buildings can bring density gains or revitalization benefits. Therefore, two project scenarios can be assessed: "density type": multi-use combined building; "revital type": underground building under open space (Table 5). A cross-analysis can be performed by coupling the project type with the land class, assessing advantages and disadvantages of each scenario and levering facilitating and constraining factors. Project performance indicators include cost, benefit, opportunity and risk.

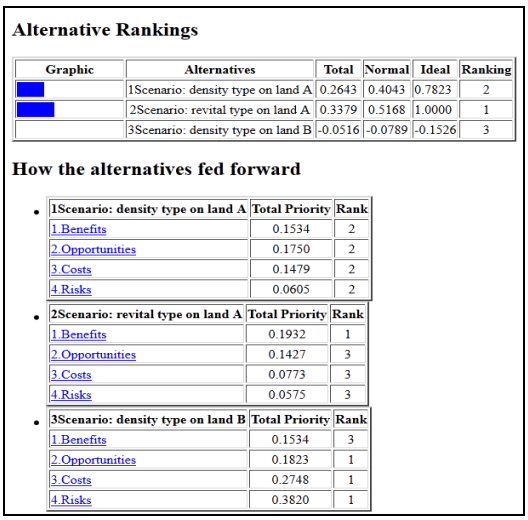
Step 3 Performance assessments:

Example is showed below to lever project viability of scenario 1, 2 and 3: (Table 6, Figure 7)

This decision-maker (environment authority) considers Scenario 2 (a revitalization type built on land class A) as the best alternative, because of a need to renew urban environment (benefit) and to protect groundwater quality (risk). Decisions of all the other stakeholders can be assessed, in order to reveal the challenges and synergies, guiding new development strategies.

Performance indicator	Criteria
Cost	• Construction • Energy consumption • Compensation payment
Benefit	• Business revenue • Environment renewal • Social welfare
Opportunity	• Geothermal system • Material recycling
Risk	• Groundwater quality

Table 6 Criteria for performance assessment



Alternative Rankings

Graphic	Alternatives	Total	Normal	Ideal	Ranking
	1Scenario: density type on land A	0.2643	0.4043	0.7823	2
	2Scenario: revital type on land A	0.3379	0.5168	1.0000	1
	3Scenario: density type on land B	-0.0516	-0.0789	-0.1526	3

How the alternatives fed forward

1Scenario: density type on land A	Total Priority	Rank
1.Benefits	0.1534	2
2.Opportunities	0.1750	2
3.Costs	0.1479	2
4.Risks	0.0605	2

2Scenario: revital type on land A	Total Priority	Rank
1.Benefits	0.1932	1
2.Opportunities	0.1427	3
3.Costs	0.0773	3
4.Risks	0.0575	3

3Scenario: density type on land B	Total Priority	Rank
1.Benefits	0.1534	3
2.Opportunities	0.1823	1
3.Costs	0.2748	1
4.Risks	0.3820	1

Figure 7 Part of the full report (by Super Decisions)

4 CONCLUSION

Rethinking the urban growth innovation by introducing sustainable concepts is current policy trend (Programme 2009). During this renovation process, social capital and natural capital have to be well integrated. The research concept and methodology put forward in the project "Deep City" tried to demonstrate a freedom for urban growth and resources consumption. Through case studies and international discussions, this third-dimension freedom could serve the future society within a participative platform, for learning, collaborating, investigating, discovering, improving and contributing. The decision platform enables a smooth process of urban restructuring, upgrading, transforming, renewing and sustaining.

5 ACKNOWLEDGEMENTS

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reviewed paper

The "Open Cities" Approach: a Prospect for Improving the Quality of Life in Alexandria City, Egypt

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1 ABSTRACT

On one level, sustainable urban development has been the focus attention of most of the planners for the past few years. It is a huge field of interest that needs not only being well studied, but also being implied to all cities all over the world. On the other level, the concept of "Open Cities" is a prospect within the planning domain, which aims at providing equal services and infrastructure to its citizens as well as making cities more attractive to foreign population, may they be migrants, visitors or investors. Hence, cities should be planned in a way to welcome a diversity of people and cultures.

This research is concerned with the introduction of sustainable urban development factors into cities to achieve the concept of "Open Cities". It aims at developing a plan that targets most of the problems facing cities, be it on the demographic, climatic, residential, commercial, social or political levels. It is believed that by combining the factors that affect "Open Cities" with the factors of Sustainable Urban Development, one could conclude the specific factors that should be tackled in order to achieve "Sustainable Open Cities".

The proposed concept and methodology of combining the factors of Sustainable Urban Development to those of "Open Cities" will be applied on the city of Alexandria as a case study. This will pinpoint and highlight the strengths and weaknesses of such an approach.

2 INTRODUCTION

"Open Cities" have become an international trend that could be applied to cities all over the world. An Open City is one that is open to new ideas and innovation; welcoming to a diversity of people and cultures. It is a city of equal opportunities for all, a city that is open for the combination of lifestyle, creativity, scale, population, cultural and commercial diversity that enables it to become a 'magnet' city alongside cities. "Open Cities" require an open approach by city planers.

Alexandria has a lot of characteristics that greatly help it to be compared with all the successful "Open Cities" all over the world. The challenge is that it is needed to find the right way to benefit from these characteristics and points of strength in the most efficient way in order to make Alexandria a successful open city and achieve its vision as a cosmopolitan city and an attractive place to live in.

The paper will focus on the research's case study of applying the methodology of combining the factors that affect both Sustainable Urban Development and those of "Open Cities" to be used in Alexandria urban development. It aims at exploring the "Open Cities" approach in achieving a sustainable urban development. It analyzes the spatial, socio-economic and administrative opportunities that could assist in the regaining of Alexandria cosmopolitan role in the 21st century. Finally, the paper suggests guidelines on how to incorporate the approach in the city planning and management processes in order to improve its quality of life.

3 METHODOLOGY:

Through the analysis of "Open Cities" factors and combining them to the factors of Sustainable Urban Development we will reach the factors that should be taken into consideration in planning the city of Alexandria to make it an Open City. Moreover, with analyzing the current state of the city planning and the challenges that face the city's sustainable development, we could suggest certain steps that could be applied on the city to make it open and improve the quality of life of the city's inhabitants.

4 OPEN CITY AND SUSTAINABLE URBAN DEVELOPMENT

Both "Open Cities" and Sustainable Urban Development are delimited by several factors that describe their physical and socioeconomic characteristics; by the analysis of these factors we will attempt to find/analyze

the relation between both types of factors, in order to use sustainable urban development to achieve the concept of "Open Cities".

4.1 "Open Cities" Factors:

The British Council and URBACT (2009) stated that Openness is a multidimensional and complex phenomenon which has to be measured by more than one factor and also by a large number of individual indicators which measure different aspects of openness. These indicators can be grouped thematically into nine key factors, where each factor represents one of various dimensions of the quality of life of all inhabitants with special attention paid to international populations who are important for the attractiveness and openness of the city. These factors are:

(1) Groups of international populations

(2) Governance and leadership

(3) Regulatory

(4) Economic

(5) Social and societal

(6) Cultural and amenity

(7) Internationalization

(8) Connectivity and accessibility

(9) Environmental factors.

4.2 Sustainable Urban Development Factors:

Sustainable Urban Development incorporates planning for transportation systems and land use to improve the structure of a town or city. Urban development includes urban renewal, which addresses issues like lack of investment in specific regions. Factors like land use, aesthetics, safety, unkempt buildings and transportation all affect how cities are planned.

In this respect, Colantonio (2007) stated that"as a framework or unifying set of principles to be applied across all towns and cities. The core components of sustainable communities present a vision which has gained the commitment of many stakeholders. However, turning the vision into reality raises key questions of delivery. The success of Sustainable Communities policies will depend on the effective interaction of spatial planning, transportation, the economy, the environment and a number of other policy interventions".

Based on Nyakaana (2010), Fallaw (2010), Kishiue et al (2005), Ottensmann (2003), one can summarize the factors affecting sustainable urban development into the following: I suggest that the main factors affecting Sustainable urban development are as follow:

1)Network and infrastructure, 2)Geographical, 3)Political and safety, 4)Residential and planning,

5)Demographic, 6)Economic, 7)Environmental, 8)Social Factors.

4.3 The relation between "Open Cities" and Sustainable Urban Development:

There are several relations between each factor of those of "Open Cities" and the suggested factors of the Sustainable Urban Development, by analyzing each of these factor's characteristics one could conclude the diagram of relations below:

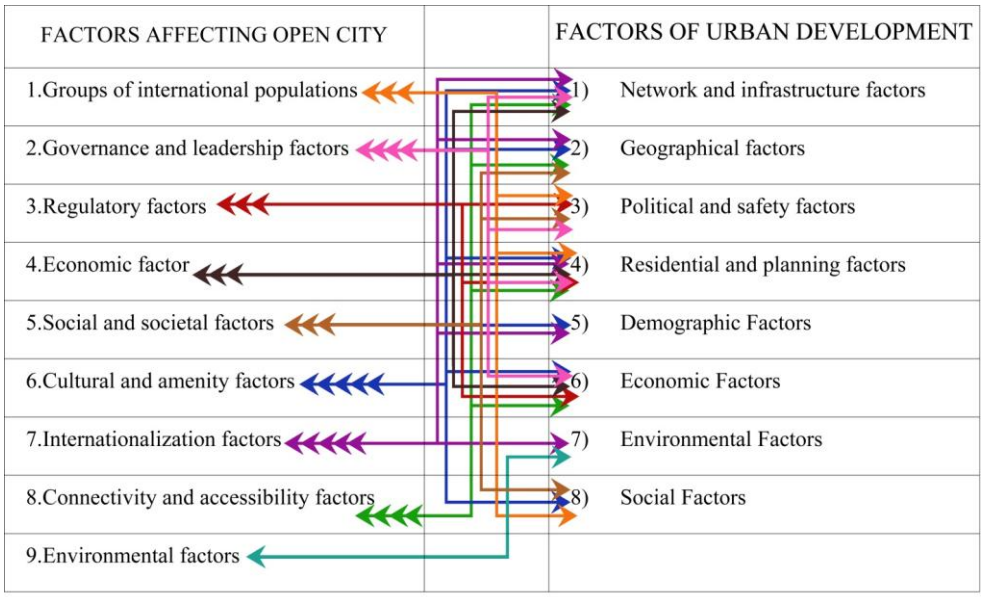

Figure.1: The relation between factors affecting "Open Cities" and factors of Sustainable Urban Development

The analysis reveals that these factors affect each other but in different weights. The factors of Sustainable Urban Development shown below are selected to be examined on the case study of Alexandria as the major effective factors on the city openness, as their effect is more than that of the other factors and also they are affected by the city openness too.

(1) Residential and planning factors

(2) Demographic and economic factors

(3) Social factors

(4) Network and infrastructure factors

(5) Environmental factors

(6) Political and safety factors

5 APPLICATION ON ALEXANDRIA

Alexandria, with a population of about 4.1 million, is the second-largest city in Egypt, and is the country's largest seaport, serving about 80 % of Egypt's imports and exports. Alexandria is also an important tourist resort (CAPMAS,2006). The city extends about 32 km along the coast of the Mediterranean Sea in north-central Egypt. It is home to the Bibliotheca Alexandrina, and is an important industrial center.

Source: Flickr.com Source: Flickr.com Source: Flickr.com

Figure.2: Shots of Alexandria Beach

5.1 Residential and planning factors

5.1.1 Housing indicators

The most populous districts (qism) of Alexandria, as indicated by the results of the 2006 census, are Montaza, El-Ameriyah and El-Rammil. However, Moharam-Bek, El-Manchiyat, Mena El-Bassal El-Labban and Karmooz are indicated as zones with high population density, as they constitute the old areas of the city. Residential densities of Alexandria all over its different districts are relatively high as presented in Table 1.

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Zone/District (Qism)	Population	Area (feddan[1])	Density (persons per feddan)	
			Gross Density	Residential Density
Bab Sharq	179,729	1,349.34	133.20	721.22
El-Ameriyah.	491,373	100,389.13	4.89	207.95
El-Attareen	343,836	6,934.52	49.58	321.64
El-Dekhiyla	40,605	441.88	91.89	308.55
El-Gomrook	85,192	840.87	101.31	623.66
El-Labban	36,750	264.80	138.78	348.34
El-Manchiyat	23,616	136.76	172.68	415.77
El-Rammil	752,371	7,510.47	100.18	538.18
Karmooz	120,062	850.63	141.14	774.59
Mena El-Bassal	254,986	2,465.56	103.42	704.97
Moharam-Bek	299,401	1,307.79	228.94	807.01
Montaza	1,173,803	20,833.33	56.34	523.67
Sidi Gabr	226,304	2,778.47	81.45	565.90

Table.1: Alexandria, Population, Area and Density, (CAPMAS, 2006)

The majority of households that belong to the upper income bracket reside Sidi Gabr, Montaza, Bab Sharq and El-Dekhiyla districts, while lower income families reside Karmooz, Mena El-Bassal and El-Gomrook districts, Table 2. Judging from the densities of those districts, one can confirm that there is a negative association between gross densities and income levels. In other words, areas with high gross densities are more likely to be the residence of low income families. This can have its implications on the quality of housing, the quality of the residential area, as well as on residents' satisfaction.

Zone/District (Qism)	Income	
	Upper	Lower
Bab Sharq	45.76	25.42
El-Ameriyah.	30.99	13.06
El-Attareen	22.03	37.29
El-Dekhiyla	45.45	27.27
El-Gomrook	15.46	35.05
El-Labban	4.69	32.81
El-Manchiyat	21.43	28.57
El-Rammil	20.89	11.97
Karmooz	1.52	63.64
Mena El-Bassal	3.15	40.16
Moharam-Bek	8.16	34.69
Montaza	46.19	7.42
Sidi Gabr	80.66	2.21

Table.2: Alexandria, Population stratified according to income, (%), NUO Survey, March 2008

5.1.2 Planning indicators

Alexandria is an urban governorate that includes the city Alexandria and the new industrial town, Borg El Arab. The City of Alexandria consists of six districts (Hai): Al-Montaza, East (Sharq), Central (Wassat), Gomrok (Customs), West (Gharb) and Ameriyah. The city can be divided into four major zones:

From the western side of the city that extends from Borg el Arab to downtown, Shallaat (Waterfalls) Gardens then to Montaza, Mamoura and Abu-Qur (East). The built-up area of Alexandria is 73,800 feddan (309,960 sq km). Residential use is the most dominant land use occupying almost 46 % of the total built-up area. Regional roads and railways comes in second place, where almost 29 % of the built-up area is dedicated to

[1] 1 Feddan = 4200 m^2

transportation purposes to facilitate the flow of commodities into and out of Egypt through the port. Industrial uses comes third, with almost 19 %; other uses include military, services and open areas figure 3.

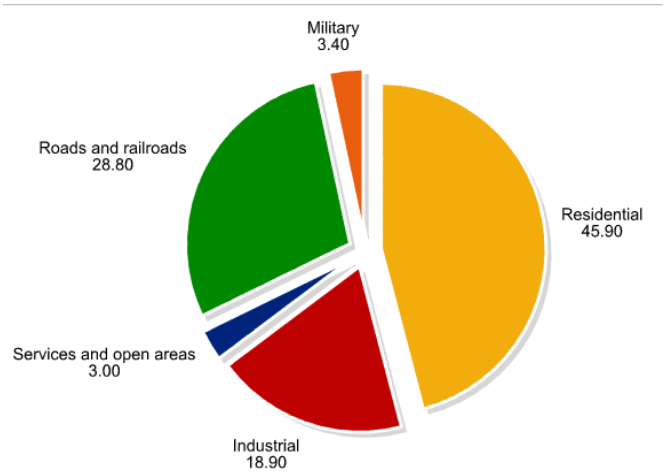
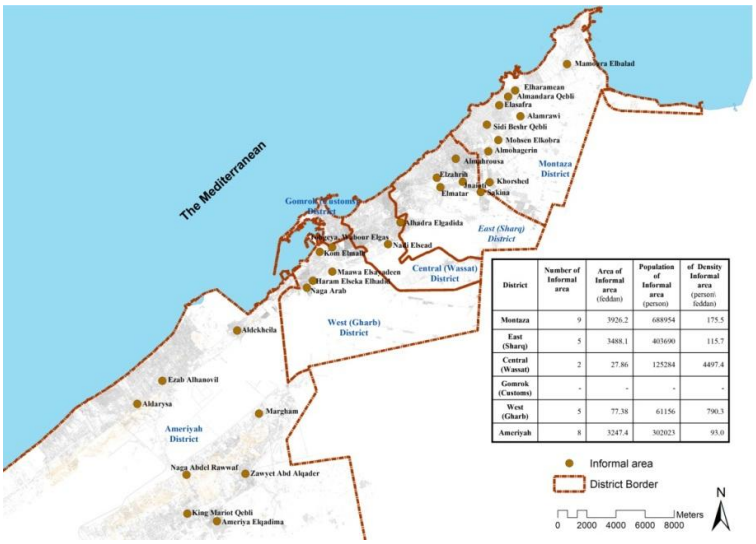


Figure.3: Alexandria, Land uses (%), (CAPMAS), 2006

According to the Ministry of State for Local Development, there are 29 informal areas within the City of Alexandria (figure 4). This represents about 2.9 % of the informal settlements of Egypt. An estimated 1.4 million persons, representing about 35 % of the residents of Alexandria, live in these informal areas (GOPP, 2007). They represent an estimated nine percent of those living in informal areas in Egypt. An estimated EGP 275.5 million during 1992/93 to 30 June 2004 had been spent to improve conditions in these informal areas by providing sewerage, electricity and paving streets. Mmost of these slum areas that are located in the old town in the western side of the city are distinguished by their compact patterns. These areas lack many amenities, such as open spaces and green areas; the streets are narrow and unpaved.



District	Number of Informal area	Area of Informal area (feddan)	Population of Informal area (person)	of Density Informal area (person/ feddan)
Montaza	9	3926.2	688954	175.5
East (Sharq)	5	3488.1	403690	115.7
Central (Wassat)	2	27.86	125284	4497.4
Gomrok (Customs)	-	-	-	-
West (Gharb)	5	77.38	61156	790.3
Ameriyah	8	3247.4	302023	93.0

Figure.4: Alexandria, Informal and slum areas, (GOPP, 2007)

5.2 Demographic and economic factors

CAPMAS (2006) stated that the population of Alexandria reached around four million. It is the second most populous city in Egypt. Population annual growth rate from 1996 to 2006 was 2.1 %, which is near the national rate. Male population represented 51 % of the total population. The percent of illiterate adults declined from 24.8 % to 19.3 % from 1996 to 2006. The percentage of educated literates with secondary and technical diploma are the majority representing almost 55 % of the literate population; while those with university and/or post graduate degrees represent almost 15 % of the literate population. Those who are economically active and participate in the labor force are only 31.2 % of the population. Those who are not part of the labor force are students, housewives, physically disabled, etc. The local economy of Alexandria depends on manufacturing as a major commodity production sector, as well as service production sectors, particularly trade and transportation (figure 5).

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Unemployment is on the rise. In 1996, those unemployed represented seven percent of the labor force, while in 2006, they represented 10.22 %. Accordingly, the dependency rate in Alexandria can be significant since only 31.2 % are economically active.

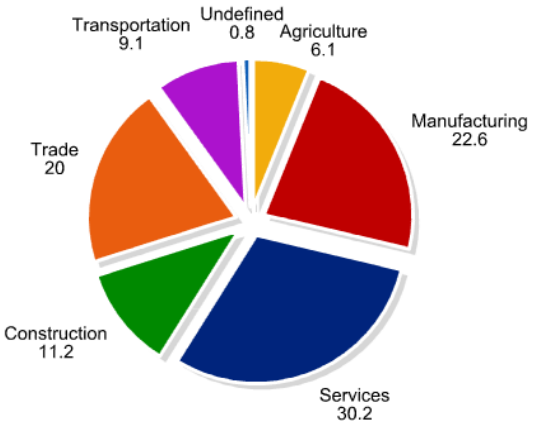

Figure.5: Alexandria, Employment rates by sector (percent), (CAPMAS, 2006)

5.3 Social factors

According to the GOPP (2006) studies, Alexandria needs additional educational services as the planning requirements indicate that the number of students has to be limited to 40, 38, and 36 students per class in primary, preparatory and secondary schools, respectively (Table3).

Alexandria Social Services: Schools

School Type	Number of Schools 2009/2010	Number of Students 2009/2010	Students per Class	School Deficit	Number of new Schools 2032	Total Number of Schools 2032
Primary	787	526,901	43	50	361	1,148
Preparatory	437	210,810	38	-	271	708
Secondary General	163	65,560	32	-	87	250
Secondary Business	26	14,350	36	-	13	39
Secondary Industrial	23	29486	30	-	11	34
Total	**1,436**	**847,107**		**50**	**743**	**2,179**

Source: Information Center of the Governorate of Alexandria (2010), calculations by AS&P

exceeds the standard of 40 students per class

Table.3: Alexandria schools, AS&P/ (2010)

The calculated needs for educational services by 2022 mount to 275.2 feddan to build an estimated 323 schools, as Table 3 indicates. Most of that land is devoted to primary education to meet the growing needs of a growing population.

Health services are also strained. The current services rate is 1.4 beds per thousand persons, which is beyond the planned requirement (3.0 beds per thousand persons). The estimated needed health service by 2022 is 3,751 beds, which will require about 44.66 feddan of land.

Currently, there exists one youth centre for every 114 thousand persons, which is considerably too low when compared with the normal average. The planned requirement is one youth centre for every 50 thousand persons. The future need of sporting facilities is then 25 sporting facilities that require about 25 feddan of land (GOPP, 2006).

Alexandria has 17 police stations, and 55 police precincts. The Governorate has one fire fighting department that includes 46 fire fighting houses distributed among the six districts and Borg Al Arab City. The planned requirement is one fire house per 30 thousand persons. The current rate in Alexandria is one fire house per 89 thousand persons. The needed service then is 91 fire houses that require about 5.4 feddan of land (GOPP, 2006).

5.4 Network and Infrastructure factors

According to GOPP, 2008, Alexandria is well connected to other parts of Egypt via a number of routes. The Cairo-Alexandria Agricultural Road connects the city to other cities within the Delta region. The Cairo-Alexandria Desert Road connects the city with the new developments, such as Sadat City and Nubaria City. The Alexandria-Matrouh Coastal Road extends towards the west, serving a number of summer resorts, such as Marina, and connects the city with other towns, such as Alameen and Marsa Matrouh. This road extends to the Egyptian-Libyan borders. Alexandria is also well connected to other northern settlements, such as Rosetta, Damietta and Port Said through the International Road. Furthermore, the city has an international airport, and is connected to other areas of the country by railroads.

The street pattern of Alexandria takes the form of grid-iron, where major roads, such as the Hurreya st. , El Geish st, stretch from the east to the west. Other important streets, such as Suez Canal Street, go from north to south.

Alexandria Water Company is responsible for providing drinking water to the residents of the Governorate. The company depends on Nubaria and Mahmoudia water canals as sources for fresh water. The company produces about 2,927 million cubic meters a day. Amounts of consumed drinking water are 1,757 million cubic meters, which means that lost drinking water is about 40 % of the produced drinking water.

An estimated 99.5 % of the residents of Alexandria (including Borg al Arab) are connected to sanitary system. Some treatment plants provide primary treatment; other plants provide secondary treatment to the wastewater. The treated wastewater is then discharged to Lake Maryut. There are four power generation plants that provide Alexandria (including Borg al Arab) with electricity. The city is well served with communication network.

5.5 Environmental factors

According to the reports of Egyptian Environmental Affairs Agency (EEAA), there are nine hotspots out of 13 locations for monitoring along the coast of the Mediterranean. El-Max, El-Dekhiyla, Western harbour and Abu-Quir are among these nine sites. The coasts of Sidi-Gaber, El-Anfoushi, El-Shatbi and Eastern harbour experience moderate levels of pollution. El-Agami, El-Montaza and west of Abu-Quir experienced less pollution compared to other polluted locations.

Lake Maryut, is one of the shallow lakes of northern Egypt. It constitutes the southern natural border to the city. Lake Maryut is heavily polluted. There are three drains connected to the lake: al Qala'a (Citadel), al Ummoum (Commons) and old estuaries to the north of the lake. These three drains are responsible for dumping liquid and solid wastes from the city districts into the lake.

In Alexandria the total generated municipal wastes ranges from 2,600 to three thousand tons a day. A private sector is responsible for collecting wastes and cleans the streets. There are three transit stations, and a sanitary landfill in Borg al Arab that receive these wastes. There are three composting plants that transform the municipal wastes into compost to be used as soil conditioner and/or organic fertilizer.

5.6 Political and safety factors

Egypt 2011 Crime and Safety Report stated that, the current overall situation has improved in Egypt, however, in late January and early February 2011, Egypt experienced a dramatic revolution and massive political upheaval. The country is still in a state of flux and the future stability of the nation remains unpredictable. In late January and early February 2011, massive protests swept the nation and hundreds of thousands of demonstrators converged on Tahrir Square and other areas throughout Egypt to include, but not limited to, Alexandria, Suez, Mansoura, Menufiya, Assuit, Qena, Tanta, and Mahallah in a successful effort to topple the regime. During these demonstrations, violent clashes between protestors and police ensued that resulted in the deaths of many demonstrators and police.

Police stations throughout Cairo and other cities were burned, and an unknown number of weapons were stolen from the police stations as well as uniforms which have yet to be accounted for. According to unconfirmed reports, up to 23,000 prisoners have escaped from police stations and prisons, and approximately 10,000 are still at large. There was widespread looting before neighborhood "watch" groups and vigilantes reestablished a tenuous calm. In the days following the initial protest, police resources were exhausted and depleted, and the result was minimal, if any, police presence throughout most of Egypt.

Intercity roads are generally in good condition, but unmarked surfaces, stray animals, and disabled vehicles without lights or reflectors are among the many hazards that can be encountered on highways, especially after dark. Embassy personnel in Egypt are prohibited from traveling outside Cairo by motor vehicle after sunset and are encouraged to travel between cities via air or train. Although rare, petty crime is a growing concern in Egypt. These crimes range from pick-pocketing and assaults to more frequent and aggressive female sexual harassment. Also, a steady increase in various types of crimes and criminal behavior. Residential burglaries are on the rise.

The police in Egypt are generally very concerned about the welfare of foreigners, tourists, and business interests. In practice, foreigners who are crime victims often receive more support from the police than do Egyptians. Tourism and antiquities police are stationed in hotels and tourist sites throughout the country.

Now aday, the police and military forces are working on keeping all the country with its cities more safe and politically stable. They are doing great efforts in order to keep the cities attractiveness not affeceted with these crimes and keep all the tourists and foregin investors safe whenever they are visiting the cities.

6 DISCUSSION

Albert Speer, 2012 stated that Alexandria by its size and geographic location has got the potential to establish itself as the quality of life alternative to Cairo. However, in order to fully exploit this potential it needs to gain attractiveness and tackle vital problems like cleanliness and solid waste management, environmental pollution, traffic congestion and partially poor or lacking utility infrastructure. Alexandria will also have to take care of its architectural heritage and its archaeological treasures. They need both, protection and investment to make visiting the city more appealing to tourists (not only domestic and Arab tourist but also international travellers) and businesses. These development steps would help Alexandria to reach the concept of being Open City in-order to achieve the city vision and goals.

6.1 Residential and planning factors

Albert Speer, 2012 said that Alexandria in particular features in its core districts very high residential densities of up to 500 persons per feddan in areas like Raml 1st. In positive terms this means that high densities are already embedded in the genetic urban code of Alexandria, and reaching an appropriate density will not be the problem, especially not in core area expansion zones. On the other hand, it has to be understood, that excessive densities like in the Raml sub-district cause serious overcrowding-problems and have to be avoided in new developments for health and safety reasons. Based on their international expertise and on a survey of average density figures in Alexandria's core districts the consultant-team recommend not to exceed a gross residential density of 250 persons per fedan and employ considerably lower densities in suburban extension areas.

In the Alexandria 2032 city profile report it was suggested to make alexandria a green city as the residential quality is closely linked to the availability of nearby green open spaces for leisure and recreation, which also fulfill important micro-climatic functions. Alexandria today is underperforming in terms of amount and accessibility of green open spaces, which is why newly planned extensions should include public parks and greens.These new areas for recreation have to be linked to the existing urban fabric as well and should be interconnected through a network for non-motorized mobility. New open spaces should be introduced alongside with innercity brownfield site developments wherever possible.

Alexandria has to devise an urban housing policy, which meets the demand in all strata of society and provides a well-balanced offer on the rental and ownership market. Every Alexandrian household, especially young married couples, shall find an adequate units in price ranges compatible with their income and adaptable to changes in family size. The city will successfully create a wellfunctioning and transparent

residential realestate market and achieve this by controlling unplanned building activities and by legalizing properties in existing unplanned areas.

By means of foresighted land-use planning and a stricter zoning regime, Alexandria will manage to avoid conflicts between residential and industrial land uses and limit the environmental impact of new developments. For inner-city areas along the Mahmodeia Canal and in Gomrok, a relocation of industrial enterprises and the conversion of disused and underused industrial sites to higher value uses will open up new perspectives. The adjacent residential neighbourhoods will benefit from this process of brownfield development.

6.2 Economic factors and Demographic factors

Albert Speer, 2012 mentioned that Alexandria faces the challenge of accommodating about 2 million additional residents by 2032. It is clear that such an increase in Alexandrian citizens cannot be absorbed by the existing urban fabric, but will result in a massive expansion of the city's built-up area. Population growth will have to be redirected away from the already overcrowded core area of Alexandria to new settlement centers either on Alexandrian territory or in the Alexandria Urban Region, especially down the North Coast Strip of Marsa Matrouh Governorate.

For the education facilities it would be better to decrease the literacy rate and improve education and training centres quality, also we should make the density of the students in their classes according to the international standards and never let it increase even with the increasing of the population rate.

Unemployment is on the rise so it should be carfully studied when trying to develop Alexandria in order to make it economically active and decrease this huge rate of unemployment, that could be reached easily when the city becomes more open. Also, we should work on increasing the FDI rate in egypt as that will help in providing extra spaces for egyptian employment and by increasing the city openness and attractiveness we could easily solve the problem of un empolyment and to attract FDI, Alexandria needs to examine what investors want. The primary objective for investors is to have transparency and political stability, easy access to, and easy communication with their investment projects. In all of these areas, Alexandria has room for improvement.

Alexandria shall take advantage of its existing diversified economic portfolio and build its future positioning on three concurrent streams of local economic development. The Natural Growth stream capitalizes on the existing strength of Alexandria in manufacturing industries, the Euro-Mid-Eastern Hub development stream focuses on logistics and related activities, and draws upon the existing seaport, road and river transportation infrastructure. As a third and most ambitious endeavour, Alexandria will embrace the City of Enlightenment stream for boosting the development of knowledge-based businesses. All of the aforementioned streams of local economic development will be linked to specific projects in urban development. Be it a research centre in Sharq, an office park dedicated to business process offshoring in Wasat, Smart City Campus in New Borg El Arab or the extended Al Nahda industrial zone in Al Ameriyah - there will be numerous high-profile investment opportunities for foreign and domestic companies in Alexandria.

With 60% of Egyptian foreign trade passing through Alexandrian Ports, the city seems naturally set to assume the role of a Euro- Mediterranean cargo hub. Substantial investment will be required to expand the already good logistical capabilities. Furthermore such endeavours should be closely coordinated with nationwide development plans for the logistics networks as Alexandria faces strong competition from Damietta and Port Said.

6.3 Network and infrastructure factors

Albert Speer, 2012 , in Alexandria 2032 planning mentioned that The railway line operating between Borg El Arab and Alexandria city centre has to play a pivotal role in this respect. Each new urban centre will have to be fitted with an efficient and affordable internal circulation and transportation network structure. Technical utility infrastructure networks have to be implemented in all devised urban expansion zones taking into consideration aspects like sustainability and reduced resource consumption. Decentralized power generation from renewable sources will complement these endeavours by stabilizing the distribution network.

Urban upgrading will be the key to improving the quality of life for the majority of Alexandrians in the coming two decades. This encompasses ensuring electricity supply, potable water supply and sanitation by extending and upgrading the networks, investing in healthcare, social and educational services, as well as offering better and more connections in public transportation. Spending half of one's working day commuting in traffic jams on clogged main roads seriously affects the quality of everyday life in Alexandria and negatively impacts the economic performance of the city. A remedy will be a set of measures, which includes massive investment in public transportation systems to increase their level service and availability throughout the city, as well as upgrading and extending the existing road network infrastructure.

6.4 Geographical factors and Environmental factors

Albert Speer, 2012 , in Alexandria 2032 planning stated that, as far as tourism is concerned, Alexandria has to take advantage of its natural topographic properties, the most prominent of which are certainly the Mediterranean Sea shore and its inland water bodies like the canals and lakes. Especially the Corniche – as yet dominated by the only viable major North-South arterial road – bears a significant potential for further upgrading and adding new points of touristic or commercial activities. Also Lake Mahmoudeya with its shores partly occupied by unplanned settlements and the heavily polluted main basin of Lake Marriout are in need of strategies for environmental upgrading opening up opportunities for future development.

Alexandria since its beginnings has been an urban hub, a port city strategically located between Orient and Occident, open to people of various beliefs and to merchants, goods, and ideas from foreign countries. Today, of course it is no longer the sea-routes and ports of Alexandria alone through which ideas are exchanged, but modern means of travelling, which themselves get more and more substituted by modern media and the intangible data-highways of the internet. Internationalism and open-mindedness are deeply routed in Alexandria's urban genome, and the city will seize the opportunity to reinvigorate its once colourful and diverse cultural life taking on and blending – like in former times – influences from Egypt, Northern Africa and Europe into a unique cosmopolitan atmosphere. However the strong positioning of Alexandria as a physical hub on the Mediterranean remains and shall be further reinforced by expanding logistics infrastructures like ports airports, road and rail networks.

6.5 Political, safety and Social factors

Albert Speer, 2012 , IN Alexandria 2032 planning said that Alexandria is a great city with public-spirited citizens so, it will be a city promoting a sense of community and active citizenship through public awareness programs and participatory actions. Alexandrians shall take responsibility for their natural, built and social environment. The Governorate's administration can only support such public spirit, yet the major changes will have to be brought about by the Alexandrian people who have to revise their personal life-styles and attitudes and finally agree upon the way they want to live in their mother city. Alexandrian home owners and potential builders should understand that unplanned development without proper roads and sanitation, without enough space for social and educational facilities in the long run jeopardizes the quality of life of every citizen and start gaining trust in coordinated public planning.

Also, Alexandria is a city promoting socialinclusion and gender equality as it will have at least double female workforce participation during the next two decades alongside with providing its youthful population with enough employment opportunities and thus seize the demographic dividend. Social inclusion has a long-standing tradition in Arab cities, which Alexandria – especially in its new residential neighbourhoods will adopt by providing adequate housing for all income levels. Infrastructure provision in all unplanned areas will be implemented according to a comprehensive plan improving residential quality all over the city. Furthermore all neighbourhoods in the urban fabric of Alexandria shall be designed and upgraded considering gender issues like adequate street lights, safe public spaces, access to affordable public transportation and informal employment opportunities.

The political and safety factors are affected a lot with the post revolution in 2011 and this should be solved very fast to make Alexandria be a safe and friendly city to all its visitors as it was. The country political forces are working hard to make the city always safe and solve any political problems as soon as they could. But the Alexandrian residents are always helping all the visitors and protecting them and their safety is the city main concern.

7 CONCLUSION

Improving the quality of life in Alexandria is not only key to the well-being of Alexandrians, but will also support the city's positioning as an important economic and touristic hub in Egypt and on the Mediterranean.

Alexandria is blessed with three waterfronts offering plenty of opportunities for sustainable expansion and development, if environmental problems are solved.

"Open Cities" is a perfect trend that will help Alexandria greatly to reach its future development vision by using Sustainable Urban Development ways of planning. The deficiencies in the urban and socioeconomic structure of Alexandria would need to be solved by the city decision makers and planners in order to reach the city openness.

Finally, Alexandria could be successful Open City by limiting the average gross residential density, redirecting urban growth to the west, linking urban nodes efficiently and providing utility infrastructure, improving quality of life and environmental quality, making Alexandria a greener city, reducing visual as well as noise and air pollution, stimulating successful socio-economic development, providing sufficient building land for economic growth, increasing alexandria's touristic attractiveness and establishing alexandria as a euro-mideastern hub for logistics, trade and business.

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Tischlein, deck dich! Über städtische Gastronomielandschaften und was Stadtplanung damit zu tun haben könnte

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1 NACHDENKEN ÜBER … GASTRONOMIE?

„Der Tresen eines Cafés ist das Parlament des Volkes." (Balzac)

Essen–und darunter Gastronomie als eine Spielart der Außer-Haus-Verköstigung–findet nur selten Niederschlag in deutschsprachigen Fachpublikationen [1] oder auch Fachdebatten [2]. Über die Gründe für den Befund der mangelnden „Beforschung" kann nur spekuliert werden, vielleicht ist Essen (gehen) als Alltagspraxis einfach zu banal? Die vorherrschende materielle Rezeption von Essen und Gastronomie (z.B. Regulierung, Ernährung) lässt die kulturellen und repräsentativen Funktionen, die auch in hohem Maße raumwirksam sind, weitgehend außen vor. Auf der anderen Seite legt die Prominenz der Themen in Populärpublikationen [3]–wie Reiseführern, Stadtmagazinen, Tageszeitungen etc.–nahe, dass sich die Kultur einer Stadt oder Region nicht zuletzt im Essen offenbart. Jeder weiß, in Paris isst man *Froschschenkel*, in Brüssel *Pommes Frites* und in Berlin *Curry-Wurst*; London ist eine großartige Stadt, aber die britische Küche…; eine Zeile in Rainald Grebes wohl bekanntesten Lied lautet: „Nimm Dir Essen mit, wir fahr'n nach Brandenburg". Regionale Küchentraditionen prägen das Image von Städten und Regionen, auch wenn viele der Urteile und Vorurteile nur wenig Substanz aufweisen. Z.B. kann man in Marseille kaum noch *Bouillabaisse* essen, da die Zutaten für das einst einfache Fischergericht mittlerweile astronomische Summen kosten; in London haben u.a. migrantische Kochtöpfe *Fish 'n' Chips* oder *Yorkshire-Pudding* sukzessive verdrängt, in Paris wird der Niedergang der klassischen Bistrokultur beklagt–und inzwischen gibt es auch in Brandenburg vereinzelte kulinarische Oasen.

„However, food is not only a functional good, but also a cultural object–consumed not only for this nutrients, but also for its symbolic and aesthetic value." (Neal 2006) Die mannigfaltigen positiven Effekte der Gastronomie, wie urbanisierende Wirkung, Imagefaktor, Alleinstellungsmerkmal von Städten, soziale Funktionen etc., müssten sie eigentlich zu einem *everybody's darling*–auch von Stadtplanern–machen. De facto wird Gastronomie aber auch hier nur vereinzelt und meist als *sidekick* des Einzelhandels betrachtet. Handlungsnotwendigkeiten werden vor allem reaktiv gesehen, d.h. wenn die Nebenwirkungen einer zunehmenden Kneipendichte, wie Lärmemissionen durch nächtliche Straßengespräche oder Parksuchverkehr, zu Konflikten mit den Bewohnern führt. In dem Artikel werden grundlegende Trends der Gastronomie eingeordnet, empirische Befunde zu Kneipenvierteln in Berlin vorgestellt und die stadtplanerische Praxis sowie Optionen diskutiert.

2 STARBUCKS, MC DONALDS ETC. VERSUS REGIONALE TRADITIONEN

Von den deutschen Unternehmen gehören ca. 6 Prozent zum Gastgewerbe. Davon sind 96 Prozent Kleinstunternehmen mit weniger als 10 sozialversicherungspflichtigen Beschäftigten [4]. Anders als in anderen Branchen [5] entfällt auf diese Unternehmen mit 60 Prozent auch ein großer Teil des Umsatzes. 19 Prozent der

[1] Z.B. erschien die Dissertation des Ethnologen Thomas Kochan 2011) über die Trinkgewohnheiten in der DDR im Aufbauverlag, was einerseits ein „Ritterschlag" im Sinne eines breiten Interesses an der Arbeit war, sie andererseits aber ein Stück weit außerhalb der Scientific Community stellte. Grundlegende Studien liegen zum Teil schon Jahrzehnte zurück, z.B. Dröge/Krämer-Badoni 1987; Schwibbe 1998; Teuteberg 1997; Wedemeyer 1990).

[2] Eine Ausnahme war die Konferenz „So ist die Stadt. Esskultur und die Eigenlogik der Städte" vom 6.-7. Mai 2011 in Darmstadt (LOEWE 2011).

[3] Das spiegelt sich natürlich auch in den zahllosen Fernseh-Kochshows von „Nachfahren" Alfred Bioleks. Allerdings geht es hier in der Regel um das Selbst-Kochen, bzw. um die Selbst-Inszenierung von Sterneköchen. Ein Sonderfall: Auf ARTE wird in der Sendung „Zu Tisch in …" ein Blick auf die häuslichen Kochtraditionen in verschiedenen europäischen Regionen geworfen (ARTE 2012).

[4] Insgesamt wies das Gaststättengewerbe 2011 ca. 673 Tsd. Beschäftigte auf. Der Bedarf schwankt in Abhängigkeit von saisonalen Gegebenheiten und auch Wochentagen (umsatzstärkster Monat ist der Juli, schwächster der Februar). Im Vergleich zur Gesamtwirtschaft werden fast dreimal mehr geringfügig Beschäftigte eingesetzt.

[5] So lag z.B. der Anteil der Lebensmittelgeschäfte unter 400 qm 2004 bei 60 Prozent, deren Umsatzanteil aber bei nur bei 11 Prozent (KPMG/EHI 2006)

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Erwerbstätigen im Gastgewerbe sind selbstständig. Als Indiz für eine mangelnde Professionalisierung der Branche kann die hohe Insolvenzrate–10 Prozent der bundesweiten Unternehmensinsolvenzen entfallen auf das Gastgewerbe–gewertet werden (Stöver 2011). In den Jahren 2010 und 2011 lag die Zahl der Betriebsaufgaben mit jeweils 17 Prozent deutlich über den Betriebsneugründungen. Insgesamt sinkt die Zahl der Unternehmen im Gaststättengewerbe seit Jahren–bundesweit existierten 2002 noch 190.760 Unternehmen, 2009 nur noch 175.576; das entspricht einem Rückgang von 8 Prozent (DEHOGA 2011b; 2012).

Tiefe und Intensität des Umbruchs in der gastronomischen Landschaft zeigt sich aber deutlicher im Detail. Verlierer der Entwicklung sind Schankwirtschaften, Restaurants und Eisdielen; klare Gewinner Imbisse und Cafés (vgl. Abbildung 1). Analog zum Einzelhandel sind Filialisierungstendenzen und Systemkonzepte auf dem Vormarsch, auch wenn der Anteil lokaler Betreiber in der Gastronomie vergleichsweise immer noch sehr hoch ist. Die 100 größten Unternehmen der Systemgastronomie in Deutschland betreiben insgesamt „nur“ 16.833 Betriebe [6]. Die einzelnen Typen der Gastronomie [7] sind dabei ganz unterschiedlich betroffen. Unter „Fullservicegastronomie“–also die Konkurrenz zu den klassischen Restaurants–fallen nur 18 Unternehmen mit insgesamt 312 Betrieben.[8] Die meisten Systemkonzepte (10.121 Betriebe) sind in der Kategorie „Fastfood, Imbiss, Home Delivery“ zu finden. Die dahinter stehenden 30 Unternehmen bedienen ganz unterschiedliche räumliche Radien: So sind 8 global (3.561 Betriebe), 5 multinational (921 Betriebe), 11 national (4.465 Betriebe) und lediglich 6 ausschließlich regional (1.174 Betriebe) ausgerichtet. Das umsatzstärkste Unternehmen ist mit Abstand McDonald‘s (DEHOGA 2011a).

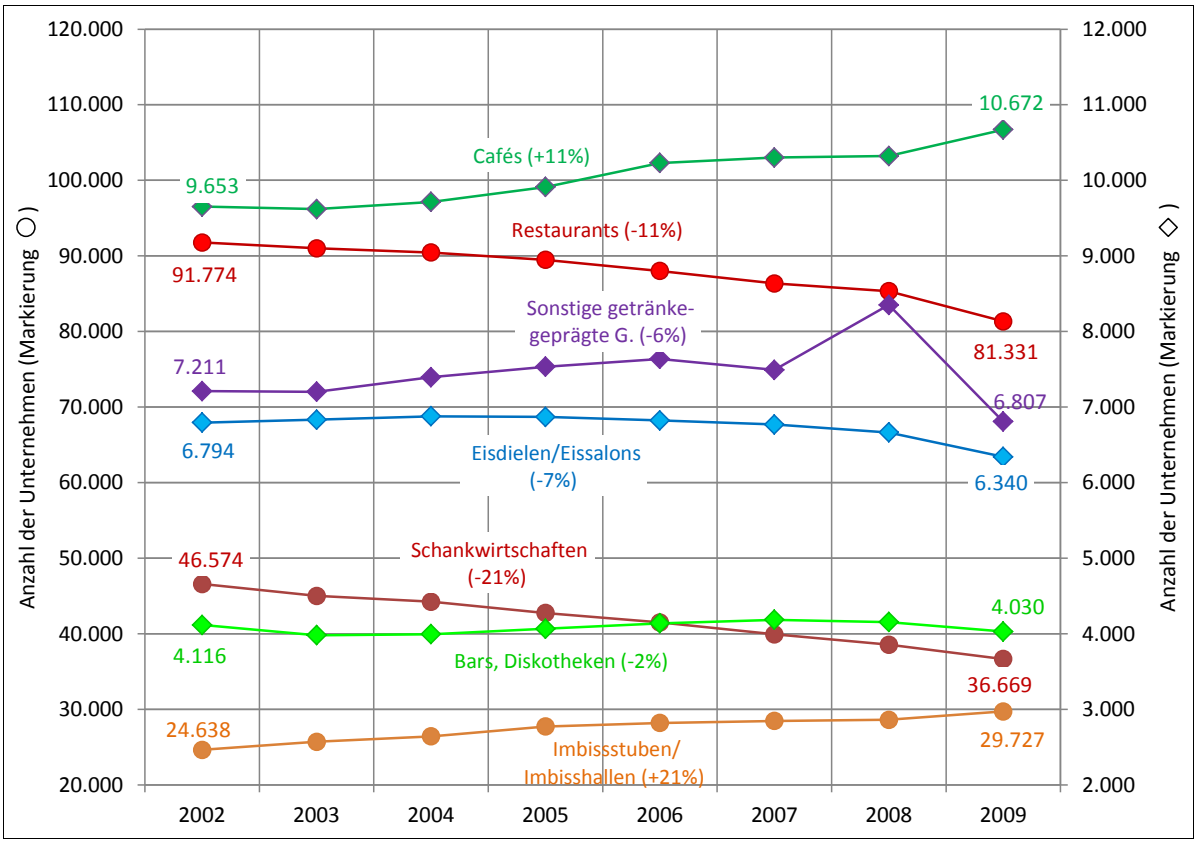


Abbildung 1: Anzahl der umsatzsteuerpflichtigen Unternehmen im Gastgewerbe 2002-2009 (Darstellung nach DEHOGA 2012)

Im Einzelhandel kann seit Jahren beobachtet werden, dass Systemkonzepte und steigende Filialisierung entscheidend zu einer sukzessiven Verdrängung der traditionellen, inhabergeführten Läden beitragen (vgl. u.a. Pätzold 2011a). Lange schien es, als würden die Parallelwelten von global und lokal ausgerichteten

[6] Inklusive der Unternehmen der Handels-, Freizeit und Verkehrsgastronomie sowie Event-, Messe- und Sport-Catering – insgesamt 54 Unternehmen mit über 6000 Betrieben.

[7] Es bestehen Zuordnungsprobleme: Die Klassifikation der Systemgastronomie der DEHOGA entspricht nicht der Klassifikation der Wirtschaftszweige des Statistischen Bundesamtes, z.B. werden unter „Fastfood, Imbiss, Home Delivery“ auch Cafés (wie Starbucks, Tchibo- und Segafredo-Coffeebars) geführt.

[8] Bekannte Formate sind u.a. Maredo, Schweinske, Wienerwald, Cafe Del Sol, Bavaria Alm oder L’Osteria.

Unternehmen in der Gastronomie nebeneinander bestehen, doch diese Balance wird zunehmend brüchig. Ursächlich ist auch hier die Verknüpfung aus wirtschaftlichen Größenvorteilen von Systemkonzepten, steigender Preissensibilität und Veränderungen in der Verteilung des frei verfügbaren Einkommens sowie anderen Nachfragepräferenzen anzusehen. Dieser Wandel ist nicht nur in Deutschland, sondern auch in vielen europäischen Ländern zu beobachten.

So wird in Großbritannien das Pub-Sterben beklagt. Befördert durch die anhaltend schlechte Wirtschaftslage schlossen 2010 allein in London sechs Pubs pro Woche. Würde man diesen Trend linear fortschreiben, wäre 2037 diese Institution gänzlich verschwunden. Die Krise betrifft allerdings inhabergeführte und Pub-Ketten gleichermaßen. Während in den Städten andere gastronomische Formate als Alternative vorhanden sind, sterben dagegen in ländlichen Regionen mit den Pubs die letzten Gemeinschaftsorte, nach den Nachversorgungs- und Dienstleistungsangeboten (BBPA 2012). Deshalb arbeitet seit 2001 die Community-Organisation „Pub ist the Hub", die auf eine Initiative von Prinz Charles zurückgeht, an Modellen zu alternativen Betreiberstrukturen (Pub 2012).

Was in Großbritannien der Pub ist, ist in Frankreich das Bistro. Im Land der Gourmets sind Fast-Food-Ketten auf dem Vormarsch und täglich müssen zwei der traditionellen Lokale schließen. Als Ursache werden die veränderten Bedingungen am Arbeitsmarkt, darunter vor allem die gesetzliche Arbeitszeitbegrenzung, in Kombination mit einer gestiegenen Preissensibilität gesehen. Die französische Küche ist zeitintensiv; das lässt sie ins Hintertreffen geraten, wenn die Mittagspause nicht auf zwei Stunden und mehr ausgedehnt wird. Hierin wird im Übrigen die vergleichsweise hohe Widerstandsfähigkeit der italienischen Traditionslokale begründet, denn die italienische Küche ist wesentlich schneller und hat in dieser Beziehung kaum Nachteile gegenüber den globalisierten Fast-Food-Formaten (o.A. 1984; Ramge 2009).

In Österreich, insbesondere in Wien, wird das Kaffeehausterben beklagt, allerdings mittlerweile die dritte Welle–Anfang des 20. Jahrhunderts waren teuren neuen Espresso-Maschinen, dann in den 1950er Jahren die Ausbreitung der italienischen Espressobars und um die Jahrtausendwende Starbucks und Co. schuld am Niedergang der Kaffeehauskultur. Bei jeder dieser Innovationswellen mussten Traditionshäuser schließen. Neben den nostalgischen Klagen, wird aber durchaus kritisch festgestellt, dass die Kaffeehäuser sich oft jeglicher Modernisierung verweigern (Holzer 2010). 2011 wurde im Rahmen des Kunstprojektes „Das große Wiener Kaffeehaus-Experiment" am MAK über die Zukunft des Kaffeehauses nachgedacht–die Ergebnisse reichten von Einrichtungsideen bis zur Integration bzw. Desintegration von neuen Medien (Wilde 2011).

Und wie sieht es in Berlin aus? Berlin war die Stadt der Eckkneipen, die zu Beginn des 20. Jahrhunderts in den überbelegten Gründerzeitquartieren das Wohnzimmer ersetzten. Im Vergleich zu Paris oder auch Wien, das Ende des 18. Jahrhunderts als der größte Gastronomiemarkt Mitteleuropas galt, war Berlin ein gastronomischer Spätentwickler. Allerdings entstand hier mit dem Unternehmen Aschinger [9], eines der ersten Systemkonzepte in der Gastronomie (vgl. Allen 2002). Die Weltkriege hinterließen tiefe Zäsuren in der gastronomischen Landschaft Berlins, die im Ostteil der Stadt durch einen gravierenden Umbau des Gastgewerbes verstärkt wurden (vgl. Abbildung 2). Noch in den 1970er Jahren hatten die Eckkneipen einen Anteil von 50 Prozent an der Westberliner Gastronomie, in den 1990er Jahren waren es nur noch 25 Prozent (Bolm 1998). Insgesamt gibt es in Berlin weniger mythische Traditionsorte als in Städten mit einer stetigen Entwicklung und es werden immer weniger. 2008 schloss z.B. das Café Adler [10], das während der Teilung das einzige Restaurant mit Blick auf die Mauer am Checkpoint Charlie war–bezeichnender Weise wird das Lokal heute von der Café-Kette Einstein bewirtschaftet.

In Summe wird das Verschwinden von Traditionslokalen–Pub, Bistro, Kaffeehaus, Eckkneipe etc.–allerorten von Melancholie begleitet. Dabei ist wie so oft ein eklatanter Bruch zwischen der „Abstimmung mit den Füßen" und den Klagen über den Identitätsverlust festzustellen. Es liegt im Wesen globalisierter Angebote, überall auf der Welt mit dem gleichen Erscheinungsbild aufzutreten. Was am Rückgang raumpräsenter Traditionen stört ist damit oft nur, dass das (Stadt-)Bild nicht mehr den Wünschen entspricht. Beklagt wird

[9] Unter dem Motto „Beste Qualität bei billigstem Preis" betrieb Aschinger (gegründet 1892) Anfang des 20. Jahrhunderts bereits 23 Bierquellen, 15 Konditoreien, acht weiteren Restaurants sowie 20 Verkaufsstellen und war damit der größte Gastronomiebetrieb Europas (Aschenbrenner 1999).

[10] In einem Blog-Eintrag war zu lesen: "It's a famous cafe from which western Berliners could have a look at the border with the East. Now it's still popular with artists, journalists and bankers, as well as tourists looking for shelter from rain." (http://members.virtualtourist.com/m/66760/12626/2/).

also vielleicht weniger der verlorene Ort, der–bei wirtschaftlichen Gründen der Geschäftsaufgabe–eben unter einem Mangel an Besuchern und respektive Einnahmen litt, sondern die Gleichschaltung der räumlichen Umgebung [11].

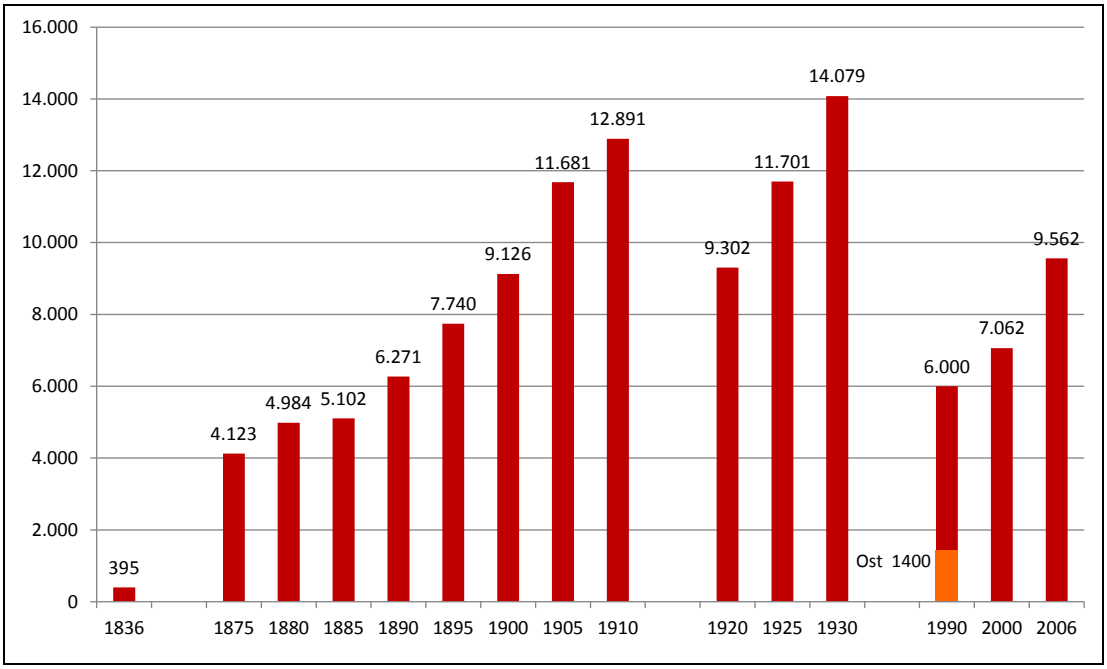


Abbildung 2: Gastronomische Betriebe in Berlin 1836-2006 (Darstellung nach Arnold 2000; Drummer 1997; Waldt 2007)

Der sukzessive Verlust von Ortstraditionen und damit gleichzeitig von Esstraditionen ist aber nur eine Seite der Medaille. Matthiesen spricht von der „Komplementarität von Globalisierungs- und Regionalisierungs¬dynamiken, die sich sowohl zwischen als auch innerhalb der kulinarischen Systeme, etwa durch das systematische Zugleich von Fast-Food- und Slow-Food-Kulturen zeigen“ (Matthiesen 2005). Je nachdrücklicher die Globalisierung in den Alltag diffundiert, desto intensiver wird scheinbar die Sehnsucht nach dem Regionalen. So wurde in der Gastronomie seit den neunziger Jahren der Zusammenhang von Raum und Geschmack neu konstruiert (Tschofen 2008). Der Ortszusatz schafft Vertrauen und macht die Welt überschaubar [12]. Flankierend wuchs in den letzten Jahren das Gewicht von Argumenten der Nachhaltigkeit, die sich unter anderem in der Forcierung von regionalen Wirtschaftskreisläufen bei Lebensmitteln in die Alltagspraxis übersetzen lassen (vgl. u.a. Stierand 2008). Die Wertschätzung der regionalen Küchen steigt parallel zum Marktwert des „Natürlichen“ und „Authentischen“; die Wertschätzung von artisanalen Produktionstechniken korreliert mit dem Symbolwert der der Nahrung beigemessen wird.

Aber sind die Huldigung des Terroir-Prinzips und der kulinarischen Identität nicht nur ein Luxusphänomen und erreichen lediglich bestimmte, quantitativ kaum relevante Bevölkerungsschichten? Der Blick in die Entwicklungen im Osten Deutschlands zeigt einerseits, dass auch unter streng nivellierenden Bedingungen eine angepasste Neuformulierung der kulinarischen Identität stattfand (Soljanka, Letscho, Goldbroiler). Andererseits hinterließ die Kappung der lokalen Traditionen eine bis heute regional wirkende kulinarische Orientierungslosigkeit. Die Neuerfindung regionaler Küchen kann als Merkmal innovativer und kreativer Regionen gesehen werden–der Blick in die regionale Verteilung der Lebensmittel mit geschützter geographischer Herkunft oder auch der Michelin-Sterne zeigt Konzentrationen im Südwesten der Republik und große weiße Flecken im Nordosten (Bröhm 2011; Ermann 2009).

In Berlins Gastronomie ist die regionale Einbettung in die brandenburgische „Steusandbüchse“ wesentlich geringer ausgeprägt als die hauptstädtische Repräsentation von Botschaften des Geschmacks aus aller Herren Länder. Man kann sich „nahezu einmal um die Welt snacken“ (Marx 2011), aber bei der Frage nach einem typisch Berlinerischen Gericht fällt die Antwort wahrscheinlich irgendwo zwischen Currywurst, Buletten,

[11] Bereits 1974 formulierte Calvino den Eindruck der zunehmenden Austauschbarkeit von Orten durch die gleichen Ausstattungsmerkmale (Läden, Hotels etc.) – „Only the name of he airport changes“ (Calvino 1974: 102).
[12] „Rund 65 Prozent der Deutschen achten beim Einkauf immer oder meist auf regionale Herkunft, denn sie wollen natürliche und authentische Lebensmittel“ PM Stiftung Warentest, 29.03.2011.

Berliner Leber und Döner aus. Die Reformulierung einer kulinarischen Tradition mit Bezug zum Terroir hat in den häuslichen Küchen über Bio-Bauern-Märkte, Gemüsekisten und urbanes Gärtnern wahrscheinlich stärker Einzug gehalten als in der Gastronomie. In letzter gilt immer noch als ambitioniertes Vorhaben, aus Steckrüben, Kohl und Kartoffeln einen heimatlichen Geschmack zu kreieren.

3 GASTRONOMIE UND STADTQUARTIERE

Die unterschiedliche Intensität der Ausprägung und die Art der gastronomischen Betriebe in Städten lassen sehr individuelle kulinarische Landschaften entstehen, die bisher im deutschsprachigen Raum nur wenig systematisch erforscht wurden [13]. Das betrifft sowohl Fragen der kulinarischen Identität als auch der Wechselbeziehung zwischen Urbanität und der ortsspezifischen Qualität von Konsumorten. Es ist unstrittig, dass die spezifische Ausprägung von Konsumorten, die lokale Lebensqualität mit bestimmt und auch als Indikator zur Beschreibung des sozio-demographischen Charakters eines Ortes herangezogen werden kann (vgl. u.a. Crewe/Lowe 1995; Mullins et al. 1999; Zukin 2004). Neal (2006) clusterte 243 US-amerikanische Städte auf Basis ihrer gastronomischen Ausstattung vgl. (Abbildung 3) in Urbane oases, McCulture oases, Urbane deserts und McCulture deserts. Die Oasen zeichnen sich durch ein hohes Angebot an gastronomischen Einrichtungen aus, die Wüsten durch ein Geringes. Sie unterscheiden sich weiterhin in der Qualität und der Vielfalt der Lokale–in den McCulture Orten ist ein dominierenden Besatz an standardisierten Gastronomieformen (McDonaldisation) zu finden. Die identifizierten urban oases weisen eine hohe Übereinstimmung mit den von Florida (2008) identifizierten Städten auf, deren ökonomische Entwicklung durch die 3 Ts (talent, technology, and tolerance) positiv beeinflusst wird.

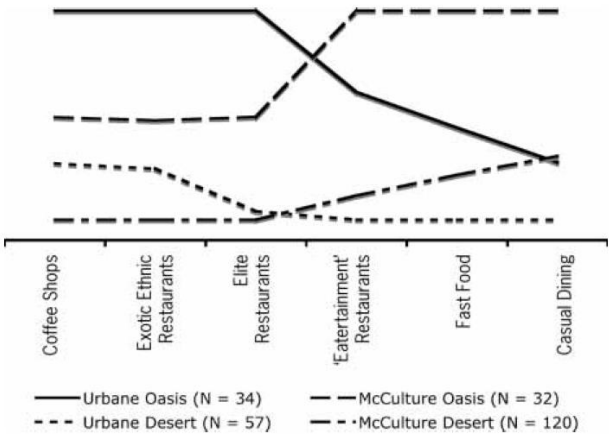


Abbildung 3: Profile von gastronomischen Clustern (Neal 2006: 11)

Die Klassifikation in gastronomische „Wüsten und Oasen“ kann auch auf den Binnenraum von Städten übertragen werden. Allerdings muss die Ausbildung von mehreren Kneipenvierteln mit unterschiedlicher Charakteristik als Spezifikum großer Städte gesehen werden, denn in kleineren Orten weist in der Regel der Marktplatz oder–sofern vorhanden–die Strandpromenade die höchste Restaurantdichte auf. In den Urbanen Oasen, also den Städten, deren Entwicklung in starkem Maße mit dem Vorhandensein der Creative Class verbunden ist, findet sich das vitalste Angebot an originellen Shopping-, Gastronomie und sonstigen Freizeitangeboten meist in den gentrifizierten oder in Gentrifizierung befindlichen Innenstadtbereichen (Gründerzeit, ehemalige Arbeiterviertel), die sich durch einen hohen soziökonomischen Status und meist auch eine ethnische Mischung auszeichnen. Die urbanen Annehmlichkeiten, wie eben eine interessante Gastronomie, sind dabei gleichzeitig Vorbedingung und Ergebnis der Anwesenheit kreativer Pioniere (u.a. Clark 2004; Florida 2008; Oldenburg 1999; Zukin 1995).

Die Dichte der gastronomischen Betriebe in den Berliner Quartieren steigt mit ihrer Zentralität–doch auch innerhalb des S-Bahnrings weisen viele Quartiere nur eine geringe gastronomische Dichte auf. Die Hot-Spots (vgl. Abbildung 4) sind in den Stadtteilen Mitte, Prenzlauer Berg, Friedrichshain, Kreuzberg, Neukölln, Schöneberg und Charlottenburg zu finden. All den ausgeprägten „Kneipenvierteln“ ist gemein,

[13] Matthiesen (2005) spricht in diesem Bezug von dem „trägeren Bereich der planungsbezogenen und sozialwissenschaftlichen Raumforschung“, Johns/Pine (2002) konstatieren aber auch für den englischsprachigen Raum, dass „the geography of dining out … seems to be a neglected area of research” (zitiert nach Neal 2006: 4).

dass die gastronomischen Betriebe zu einer Ballung neigen, d.h. dass sich innerhalb der Quartiere meist ein Knotenpunkt oder eine Hauptachse herausbildet. Das gastronomisches Gefüge in den Städten ist nur teilweise stabil: Eine hohe Kontinuität weisen oft „Touristenfallen“, hochpreisige Restaurants sowie traditionelle Quartierslokale auf; ständig im Fluss ist dagegen die „Szenegastronomie“, die oft Hand in Hand mit Akteuren aus der Kunst zur Entdeckung neuer Quartiere beiträgt.

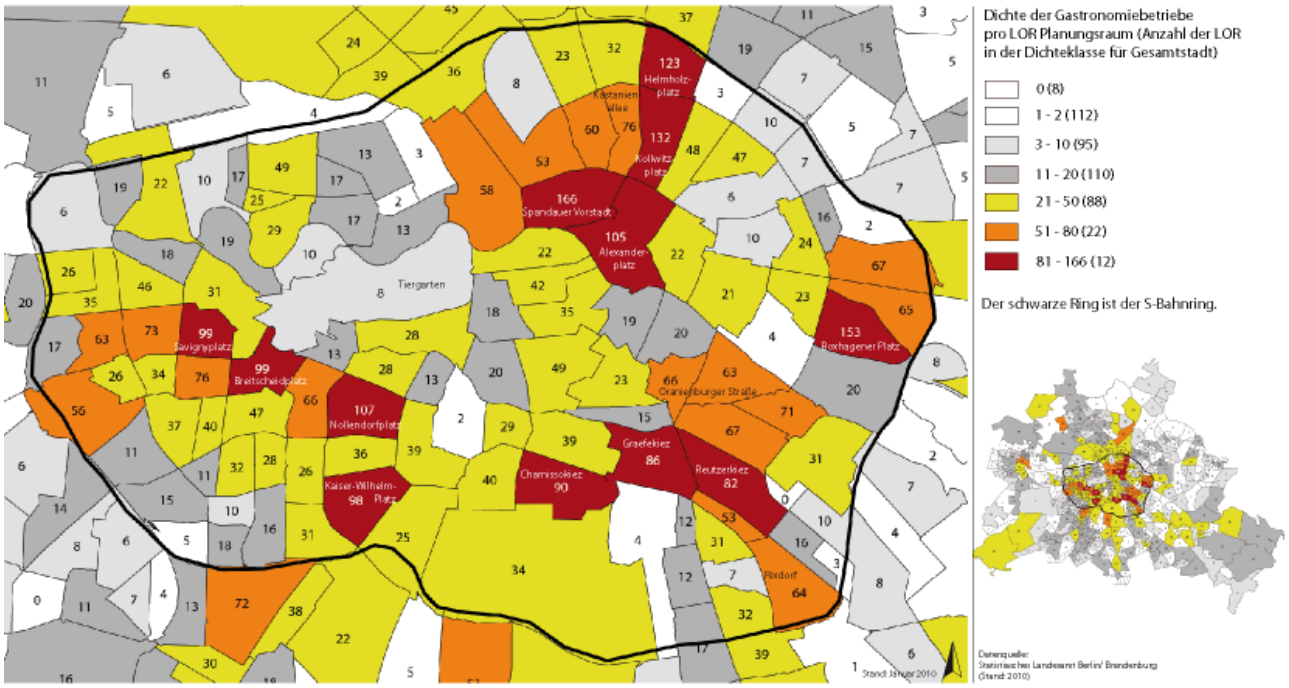


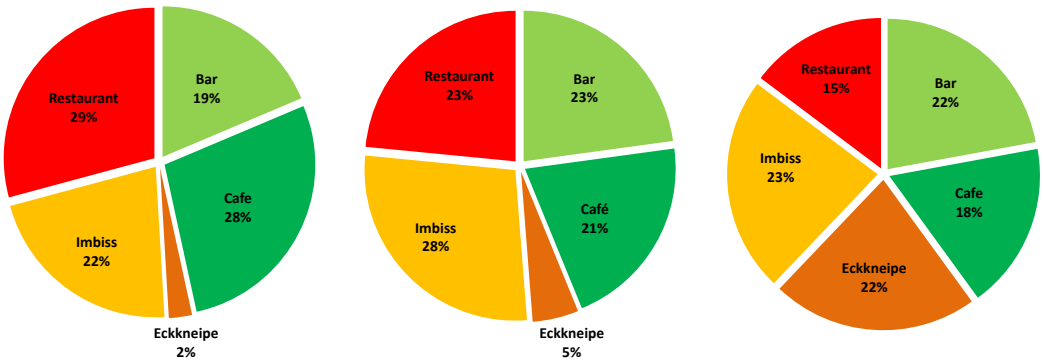
Abbildung 4: Berlins gastronomische Landschaft (Darstellung nach Berechnungen des StaLa BB 2010)

Die Wechselbeziehung zwischen Bewohnermilieus und Gastronomie kann an der inzwischen in Berlin verbreiteten symbolischen Verwendung von bestimmten Getränken zur Beschreibung einer Quartierscharakteristik verdeutlicht werden–dies hat natürlich Vorbilder in den Makro-Nationalismen, wie „Krauts“, „Frogs“, „Pommes“ und „Spaghetti-Fressern“. So stehen Bionade und Latte Macchiato stellvertretend für Gentrifizierungsprozesse und die Präsenz von urbanen Eliten. Das breit rezipierte Bild des Bionade-Biedermeier (Sußebach 2007) im Prenzlauer Berg wird unverdrossen weiter verwendet, obwohl das namensgebende Getränk seinen Independent-Status durch den Verkauf an die Radeberger-Gruppe (Oetker-Konzern) mittlerweile eingebüßt hat. Mit dem Bionade-Begriff geht die Assoziation einer neuen bürgerlichen Schicht einher, die horrende Mieten oder Kaufpreise für Gründerzeitwohnungen bezahlt, damit einkommensschwächeren Bevölkerungsschichten verdrängt, die Kindererziehung zum Lebensziel erklärt und von früh bis abends wohlgemerkt Latte Macchiato trinkt. Die Bionade selbst ist eher Symbol für ein ökologisch orientiertes Gutmenschentum.

In der medialen Aufbereitung des neuen Berliner Szenequartiers Neukölln–oder besser Nordneukölln–spielt Latte Macchiato ebenfalls eine entscheidende Rolle. Im Jahr 2006, als das Stadtviertel durch den Brandbrief der Schulleiterin der Rütli-Schule bundesweit als Problemkiez Schlagzeilen machte, erschien in der Berliner Zeitung ein Artikel mit dem Titel „Auch hier gibt es Latte Macchiato“ (Sundermeier 2006), der auf die kommenden Umwälzungen prophezeite und in dem es natürlich nicht um Espresso im Glas mit Milchschaum ging. Dem Verdruss über die Veränderungsprozesse im Quartier machte sich die Pioniergastronomie „Freies Neukölln“ mit dem Film „Offending the Clientele“ Luft. Dieser gipfelte in der Aussage „we dont have Latte … stop to life a standard live in a standard world”. Natürlich haben aber gerade die neuen Kneipen einen nicht unwesentlichen Anteil an den Veränderungsprozessen in Quartieren. Sie sind Anlaufpunkte und ihrerseits Symbole für die Gastlichkeit und Bewohnbarkeit von Quartieren. Das zeigt sich unter umgekehrten Vorzeichen im Shoppingparadies rund um den Hackeschen Markt, wo zwischen den internationalen Brand-Stores fast nur noch Filialen der To-Go-Gastronomie übrig geblieben sind.

Überhaupt unterscheiden sich die Kneipenviertel erheblich von ihrem Charakter. Beispielhaft sollen hier die Gebiete Kastanienallee (Prenzlauer Berg), Oranienstraße (Kreuzberg) und Rixdorf (Neukölln) kurz

beschrieben werden [14]. Betrachtet man die Auszählung der Gastronomietypen in den drei Gebieten (Abbildung 5), so erscheinen die Unterschiede nicht besonders gravierend–die Rixdorfer mögen eben ihre Eckkneipen. Ansonsten ist die Café-Dichte im Prenzlauer Berg etwas höher und der Anteil der Restaurants ebenfalls. Deutliche Unterschiede ergaben sich allenfalls beim Rauchverbot oder der Deklarierung des Lokals als Raucherkneipe: Im Gebiet Kastanienallee war das Verhältnis von Nichtraucher- zu Rauchergastronomie 87:13, in der Oranienstraße 79:21 und in Rixdorf 51:49. Insgesamt ist aber eine solche qualitative Betrachtung nur bedingt hilfreich, um dem gastronomischen Charakter eines Gebietes auf die Spur zu kommen. Dazu wäre Bildung von Kategorien auf Basis des visuellen Eindrucks (Einrichtung, Freisitze etc.) und der dargebotenen Speisen und Getränke notwendig. Um die Unterschiede zwischen den Gebieten zu verdeutlichen, werden im Folgenden ein paar Auszüge aus den Quartiersbeschreibungen im Projekt angeführt.



Kastanienallee Oranienstraße Rixdorf

Abbildung 5: Ausprägung der Lokale in 3 Gebieten

Kastanienallee: Das Quartier ist schon seit einiger Zeit bekannt und ist trotzdem noch nicht „festgefahren". Es hat sich seit den 1990er Jahren entwickelt, ist seitdem in Reise- oder Gastronomieführern vertreten und wird teilweise immer noch als Geheimtipp angepriesen. Die Gastronomie ist eine Mischung aus Tradition und Moderne. Aus DDR-Zeiten haben kaum Lokale überlebt, damit haben Läden den Nimbus einer Institution, wenn sie Anfang bis Mitte der 1990er Jahre eröffnet wurden. Dazu kommen zahlreiche neue kleine und originelle Läden, aber auch vermehrt Franchise-Lokale. Die Angebote im Quartier sind bisher weder ausschließlich auf die breite Masse oder Touristen ausgelegt, noch hoffnungslos überteuert.

Oranienstraße: Nach dem Bedeutungsverlust nach der Wende boomt Kreuzberg wieder. Bisher blieb aber der widerständige Geist im legendären SO36 zu Teilen erhalten. Die gastronomische Ausrichtung der Lokale ist oft nicht eindeutig festzustellen, da die Restaurants aus vielen ethnischen Richtungen etwas anbieten–Cross-Over-Gastronomie. Das Preisniveau im Gebiet schwankt stark, aber die Lokale mit sehr niedrigen Preisen überwiegen klar. Es gibt, nicht zuletzt durch die gründerzeitliche Bebauungsstruktur und die Quartiersgeschichte viele kleine, individuelle Lokale mit alternativen Konzepten und Ideen. Gerade diese Abwechslung stellt für die meisten Besucher die Attraktivität des Gebietes dar. Essen und Trinken kann man in Kreuzberg alles und das zu jeder Zeit. Frühstück um 23 Uhr abends ist genau so wenig ein Problem, wie das erste Bier morgens um 6 Uhr.

Rixdorf: Die Gastronomie ist stark durch ethnische Einflüsse geprägt. Eine touristische Prägung ist heute noch nicht wahrnehmbar und auch die Studentenszene hat keinen sichtbaren Einfluss auf die Gastronomiestruktur. Das Angebot setzt sich aus Imbissen mit überwiegend ethnischer Ausrichtung, Casinos sowie Eckkneipen zusammen, die sich alle samt im Niedrigpreissektor bewegen. Lediglich eine Hand voll Restaurants, die sich überwiegend am ehemaligen Rixdorfer Zentrum–dem Richardplatz–befinden, sorgen für Abwechslung. Durch den vermuteten Zuzug von Künstlern und Kreativen in den nächsten Jahren, werden Veränderungen in der Gastronomielandschaft erwartet.

Anhand der drei Gebiete und der weiteren Ergebnisse des Projekts kann bestätigt werden, dass das gastronomische Angebot das Bewohnermilieu deutlicher widerspiegelt, je weiter man sich von den

[14] Die Angaben beruhen auf Bestandsaufnahmen, die im Rahmen des Projekts „Kitchen Stories" durchgeführt wurden (Studienprojekt 2010/11). Ein interessanter „Nebenbefund" war, dass die offiziellen Zahlen zu den Gastronomiebetrieben (Abbildung 4) in den aktuellen Szenegebieten stark von den erhobenen Betrieben abwichen.

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touristischen Hauptrouten entfernt. Zentralität ist damit eine wichtige, aber nicht hinreichende Bedingung, damit ein überlokal bedeutendes Ausgehviertel entsteht. Ein Blick auf die (fast) vergeblichen gastronomischen Urbanisierungsversuche am Potsdamer Platz legen die Vermutung nahe, dass die Kombination aus Genius Loci, Raumangebot (Eignung der gründerzeitlichen Ladenlokale), ausgeh-affinen Bewohnern und Standort vorhanden sein muss. Gerade in diesem Zusammenhang sollten aber auch die in den letzten Jahren zunehmend kritisch diskutierten Störungen und Einflüsse durch Touristen (o.A. 2011) differenziert betrachtet werden, denn natürlich ist diese Gruppe ein wichtiger Nachfrager [15]. Gleichwohl haben auch die Medien (Stadtmagazine etc.) einen nicht zu unterschätzenden Einfluss. Die Rolle der Gastronomie als eine zentrale Institution der Alltagskultur–Wohnzimmer, Küche, Treffpunkt, Nachrichtenzentrale etc.–scheint ebenfalls an eine gewisse Bebauungs- und Bevölkerungsdichte, aber auch an Milieus gebunden zu sein. Meist sind weder in expliziten Touristenvierteln, noch in neu entwickelten Wohnquartieren (z.B. Rummelsburger Bucht, Alter Schlachthof) Quartierslokale (im Sinne von hubs) zu finden.

4 EIN CAFÉ WÄRE SCHÖN… ABER OHNE PLASTIKSTÜHLE UND WERBUNG AUF DEM SONNENSCHIRM UND LAUT SOLLTE ES AUCH NICHT SEIN…

Die Rolle der Gastronomie in städtischen Veränderungsprozessen sollte damit nicht unterschätzt werden. Sie wird zwar oft nur als Symbol solcher Prozesse wahrgenommen, kann aber durchaus selbst Entwicklungen forcieren. Wer aber kümmert sich in Städten um die Gastronomie? Gibt es irgendeine steuernde Instanz oder auch nur eine Vorstellung von einer gewünschten Entwicklungsrichtung? Solche Fragen werden in der Regel mit einem Achselzucken beantwortet oder auch mit einem „Gott-sei-dank kümmert sich niemand“. Formal ist natürlich jeder Gaststättenbetrieb erlaubnispflichtig und der Betreiber muss Auflagen beim Ausschank von Alkohol erfüllen. Hinsichtlich der Standorte gelten die Ausführungen der BauNVO, nach der Gastronomie als Einrichtung zur Versorgung des Gebiets auch in Wohngebieten zulässig ist. Eine zentrale Bedeutung kommt damit dem Vermieter zu, der den Mietvertrag mit dem Betreiber abschließt. Da Konflikte mit den Bewohner auf Grund von Geruchs- und Lärmbelästigungen häufig auftreten und die baulichen Anpassungen an Auflagen des Gesundheitsamtes etc. nicht unerheblich sind, scheuen sich nicht wenige Vermieter vor der Neueinrichtung an gastronomische Betriebe zurück. Die erzielbaren Mieten liegen aber häufig über denen von anderen Gewerben, was wiederum ein Anreiz sein kann.

Die Formation und Qualität der gastronomischen Landschaft ist also alleiniges Resultat der Innovationsfreude der Gastronomen und Vermieter, ein Beispiel für das segensreiche Wirken der „unsichtbaren Hand“? Natürlich gibt es planerische Auflagen, aber diese betreffen fast alle den öffentlichen Raum, der sich in letzten Jahren sukzessive zum Gastraum entwickelte. Für die wachsende Zahl der Freisitze wurden in vielen Städten Auflagen erlassen bzw. Gestaltungsvorschriften entwickelt. Je nach Ambition der Stadt fallen diese mehr oder weniger detailliert aus (vgl. Pätzold 2011b). In Berlin ist die vor allem in Kreuzberg und Friedrichshain weit verbreitete Wohnzimmer-Dekoration des öffentlichen Raums mit Flohmarktmöbeln eher unerwünscht, allerdings sind die Kontroll- und Sanktionsmechanismen relativ begrenzt. Noch schwieriger als solchen überbordenden Individualismus in die Schranken zu weisen, ist es allerdings qualitativ hochwertige Gestaltungen zu forcieren und Plastestühle und Sonnenschirmwerbeträger zu verhindern.

Es gibt darüber hinaus immer wieder Vorstellungen, dass die Gastronomie zur Belebung von Quartieren betragen kann. Insbesondere auf Visualisierungen von in neuen Quartieren übernehmen Lokale die Funktion der Urbanisierung des Bildes (vgl. Abbildung 6). Wie die Fläche zu dem passenden Gastronomen kommt, oder ob sich ein solches Lokal an der Stelle wirtschaftlich trägt, steht häufig auf einem anderen Blatt.

Ein klarer Handlungsauftrag an die ordnende Hand der Stadtverwaltung erwächst meist aus Konflikten im Kontext von gastronomischen Betrieben. Von öffentlicher Seite wird allerdings erst bei Beschwerden eingegriffen, vorausschauende planerische Interventionen gibt es nicht, weil eben jeder Betrieb in der Genehmigung einzeln betrachtet wird und kein Monitoring existiert. Insbesondere aus einem raschen Zuwachs an Lokalen kann aber eine Vielzahl von Problemen entstehen. Diese können sich über das gesamte Quartier erstrecken, oder nur punktuell wirken. Nebenwirkungen des Alkoholkonsums, wie Lärm und

[15] „Food structures the tourist day“ (Richards 2002: 11), ohne die Touristen gäbe es nach Schätzungen bis zu einem Drittel Bars, Clubs etc. weniger in der Berlin.

Aggressionen, Behinderung der Gehwege durch Freisitze, Verschmutzungen und hohe Besucherfrequenzen bilden die Hauptstreitpunkte zwischen Anwohnern und Gastronomen in Wohngebieten. Diese sind allerdings häufig gar nicht die alleinigen Verursacher, denn dafür, dass das junge Publikum permanent Bierflaschen als urbanes Accessoire mit sich herumträgt, sorgen eher die Spätshops.

Abbildung 6: München–neues Wohnquartier auf dem Gebiet der ehem. Siemenswerke Obersendling. Das Nahversorgungszentrum soll ein Ort der Begegnung werden. (Quelle: o.A. 2010)

Die kulturinduzierte neue Gastronomie in Neukölln–in zurückliegenden Zyklen in der Spandauer Vorstadt oder in der Simon-Dach-Straße in Friedrichshain –, die wesentlich zur Urbanisierung und zum Attraktivitätsgewinn des Quartiers beitrug, hatte eine starke Rückbindung zumindest zu den „neuen" Bewohnern des Quartiers. Es gibt und gab jeweils für eine Zeit eine Balance, ein Nebeneinander zwischen neuen und alten Bewohnern, aus neuer und eingesessener Gastronomie. Eine ungehemmte „Goldgräberstimmung" führt meist zum Verlust dieser Einbettung in das Bewohnermilieu und damit auch oft zu einer Übernutzung des Quartiers durch das Ausgehpublikum. Daher wäre eine Art Frühwarnsystem [16], das in „trendige" Stadtteile wie z.B. aktuell im Schillerkiez angewandt werden würde, von Vorteil für die Bewohner und könnte eine frühzeitige Moderation von Konflikten ermöglichen. Meist werden planerische Instrumente–wie z.B. ein B-Plan, der die Neuansiedlung von Gastronomie verhindert–erst angewandt, wenn die Entwicklung ihren Zenit erreicht hat. Genauso sollten sich Städte aber auch mit der Frage auseinander setzen, inwiefern eine Stadt gastronomische Hot-Spots braucht, in denen dann eben weniger Ruhe herrscht. Eine Entzerrung der Probleme durch eine gleichmäßige Verteilung der Gastronomie, wie es etwa das Resultat einer Bedarfsprüfung [17] sein könnte, entspricht sicher in keinem Fall den wirtschaftlichen Funktionsprinzipien der Branche–abgesehen davon, dass es den Maximen der Gewerbefreiheit widersprechen würde.

5 SCHLUSSBEMERKUNG

Das kulinarische System einer Stadt aus Essgewohnheiten und gastronomischen Betrieben ist Teil von deren Identität. Angesichts des sukzessiven Verschwindens von Traditionsorten bei gleichzeitiger Zunahme der Systemgastronomie stellt sich die Frage nach den Perspektiven. Insbesondere Städte mit einem großen Potenzial an kreativen Menschen bringen auch immer wieder Innovationen im gastronomischen Bereich hervor. Allerdings findet nur selten eine Rückbettung zu den traditionellen Formen statt. Die hohe Zahl an Insolenzen und Geschäftsaufgaben in der Gastronomie zeigt deutlich die geringe Professionalisierung der Branche und illustriert das Bonmot: „Wer nichts wird, wird Wirt". Allerdings leistet das auch der Ausbreitung von Filialsystemen Vorschub, denn deren wirtschaftliche Konzepte sind meist stimmiger. In Summe ist eine Entwicklung hin zu den Verhältnissen im Einzelhandel denkbar, in der wenige große Player

[16] Vorstellbar als Monitoring – welche Lokale mit welchem Charakter (Ausrichtung, Größe) entsteht wo.

[17] In Wien gab es z.B. bis zur Novellierung der Gewerbeordnung 1973 eine Bedarfsprüfung, die der Regulierung der Ansiedlung von Gaststätten (und anderer Branchen) diente. Wollte ein Unternehmer ein neues Lokal eröffnen, wurde zunächst eine Prüfung vorgenommen, ob wirklich ein lokaler Bedarf bestand. Auf der anderen Seite gab es Vorgaben, dass es zwischen zwei gleichartigen Lokalitäten festgelegte Abstände geben muss. Hintergrund der Regelung war der Schutz der Betriebe vor einer existenzbedrohenden Konkurrenz (vgl. Schulev-Steindl 1996: 69).

den Markt bestimmen und wenige inhabergeführte Lokale für das Lokalkolorit zuständig sind (McCulture-Oases).

Stadtplanung oder Stadtforschung sollten sich dem Thema stärker als bisher annehmen, denn für das Verständnis der Ausprägung von Urbanität ist die Gastronomie ein wichtiger Baustein. Lokale können nicht nur vom Bild oder der gewünschten Wirkung her gedacht werden. Planerisch können natürlich die Erfahrungen im Umgang mit dem Einzelhandel genutzt werden, obwohl es sicher nicht ausreicht einfach Einzelhandel (Schrägstrich) Gastronomie in den Titel von Zentrenkonzepten zu setzen. An ausgewählten dynamischen Orten könnte eine Art lokales Gastronomiekonzept mit Ideen zur Profilierung des Standorts und Maßnahmen für die Umsetzung (Gespräche mit Immobilieneigentümern bis zu Mediationsverfahren) erprobt werden. Wichtiger als die direkte planerische Tat scheint es mir aber, zuvor mehr Wissen zu sammeln, inhaltlich tiefer in das Themenfeld einzusteigen. Welche Gastronomiestruktur hat die Stadt, wer sind die Akteure, welche Trends zeichnen sich ab? Das Wissen von Experten in dem Themenfeld, wie Gastrokritiker oder die Gastronomen selbst (Tamò 2009), liegt weitgehend brach und wird derzeit viel zu wenig genutzt. Und um all die nostalgischen Gefühle bei der Betrachtung verschwindender Orte, wie Eckkneipen, Bistros und Caféhäuser zu operationalisieren, könnte darüber nachgesonnen werden, manche zentralen Institutionen in ihrer Gestalt zu schützen und einen Modus zu finden, deren Betrieb in die Zukunft zu überführen.

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🏆 *reviewed paper*

Tourism Continuity Plan after the 2003 Bam Earthquake

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1 ABSTRACT

Natural disasters are frequent treats to tourist locations, and have the potential of adversly affecting tourism industry; as one of the world's largest economic sectors. Subsequent to an disasterous event, destinations are faced with not only the daunting tasks of rebuilding infrastructure and communities, but also restoration image of desstination.The present paper aims to define the effects of the disasters, especially earthquakes, on tourism continuity plan and various ways that they affect the operations and viability of tourism in the strucken area. The study focuses on perception changes and negative impact on the "Image of the Destination" after the 2003 Bam earthquake. It also proposes mechanism to develop tourism marketing strategies tallying with internal and external environment in Bam destination.

Achieving the aim, which includes studying the effects of the 2003 Bam earthquake on behavioral intention of visitors to choose Bam destination and proposing Tourism Revival Marketing Strategies by the means of SWOT method, may contribute to the understanding of consumers' affective reactions towards a tourism destination and their influences on future visit intention. In addition, the paper provides a prescriptive list of functions that are dependent to destination or disaster characteristics that can serve as a foundation for revival policy making of Bam in post-earthquake recovery.

2 INTRODUCTION

Tourism, as one of the world's largest economic generating sectors, can affect regions' competitiveness (Wickramasinghe,?). This has made tourism destinations look for the ways to attract more tourists from all around the world. Since potential tourists are exposed to many alternative destinations similar to each other and fiercely competing to get more of the market share, then it is vital for destinations to differentiate themselves from competing ones and to occupy a favorable position in the minds of potential visitors by developing a positive and favorable image (Sahin&Baloglu, 2011). Destination image [1] can be defined as "the perception of a person or a group of people regarding a place (Sahin & Baloglu, 2011)" that can influence tourist satisfaction and their behaviors such as the choice of a destination, the subsequent evaluations, and their future "behavioral intentions [2]" (Chun-yang & Maxwell, 2010). Hence "destination image" is commonly accepted as an important aspect in successful and sustainable tourism development and destination marketing due to its impact on both supply and demand side aspects of marketing. Destination Image can be influenced by several factors including "natural disasters" that may impact on the destination marketability.

According to the World Tourism Organization (WTO, 2003), Natural disaster risk [3] like earthquake is one of the major sources of risk [4] with the potential of affecting tourism destinations (Lehto & et.al., 2008). So recreating and managing an attractive image through marketing strategies is an important key to sustainable success for tourism businesses in quake-hit areas. In this regard, the paper aims to:

[1] image is the sum of beliefs, ideas, and impressions that a person has of a destination(Tasci & Kozak,2006)
[2] The concept of behavioral intentions can be captured by a tourist's willingness to revisit a tourism destination (Andreassen & Lindestad, 1998).
[3] Natural disaster risk refers to the possibility of being involved in a natural disaster event;
[4] Risk is defined as the uncertainty that consumers face when they cannot foresee the consequences of their purchase decisions;

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- Study of the effect of the earthquake on business continuity of tourism sector & define the various ways that it affected the operations and viability of tourism in the quake-hit areas(with emphasis on Bam);
- Propose mechanism to develop tourism marketing strategies and address feasible solutions in order to re-image destination aftermath a sudden calamity considering theoretical concepts and using analytical techniques and hence restore region competitiveness;

As a result, the paper would contribute to understanding of consumers' reactions towards a tourism destination after a natural disaster (with emphasis on earthquake) and their influences on future visit intention and serves as the foundation for policy making for revival of destinations following the earthquake.

3 THEORETICAL FRAMEWORK

Disaster refers to "situations where an enterprise (or collection of enterprises in the case of a tourist destination) is confronted with sudden unpredictable a catastrophic change over which it has little control (Lehto & et.al., 2008). Disasters that are unavoidable, since they are beyond human control, have been known to transform the reputation, desirability, and marketability of popular tourist destinations (Park & Reisinger, 2010). The occurrence of natural disasters leads to a decrease in tourists' arrivals because of perception change. Therefore, after elimination of the physical hazards associated with natural disasters, the amount of tourists is another significant issue in a tourist destination.

Perception changes can occur after natural disaster occurrences due to their devastating effects because the thought of tourism naturally evokes feelings of enjoyment, pleasure, relaxation, and safety while conversely, disasters arouse distress, fear, anxiety, trauma, and panic in individuals. This can be both serious and long-lasting because of its profound impact on the travel decision-making process (Lehto & et.al., 2008). Therefore subsequent to a disaster, destinations are faced with not only the daunting tasks of rebuilding infrastructure, facilities and communities, but also Image [5] Recovery (Travel destination image).

Where communities have considerable economic dependence on tourism related activities, their vulnerability to crisis occurrence is significantly increased and they need to maintain a positive image of attractiveness for continued success. Hence marketing strategies through business continuity plan can play a central role for economic recovery and changing potential customers' misperception.

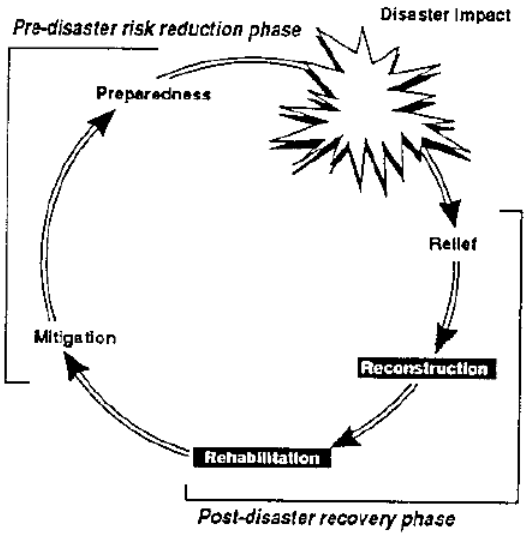

Fig. 1: Disaster management process(UNDRO,1992)

3.1 Business continuity plan concept

Disaster management for tourism has often focused on the post-disaster recovery phase. The International Strategy for Disaster Reduction (ISDR) defines "Recovery" as the "decisions and actions taken after a disaster with a view to restoring or improving the pre-disaster living conditions of the stricken community,

[5] Image is an attitudinal construct representing an individual's beliefs, feelings, and general impressions about an object or destination (Lehto, Douglas & Park, 2008).

while encouraging and facilitating necessary adjustments to reduce disaster risk". Recovery is therefore about shifting focus from saving lives to restoring livelihoods (UNDP,?).

Reconstruction and rehabilitation are considered as main steps of "disaster recovery phase" (Fig.1). These steps are focused on activities that are devoted to restoring the condition to normal. Reconstruction process is associated with the immediate post-disaster activities in order to help affected population for restoring them to normal lifestyle. On the other hand, rehabilitation is the next step after reconstruction and ongoing long-term development. This step not only helps economic revitalization, but also promotes the business continuity (UNDRO,1992).

Disaster Recovery Plan (DRP) and Business Continuity Plan (BRP) often used interchangeably in various texts. Whereas Recovery Plan is used for retrieval of systems and infrastructure components in a specific time series, Continuity Plan has more expanded scales and scopes, which is associated with determination of components and functions of recovery. Business continuity plan can be considered as an iterative process in order to determine mission of critical business function, policies, processes, plans, procedures which are needed for continuation of activities on unforeseen events (Nickolett, 2001). Instead of the focus on rebuilding of infrastructures or hotels, Business Continuity Plan emphasis on re-launching of different scale of touristic businesses and people who are the target of tourism [6] (NZIER,2011).

Proposed activities for the revitalization of long-term business continuity are (Nickolett, 2001):

- Recognize the importance of the tourism market in region and its impact on tourists in order to minimize the effects of reduced demand;
- Determination of the functions of the tourism sector should return to normal
- Preparing recovery promotional programs
- The beneficial evaluation of system through: (1) Speed of return to the former condition, (2) Rates of return to former condition, (3) Amount of increased resistance of buildings against next disasters

3.2 Destination Image concept

It is commonly recognized that destination image [7]-"the sum of beliefs, ideas, and impressions that a person has of a destination (Crompton, 1979; Kotler & et.al., 1993)"- is an important aspect in successful destination marketing; so one important aspect of destination marketing is "destination image management". Several researchers have studied destination image as an independent variable influencing several consumer behavior variables, such as destination choice, decision-making and satisfaction. Due to the importance of destination image in terms of its effects on tourist behavior, researchers have been trying to identify the determinants that define, modify, and strengthen this construct (Tasci & Gartner, 2007) in order to minimize the "gap that may be between "desired brand image [8]" and "perceived one [9]"(Lopes, 2011)" undermining the continuity of the destination business.

Promoting destination image requires knowing about image formation agents or components. Development of the image of a tourist destination is based on the consumer's rationality and emotionality, and as the result of the combination of two main components or dimensions. Beerli and Martin (2004) suggested that "affective" and "cognitive" image together leads to an overall image, resulting either in a positive or a negative image about the destination. Cognitive image is determined by beliefs and knowledge about a place,

[6] Proposed activities for capacity building in communities based on the following steps are (Nickolett,2001):

- Planning (readiness) phase including preventive activities and increase capacity;
- crisis management readiness program including evaluation of effects due to disaster preparedness management and disaster management;
- The step that response during and immediately after the accident including effective contingency plans;
- Long-term disaster recovery step;

The first three steps are outside of the subject of this study and only the final step will be considered.

[7] According to the World Tourism Organization, the image of an object or situation is defined as (Lopes, 2011) the artificial imitation of the apparent form of an object; Similarity or identity with the form (e.g.: art or design); Individual or collective ideas about the destination.

[8] Desired image is related to how the company wants to be perceived by the target segment (Lopes, 2011).

[9] Perceived image is about how the target segment sees and perceives the brand through a brand image study (Lopes, 2011).

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whereas affective one is all about feelings towards that destination [10]. Overall tourism destination image has an indirect impact on "behavioral intentions". Also destination image literature reveals three sources of image formation factors (Table. 1):

- Supply-side or destination that refers to destination marketers engage in promotional efforts to establish a positive image or to change an existing image.
- Demand-side or image receivers that is related to their characteristics.

Disaster management literatures show a relation between "perceived influence of natural disasters" and "travel risk [11] acceptance" depending on the type of travel risk and individual tourists' characteristics(such as nationality, gender, Age, marital status, education, employment status, annual income & travel companionship). The rapid increase in natural disasters makes many tourists perceive that travelling around the world is dangerous and risky (Park & Reisinger, 2010). Park and Reisinger (2010) study about "perceived influence of earthquake on travel by demographics" shows that:

- Asian people perceived a greater influence of the earthquake on travel than other nationality group. American and the European travelers feel more comfortable about earthquake.
- Female tourists perceive a greater influence of earthquake than male tourists.
- Low-income tourists are more concerned about travel when the risk of natural disasters is high; probably because they have a relatively lower travel budget and are more concerned about the extra spending and financial losses when involved in a natural disaster accident.
- Tourists with low educational attainment perceive a greater influence of natural risk than high and middle-educated tourists perhaps because they have relatively less social skills and are less confident about their vacation choice. As a whole educated tourists perceive lower risk.
- Family and friend tourists perceptions of natural disasters are stronger than alone people.
- Independent or autonomous as intermediate factors between demand and supply side that consist of information sources such as news articles, educational materials, movies and etc.

Autonomous agents create general knowledge about a destination, and are out of a destination's immediate control (Tasci & Gartner, 2007)". Gartner and Shen (1992) assert that in the case of a disastrous event, distant countries, for which lack of knowledge exists, the autonomous agents, such as news reports, articles, and movies are able to cause a more dramatic change in image due to their high credibility and ability to reach mass crowds than destination-originated information. The intense and sometimes sensational media reporting could play a significant role influencing in consumers' cognition about a destination after natural disasters (Lehto & et.al., 2008).

image formation factor	Attribute of image factor	location	Image formation means
Supply side	dynamic/ controllable	Destination-oriented	Marketing strategies
Independent	semi-dynamic/ semi-controllable	intermediate	Information sources (educational materials, news, movies, word of mouth, user groups)
Demand side	dynamic/ uncontrollable	Perceiver Characteristics	Socio-demographics, psychologics, tourist's motivations, cultural values, experience and prior visit, attitude, needs

Table.1: Destination image formation factors(Author's analysis based on (Tasci & Gartner, 2007))

[10] Cognitive evaluation has an indirect influence on the overall image through the affective evaluation. A common agreement among researchers seems to point out that affective evaluation depends on cognitive assessment while the affective responses are formed as a function (Chun-yang & Maxwell, 2010).

[11] Travel risk is defined as the possibility of experiencing a danger while engaging in travel or the consciousness of security and knowledge of the likelihood of damage during travel (Park & Reisinger, 2010).

4 RESEARCH METHODOLOGY

This paper provides a framework for creating business continuity plan. Due to the existing definitions of business continuity plan presented in the previous section, using a strategic approach is the necessary elements to promote the business continuity plan. Strategic planning is possible in each field by answering the following four basic questions (Brewster, MTP, 2005):

- Quiddity of the current situation;
- Quiddity of probable outcome if failure to do corrective action;
- Quiddity of desirable long-term future of the community;
- How to achieve this desirable future and required actions to achieve.

Process of business continuity plan in this research would have the following steps, with focus on the final step of business continuity plan and adoption of strategic planning methodology:

- The first step: Analyzing the situation and current and future trends (identifying the opportunities, constraints and limitations) by foreseeing, if failure to do corrective action (Nickolett, 2001). Identifying the importance of tourism marketing in the region and the effects of the disaster occurred, can be done using statistical quantitative methods. The output of this step plays a major role in making the plan in next steps.
- The second step: Drawing out the desirable future through goals setting;
- The third step: Making improvement strategies and programs for regeneration; at this step, key functions would be identified and risk management prescribed. The output of this step would directly lead to business continuity plan.

There are four types of relationship between development and disaster(Fig. No. 2). Approach of this paper in making strategies is transitioning of phase (--) to phase (- +) to reduce the negative impact of disasters on development - caused by the waste of resources and as a consequence, disruption of economic growth, disruption of programs and destabilization - and to convert it into an opportunity for development.

image formation factor	Attribute of image factor	location	Image formation means
Supply side	dynamic/ controllable	Destination-oriented	Marketing strategies
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Demand side	dynamic/ uncontrollable	Perceiver Characteristics	Socio-demographics, psychologics, tourist's motivations, cultural values, experience and prior visit, attitude, needs

Fig. 2:The types of Relation between development and disaster (1991Stephenson,)Reference: (1991Stephenson,)

The ultimate success of a strategic business continuity plan is largely dependent on the accuracy of an effective situational assessment (Wickramasinghe,?). SWOT technique is one of the best and the simplest in situational assessment. So, Competitive strategies for tourism destinations would be offered by use of strategic assessment matrix according to internal capabilities and insufficiencies and external factors. The proposed model positions the destination's strengths and weaknesses and permits the identification of opportunities to improve Bam destination competitiveness.

The difference between this paper and other researches in this field is in making business continuity strategies, referring to the destination image concept. Accordingly, the situational assessment is done using the SWOT technique, according to the constituent elements of destination image. Demand-related and Intermediate factors will be considered as external factors, outside the system control (opportunities and threats). Also, in the supply-related factors, strengths and weaknesses of the system are considered. In the business continuity plan, strategies are following maximum use of available strengths and opportunities and confronting weaknesses and threats ahead.

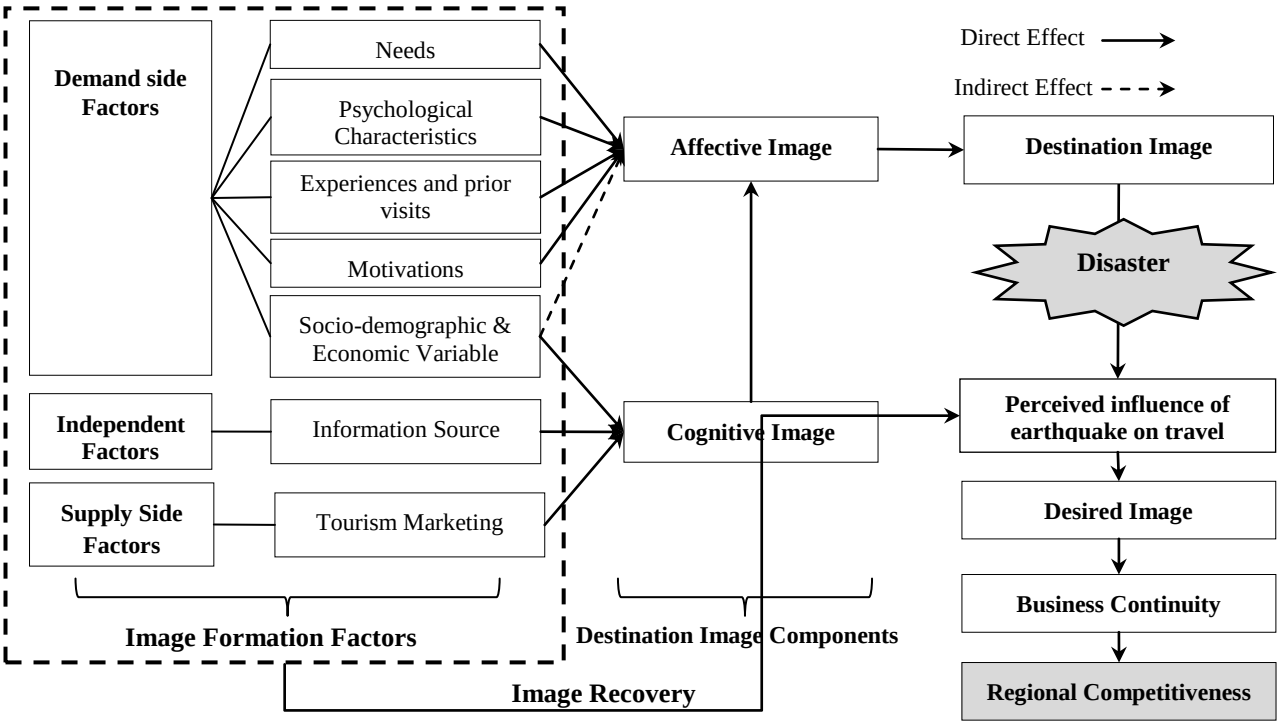

Fig. 3: Conceptual framework of the study based on destination Image concept

5 CASE STUDY

One of the ancient urban centers in Iran is located in Bam City with about two thousand five hundred years old. Due to be at the crossroads of important trade routes including Silk Road and Spice Trade Road and known for the production of silk and cotton garments, this city was of strategic importance. The cultural landscape of Bam and its Citadel, which is made entirely of mud bricks, clay, straw and the trunks of palm trees, is a significant symbol of the interaction of man and nature in a desert environment.

Bam tourism industry, a large income generating industry prior the 2003 earthquake, was an important driving force of regional economic development contributes to the employment generation and to the enrichment of many related industries.

After the earthquake, this industry was faced with a severe disorder. 90 percent Destruction in the citadel, as a showcase of Iranian architecture, due to the earthquake led to lose its place among the world's tourist attractive poles for several years; Although after the earthquake, citadel and historic perspective of Bam were simultaneously recorded on the UNESCO World Heritage List and the List of World Heritage in Danger, during the twenty-seventh session of the UNESCO World Heritage Committee, and placed in the center of international attention. Bam earthquake, despite all its' damages to the tourism sector, has made the largest international restoration workshop in this ancient city, due to the widespread absorption of foreign experts, including Japanese, German and Italian along with Iranian experts. Also, this earthquake has raised supports, credits and international attentions for restoration of the citadel.

5.1 Analysing the impact of Bam earthquake on tourism (situational analysis) and outlining the desire future

The Bam earthquake was centered approximately 10 km to the southwest of Bam. In terms of human cost, this earthquake ranks as the worst recorded disaster in Iranian history. Damage was concentrated in a relatively small area, of roughly 16km radius, around Bam-a tourist destination on the old Silk Road- famed for its 2,500 year old citadel Arg-e-Bam. The historic city center and fortress ruined. According to field reports, up to 95% of buildings collapsed within the ancient Bam citadel (Fig. 4).

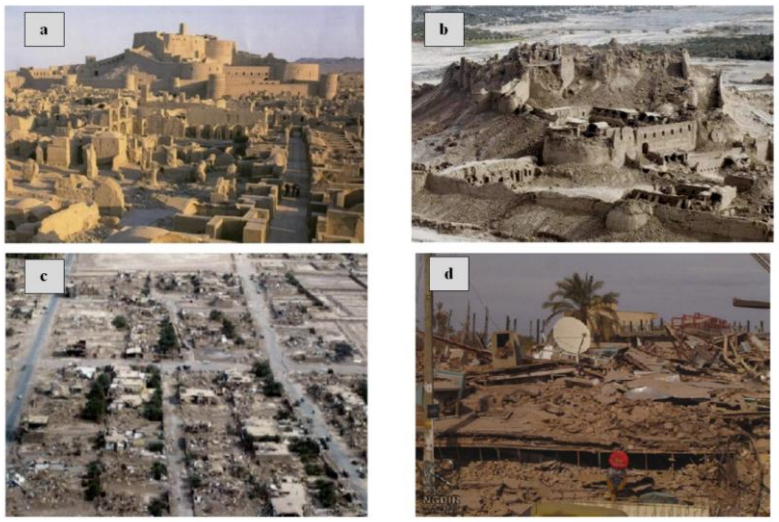

Fig. 4: Photo mosaic of the Bam Citadel and surrounding urban districts. (a) The Citadel before the earthquake struck; (b) the Citadel after the December 26, 2003 earthquake; (c) residential city blocks razed by the earthquake; (d) mud-brick houses reduced to rubble; Reference: (Adams and et.al. ?)

Also, studying the amount of active units by type and location status, based on official statistics published by the Statistical Center of Iran, shows the 88 percent destruction and 11 percent damage to the hotel and restaurant units and also 82 percent destruction and 16 percent damage to business units in Bam after the earthquake in 2003.

It is important to recognize that the impact of such a natural disaster affects not only the immediate communities, livelihood of local people, disruption of natural and built environment which are all important stakeholders at any given destination, but also the minds of the potential travelers. The later will need great attention in the recovery process.

Bam Citadel, one of the greatest monuments of Iran, was almost destroyed by the devastating earthquake on the morning of December 26, 2003. Since this year, in a period of several years, there was no registered visitor, according to official statistics published by the Cultural Heritage, Handicrafts and Tourism Organization of Kerman province.

The 2003 earthquake in Bam caused directly a 100 percent drop in tourist arrivals because of the formation of negative destination image. The ruinous Bam earthquake and the risk of another earthquake have made many tourists perceive that travelling to that region is dangerous and risky. This has caused a sharp decline in region's tourism income and has undermined the continuity of the destination business in future (Fig. 5).

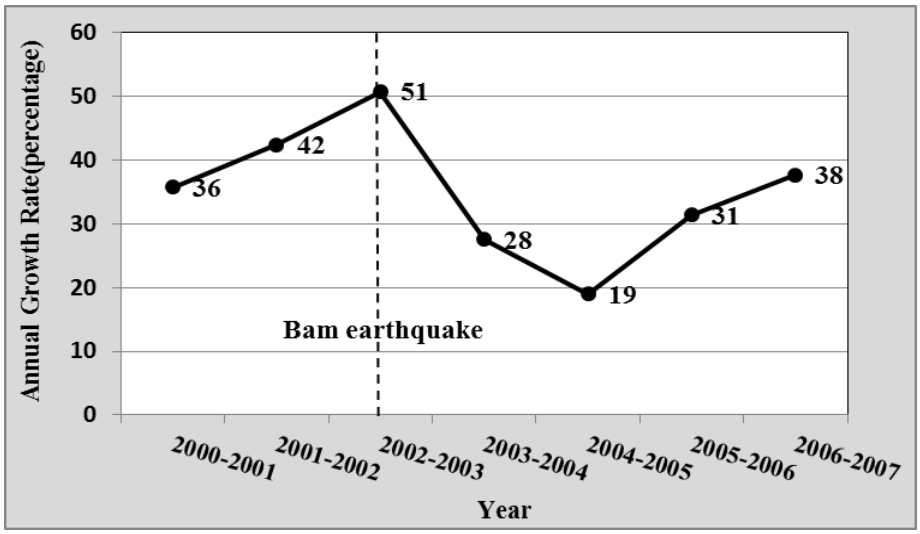

Fig. 5: Average annual growth rate of Bam tourism sector income before and after the 2003 earthquake due to authors analysis based on available official statistics (census data)

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So due to the importance of destination image in terms of its effects on Bam's tourist behavior and with acceptance of problem solving approach, the main goal of the Bam Business continuity plan is devoted to speed up recovery of the tourism sector by restoring traveller confidence in the region so that visitor flows resume as quickly as possible.

5.2 Developing tourism revival strategies

Tourism revival marketing strategies, for establishing a positive desired image or changing the existing image, would be presented in three main parts based on paper's methodology and situational analysis as the result of confronting internal and external factors (Table. 2): Destination-oriented or supply-side revival strategies, independent or intermediate revival strategies and perceiver-oriented or demand-side revival strategies;

(1) **Destination-oriented or supply-side revival strategies**

- Ensuring the sustainability of tourism products in the form of diversification and changing nature of tourism, after the disaster.

Post-earthquake development offers the opportunity to correct the mistakes of the past and make the re-emerging destinations among the best in the world in terms of environmental conservation and community involvement in the planning process. It also offers the chance to rethink and diversify the product offer so that destinations become more competitive in the global marketplace (WTO, 2005).

- Promoting participatory approaches and decentralized planning and programming for recovery;

As one of UNDP strategies, planning, programming and execution of local level recovery initiatives does not require the complex and time consuming impact and feasibility studies and planning processes of national level long-term reconstruction planning, enabling recovery activities to begin as early as possible after the disaster. Strengthening of community groups to stimulate involvement in planning process also makes them confident.

- Increasing economic benefits and employment opportunities for the local community and hence sustainable tourism.

Recovery activities should contribute to improving the living conditions of the affected communities and sectors through the revival of production (agriculture, industry), trade and services, and the creation of income-generation/employment opportunities. The goal should go beyond the simple restoration of pre-disaster levels, but aim towards the creation of more sustainable livelihoods for the population. This could be met by improving the living conditions of the affected communities and sectors in Bam through (WTO, 2005):

- employing local staff wherever possible by retraining programmes;
- The earthquake disrupted the employment of many of people. Retraining programmes are needed to help them find new jobs or to help update their skills while waiting for their former jobs to become available again. Likewise, new employees for the tourism industry need to be trained to replace those who perished and make them more efficient and competitive in order to raise service standards. Building leadership capacity and counseling for those in the tourism sector are also needed (WTO, 2005).
- helping small tourism-related businesses and employees survive the recovery period; Small and medium-sized tourism businesses in the Bam destination, such as restaurants, handicraft producers, have less access to recovery funds than large corporations, so assistance is urgently needed. In addition, many of these enterprises are family-based and may have lost family members in the earthquake. Technical and financial support is needed to help them resume business and increase competitiveness. In this thematic area one policy could be identification and assistance to small enterprises damaged by earthquake through grants and micro-financing.
- Making coordination plan;

Coordination commands would be prepared in this strategy. In reality, multiplicity of actors, national and international, requires improving/maintaining coordination; hence, promoting and initiating recovery activities have to avoid duplications and gaps and to optimize the resources available for sustainable

recovery. This could be satisfied through conceiving recovery as an integral part of ongoing developmental process at all levels: national, regional, and local.

- Making review, refine and maintenance plan in order to update and increase the usefulness of business continuity plan. Since business continuity plan such as cyclical process of strategic planning, requires continues update;
- Making Risk Management plan

To make Bam tourism destinations safer and more secure, risk management analysis will be conducted, with special attention to clear communication channels and increase cooperation between the tourism sector and public safety authorities. Training workshops will also be offered in risk and reputation management.

(2) **Independent or intermediate revival strategies**

- Capacity building to face effectively with negative traveling propaganda for tourism destination and recovering the confidence of the marketplace;

Clear, detailed and abundant information is a key factor to recover the confidence of the marketplace. Effective communications is needed on many different levels: government; business; tour operators; travel agents; the media; and the public. Special attention needs to be paid to travel advisories. The use of special events and development of new products is also needed to help speed the recovery process. In this thematic area policies could be (WTO, 2005):

- Organizing familiarization trips for journalists and tour leaders and
- hosting "hallmark" or "mega" events, involvement with travel writers
- Provide communications expert to help look for and disseminate positive news throughout the recovery period;
- Provide financing to enhance tourism website and email newsletter;
- Ensuring a stable integrated flow of information to consumers and operators.

Prevention of the malicious rumors spread, that cause harm to destination image, requires sustainable unified information flow for users and beneficiaries and making connection between publc and private actors, national and regional organizations and other groups. This could be met tough capacity building in governmental institution for facing effectively with negative advertisements against destination by means of:

- Establishing media center responsible for correct informing;
- Provision of effective contingency plans in order to damages controlling and informing interest groups;

(3) **Perceiver-oriented or demand-side revival strategies**

From a crisis management perspective, a crisis recovery system that is built upon better understanding of consumer psychology in the face of environmental changes can be more effective than one that is built upon suppliers frame of mind. In this relation Bam demand-side revival strategies are:

- Facilitating attraction of tourists all around the world that perceive less risk and are less concerned about travel when the risk of natural disasters:
- Trying to Absorb and motivate American and European visitors that feel more comfortable about earthquake.
- Applying attractive actions for alone and high educated visitors.
- Motivating high income visitors with lower risk perception.
- Meeting these strategies require recognition of their interests in defining tourism product; furthermore improving the diversity of tourism infrastructures and the quality of tourism facilities and services that is necessary for these groups of tourists.
- Changing nature of tourism to meet short term goals and business continuity in the age of reconstruction.

In this relation, disastrous tourism seems effective. Disaster tourism is used to designate tourism to sites of natural disasters (Robbi, 2008). Pottorff and Neal (1994) in their discussion of marketing implications for post-disaster tourism destinations posited that disasters sometimes actually attract visitors that may be curious about the damage left behind. This approach to utilize visitor's mass convergence tendency could be effective to tourists who are driven by novelty, curiosity and competence.

- Persuading visitors about destination safety and restoring confidence in the minds of potential visitors. Destination marketers should therefore ensure that messages communicated after the disaster are effective at persuading visitors that the destination is safe. Additionally, marketing messages should serve to defray any misinformation prevalent in media which has the potential to significantly affect the rate of economic recovery for the destination (Lehto, Douglas & Park, 2008).
- Presenting Bam's cultural landscape and enhancing the visitor experiences. This could be done through:
- Preparing educational programs;
- Organizing cultural programs such as local festivals and exhibition for both the local domestics and international tourists;
- Developing, publishing and marketing interpretation materials preferably unified in product line and quality with Bam identity (such as souvenir guide book, brochures and information leaflets;
- Improving site presentation and interpretation;

6 CONCLUSION

As shown in this paper, after 2003 earthquake and in the post recovery phase, Bam has benn facing not only with daunting task of reconstructing, but with rehabilitation and as one of the most important parts, image restoration. Devastated Bam's destination image caused serious problems in tourist viability due to rigorous earthquake influence on behavioral intention of visitors. Bam, as a city with considerable economic dependence on tourism related activities, needs to look seriously for feasible solutions in order to re-imaging destination and hence restoring region competitiveness and it's viability; So this paper tried to promote a revival strategies framework for continuing business after earthquake by means of SWOT situational analysis in the form of three image formation factors; since linking the perception changes of the traveler to the destination is important for destinations to effectively manage image formation and change.

As a result, this paper may contribute to the understanding of consumers' affective reactions towards a tourism destination and their influences on future visit intention and by providing a prescriptive list of functions dependent to destination or disaster characteristics can serve as a foundation for revival policy making of Bam in post-earthquake recovery. It also serves as a call for active research into issues relating to the effects of natural disasters on the consumers of the tourism product in the affected areas due to the importance of managing image and image recovery after a crisis situation; Since From a crisis management perspective, a crisis recovery system that is built upon better understanding of consumer psychology in the face of environmental changes can be more effective than one that is built upon suppliers frame of mind. So cognition of differnces between feasible solutions for revival marketing strategies based on tourists with different socio-demographic background is necessary.

Internal factors		
Image factors	**Weaknesses**	**Strengths**
Supply Side Factors	• The possibility of delisting of Bam by UNESCO because of Inability to control the informal settlement; • prolonged reconstruction because of shortage of credit among other national projects; • The 15-year period in the recovery projects due to the sensitivity and complexity of the reconstruction of Bam Citadel; • Disregarding of national institutions to the issue of tourism and crisis; • Lack of the awareness of the rebuilding process and the situation in Bam after the disaster; • Lack of proper policies in order to take necessary scientific and financial assistance of UNESCO for recovery projects; • Under-developed tourism and related facilities appropriate for high income and educated national and international visitors; • Poor preparation for facing another earthquake; • Lack of Active Tourism Controlling Authority; • Inadequate Marketing promotion strategies; • Absence of systematic management of the territory and poor Coordination among local, regional, national and supranational tourism authorities; • Under-developed tourism and related facilities appropriate for high income and educated national and international visitors; • Poor preparation for facing another earthquake; • Lack of Active Tourism Controlling Authority; • Inadequate Marketing promotion strategies; • Absence of systematic management of the territory and poor coordination among local, regional, national and supranational tourism authorities;	• Existence of dependency, economic and cultural sense of belonging and interaction with residents and natives of Bam; • Attractiveness of Bam as an outstanding example of a fortified settlement and citadel in the Central Asian region, based on the use mud layer technique combined with mud bricks; • Touristic attractions of Bam Citadel as promoting economic growth; • High degree of authenticity and integrity in Arg-e-Bam in spite of the severe damage incurred during the December 2003 earthquake; • Presence of an ensemble of exceptional testimonies to the development of settlements dating back to Neolithic times; • High degree of authenticity and integrity in Arg-e-Bam(citadel) in spite of the severe damage incurred during the December 2003 earthquake; • Presence of an ensemble of exceptional testimonies to the development of settlements dating back to Neolithic times;
Independent Factors	• Lack of media coverage and Problem with inquisitive visitors;	-
Demand side Factors	-	-
	External factors	
	Opportunities	**Threats**
Supply Side Factors	• Bam registration on the UNESCO World Heritage List and the List of World Heritage in Danger after the earthquake, in 2004, as a factor to absorption of international attention; • Creating opportunities to Modernize and develop of regional economic basis; • Opportunity to correct the mistakes of the past and making fundamental changes; • Having chance to rethink and diversify the product offer so that destination becomes more competitive in the global marketplace; • Drawing the attention of the world to Bam and its cultural landscape as opportunities for economic development of the region; • The inscription of Bam and its cultural landscape on the world heritage list; • Revealing much of the archaeology in the Bam area after the 2003 earthquake; • Attraction and mobilization of international scientific, technical and financial aid and credits for renewal of historic buildings and sustainable development of tourism through UNESCO, Japan and Italy; • Bam Citadel as the largest international workshop for historic restoration experts & scholars and archaeologists from around the world; • Creation of the potential for tourism development with natural crises; • Appearance of the skills and new job opportunities related to reconstruction of the city;	• Destroying about 90 percent of the citadel and Impossibility of visiting from all parts of it; • Increase in population and social instabilities caused by migration of natives and immigration of non-native people to the city; • Reduction in safety and environmental comfort as a factor to outgoing of local capital; • Reduction in regional competitiveness ability; • Formation of negative perceived image in potential travelers regarding safety and security Instability and as a consequence sudden fall in the number of visitors; • Increase in unemployment rate with finalization of post-earthquake reconstruction; • Existence of open work sites where relatively few structures have been completed;
Independent Factors	• Increasing global attention to Bam area through the media;	• Lack of real knowledge between autonomous agents about Bam's situation that has caused a more dramatic change in image; • Negative Messages communicated after the disaster by high creditable medias have access to mass crowds;
Demand side Factors	• Less influence of the earthquake on American and European visitors' travel intention; • Less influence of earthquake on high-income tourists' intention; • Lower earthquake risk perception in educated tourists; • Lower perceptions of natural disasters in alone people; • Presence of visitors that are curious about the damage left behind the disasters;	• Perception change, specially in low-income visitors, Asian visitors and low-educated tourists; • Presence of further seismic action that contribute to a feeling of insecurity and uncertainty;

Table. 2. The summary of Bam situational (SWOT) analysis after 2003 earthquake Reference: Authors analysis based on (Iranian Cultural Heritage, handicraft and tourism organization & UNESCO, 2008) and other information sources

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Toward Mixed-Use Communities by Transit-oriented development (TOD) in the United States

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1 ABSTRACT

Increasing social and environmental damages is certainly related to current urban forms. The linkage between low-density, separated-use development and increasing travel is undeniable. In order to recent concerns about today needs of cities and their future, Transit-oriented development (TOD) has rapidly emerged as one of the popular urban planning paradigm in the world. It seeks to maximize access to mass transit and non-motorized transportation with centrally located public transportation system surrounded by relatively high-density commercial and residential development. Therefore this strategy can improve quality of life in urban areas and encourage more compact development. In essence, TOD means the creation of denser, mixed-use activity nodes connected by high quality public transportation. TOD can enhance quality of life in urban areas at the same time provide benefits for individuals, communities and developers.

Transit-oriented development in the United States has gained wide acceptance among all of the policies and strategies that the federal and local government have adopted to respond to challenge of rapid social, environmental, economic, technological and cultural changes which citis are facing. To understand more about Transit-oriented development, this study presents details about definition and typologies. It also included key actors involved in TOD projects and their goals. Current scope of TOD and implementation tools in the United States are being discussed and the following key issues are associated with the recognition of TOD benefits and barriers in the United States. In order to creat compact development and mixed-use communities according to key TOD components, some strategies about implementing TOD in the cities of the world and specially the United States follow at the end.

2 INTRODUCTION

2.1 Definition of Transit-oriented development

There is no universally accepted definition of TOD because development that would be considered dense, pedestrian-friendly, and transit-supportive in a middle-size city in the Midwest would be viewed quite differently in the heart of Manhattan or the District of Columbia. Some authors use the term TOD quite liberally, referring to any form of "transportation-oriented¬¬¬ development", including bus and rail oriented development as well as development along freeways (Lefaver,1997). This review takes a narrower definition, referring to development near or oriented to mass transit facilities.

The following represents a sample of TOD definitions found in the literature:

- "Development within a specified geographic area around a transit station with a variety of land uses and a multiplicity of landowners" (Salvensen,1996)
- "A mixed-use community that encourages people to live near transit services and to decrease their dependence on driving" (Still,2002).
- "Moderate to higher density development, located within an easy walk of a major transit stop, generally with a mix of residential, employment, and shopping opportunities designed for pedestrians without excluding the auto. TOD can be new construction or redevelopment of one or more buildings whose design and orientation facilitate transit use" (California Department of Transportation,2001).

Less universally subscribed to, though found in some definitions of TOD, are the following traits:

- Compactness
- Pedestrian- and cycle-friendly environs
- Public and civic spaces near stations
- Stations as community hubs (Cervero,2002,P5)

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Traditional Transit-Oriented Development is designed so that residents can live, work, shop, and recreate in the same area. A TOD resembles a small, walkable neighborhood focused around a regional transit station. The transit stop (rail or bus) is the main focal point of the development and is immediately surrounded by high-level densities of commercial, office, and residential properties. The transit stop serves as the regional connection for the development as well as the connection to the urban center to which people commute. To maximize access and land-use efficiency, the transit stop is connected to vehicular, bicycle, and pedestrian traffic. As one walks further from the transit center, the building density decreases and becomes more uniformly residential. Density still remains higher than typical suburban densities to centralize the population and maximize land uses (Rappahannock Rapidan Regional Commission,2006).

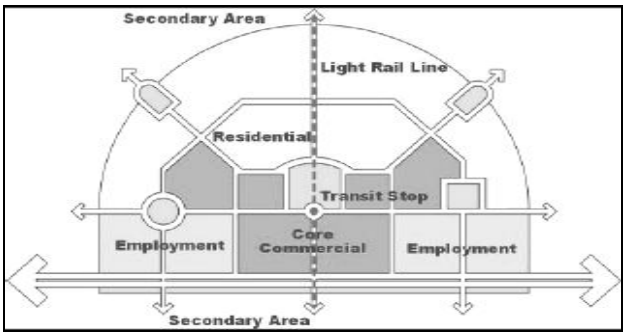

Fig. 1: Transit-oriented development Model

2.2 Transit-oriented development Typologies

City planners used a TOD typology to indicate the desired mix and intensity of development at specific transit stations and to show that not all stations will be built in identical patterns. This helped residents understand that their existing neighborhoods would change only modestly and signaled to developers where the city planned to support intensive, new TOD (An Issue Paper of the American Planning Association, 2007). The following table describes TOD typologies that should be considered in the United States:

Typology	Characteristics
Urban-Downtown	• Civic and cultural centres • Multiple transit lines and transfer points
Urban Neighbourhood	• Moderate to high density (>30 du per acre) • Extension of downtown street system • Shopping along a central street • Key crossroads • Usually more affordable housing • High pedestrian activity • Sometimes historic districts adjacent to downtown
Suburban Neighbourhood	• Opportunity for higher density and redesign • More commuter focused • Some retail and commercial in existence, but limited
Neighbourhood Transit Zone	• Mostly residential • Some shopping with limited retail or office space
Commuter Town	• Freestanding, with commuter service to downtown • Station area may be a “main street” with retail, offices, residential • Supports peak hour service but needs parking
University Centre	• Pedestrian and bike environment • Needs sidewalk and shuttle bus connectivity to student activity • centres, sports complex and libraries
Regional Town Centre	• Shopping centre, with ample auto access • Will require careful connectivity • Land use changes will likely be needed • Infill opportunities to make the area 24 hour

Table 1: Transit-oriented development Typologies

2.3 TOD Actors and Their Goals

A number of possible goals associated with each of the actors involved in TOD projects are shown in Table 2. Many of these goals-such as maintaining a high level of station parking and maximizing pedestrian access to the station-conflict with each other. Even a single actor may have goals that are incompatible, or at the very least, that require careful balancing if they are to be reconciled. Many of the incompatibilities reflect the basic tension between place and node.

Actor	Possible Goals
Transit Agency	• Maximize monetary return on land • Maximize ridership. • Capture value in the long term
Riders	• Create/maintain high level of parking • Improve transit service and station access • Increase mobility choices • Develop convenient mix of uses near station
Neighbours	• Maintain/increase property values • Minimize traffic impact • Increase mobility choices and access to transit, services and jobs • Enhance neighborhood livability • Foster redevelopment
Local Government	• Maximize tax revenues • Foster economic vitality • Redevelop underutilized land
Federal Government	• Protect “public interest” and set limits on federally-funded investments
Developer/Lender	• Maximize return on investment • Minimize risk, complexity • Ensure value in long term

Table 2: TOD actors and their goals

3 TRANSIT-ORIENTED DEVELOPMENT IN THE UNITED STATES

Transit-oriented development (TOD) has attracted interest as a tool for promoting smart growth, leveraging economic development, and catering to shifting market demands and lifestyle preferences. TOD is viewed and defined differently throughout the country, with its most common traits being compact, mixed-use development near transit facilities and high-quality walking environments. Joint development is a form of TOD that is often project specific, taking place on, above, or adjacent to transit-agency property. The results of a national survey suggest that the principal aim of TOD and joint development is to boost ridership and, thereby, boost revenue income. Community economic development and broader smart-growth agendas are secondary objectives.

A rich mix of TOD can be found across America today, and all indications are that the numbers and types of TOD will grow in years to come. Over 100 TOD projects currently exist in the United States, found overwhelmingly in and around heavy-, light-, and commuter-rail stations. While typically nodal in form, TOD corridors have taken or are beginning to take shape. In addition, over 100 joint development projects today exist on, above, or adjacent to U.S. transit-agency property. The most common joint development arrangements are ground leases and operation-cost sharing. Most often, joint development occurs at rail stations surrounded by a mix of office, commercial, and institutional land uses. However, examples of public-private joint ventures can be found among bus only systems as well, normally in the form of joint intermodal transfer and commercial-retail space at central-city bus terminals.

Many voices shape the practice of TOD in contemporary urban America. A multi-layered, sometimes complex institutional and political environment has evolved that ensures accountability and instills a degree of responsibility and fairness into the decision-making process, but this environment can also form roadblocks to implementation.

The spectrum of participatory roles transit agencies can take on are wide-ranging— from roles as modest as providing technical guidance (e.g., transitsupportive design guidelines) to those as ambitious as being the self-anointed lead developer. Most transit agencies get involved in land-use affairs (broadly defined); however, they generally limit their involvement in TOD matters to interagency coordination. Most TOD

work concentrates on public outreach and education. A common method for drawing public input into the TOD planning process is organizing design charrettes—ranging from multi-day workshops led by professional designers to facilitated community discussions (inspired by the successes at the Pleasant Hill BART station in the San Francisco Bay Area and along the Wasatch Front under the guidance of Envision Utah). Local governments wield considerable control over TOD outcomes through zoning ordinances and building codes. Some states, notably California and New Jersey, have sought to jump-start TOD through transit village initiatives that critics view as mere window-dressing since little funding support is provided.

4 TOD IMPLEMENTATION TOOLS IN THE UNITED STATES

TOD implementation ideally starts with a vision, cultivated from broad-based public input, and proceeds to strategic station-area planning backed by appropriate zoning as well as policy incentives and regulations. Around half of surveyed transit properties in the United States state that their regions have a vision, policy, or plan in place that embraces TOD principles.

Overlay zones are the most common means of controlling land uses, densities, and site designs of TOD. Overlays, often introduced on an interim basis to head off automobile-oriented uses that might compromise a TOD, usually specify desired land uses as-of-right, such as housing and convenience shops. For urban TODs, densities of 20 to 30 dwelling units per residential acre and FARs of 1.0 and above are not uncommon. Some of the more progressive TOD zoning districts also lower automobile parking requirements and sometimes even set bicycle parking mandates.

The national survey of U.S. transit agencies revealed that besides standard zoning, the tools most frequently used to leverage TOD are funding for station area planning and ancillary capital improvements; the introduction of density bonuses, sometimes used to encourage the production of affordable housing units; and relaxation of parking standards. These measures, moreover, received high marks in terms of their overall effectiveness among transit professionals who responded to the survey. Next in the order of frequency of usage have been land-based tools, like land purchases on the open market (for land-banking and potential "deal-making") and assistance with land assemblage. For the most part, redevelopment agencies have applied these tools, meaning their role in leveraging TOD has been mainly limited to economically depressed or blighted neighborhood settings. Because of the higher risk involved, redevelopment tools have often been accompanied by other funding sources, sometimes with a dozen or more participants involved in the process.

Implementation strategies that are procedural in nature, like expediting entitlement reviews and excluding TODs from concurrency requirements, have been applied less often in practice and are also viewed by public-sector interests as less effective than other measures in jump-starting TOD. This view, however, does not square with that of many TOD developers. In terms of what metropolitan planning organizations, state departments of transportation, and the federal government might do to help implement TODs, respondents from the local levels stated loudly and clearly that what is most needed is money—specifically for strategic station-area planning, infrastructure, and on-the-ground improvements. Smart-growth legislation that targets state infrastructure and urban renewal grants to transit station areas (such as that in Maryland) is also looked upon favorably by local interests. Regulations like concurrency requirements, on the other hand, generally received low grades among

survey respondents from the local level. For financing streetscape and other ancillary improvements around transit stations, monies have mostly come from federal and state grants such as the Transportation and Community System Preservation Pilot Program under the Transportation Equity Act for the 21st Century (TEA-21). The most common sources of non-grant funds used to leverage TOD are individual investor funds and nonprofit/foundation funds.

Many cities, counties and state/federal agencies across the United States are achieving TOD in their jurisdictions, using a variety of implementation tools. A number of implementation "best practices" have emerged, which are outlined below.

4.1 Provide a Vision for TOD and Keep Focused on the Long Term Vision and Interim Development

A comprehensive, strategic vision establishes TOD as a key element of a City's overall land use and mobility plan. The vision encompasses broader city-wide land use and development goals, as well as performance expectations for future development around transit stations.

Full build out of many station areas may take decades to complete. A commitment to the long term vision is necessary. However, timely plan re-assessments may be needed to facilitate small, incremental development opportunities which still contribute to long term goals.

Establish guidelines for "interim" developments that will maintain the long term vision for the station area is also necessary. Interim development can be used to provide key public infrastructure, identify future development patterns and establish quality pedestrian environments. Interim uses that prematurely fragment land or create negative external impacts that discourage TOD opportunities are avoided.

4.2 Build Community Support for Public and Private Participation

A broad understanding and acceptance of TOD is important. Community wide information and education programs should be promoted. Planning processes that involve neighbourhoods, elected officials, land owners and the development industry can create a TOD program that is supported and will be implemented.

The participation of both the private sector and local government is important in reducing project risk. Foremost, it is governments and transit authorities that will encourage supportive land use policies that facilitate TOD. Secondly, there are typically large public land holdings around transit stations. These lands can be leveraged to reduce developer risk, speed development timing and ensure other public benefits are achieved through TOD.

4.3 Identify Priority Transit Station Area Plans and Market Responsive

Wherever there is an LRT[1] station there is an opportunity for TOD. However, the market is not limitless. Identify priority stations where there is market interest, sufficient land and a reasonable opportunity for success. Focus attention at these priority stations to ensure early TOD projects are successes.

Individual stations need specific plans that recognize local market strengths, site opportunities and community interests. These plans will outline clear goals for TOD at the individual station and provide guidelines for land use, density, public systems, urban design and parking management.

TOD plans will only be implemented if they can entice the local real estate market to build. Development industry participation in preparing station area plans, land use mixes and marketing strategies is essential. Station area plans need to provide flexibility to allow the market to evolve, adapt to this new form and ultimately flourish.

4.4 Financing and Incentive Strategies and Eliminate Roadblocks

TOD and mixed use development provide financing challenges. Creative solutions have often been needed to make it happen. In many U.S. jurisdictions federal grants, tax incremental financing, public-private partnerships, joint ventures and "Location Efficient Mortgages" have been used to encourage development. Local governments also provide density bonusing, key public infrastructure and reduced approval timelines as incentives for TOD.

TOD is a unique and emerging form of urban development. It is one that many developers are not willing to risk. Often cited reasons for this uncertainty are difficulty in obtaining financing, lack of clear policy direction, lengthy approvals processes and NIMBY-ism[2]. Municipalities help reduce this risk by ensuring planning policies, zoning and approvals processes are in place to eliminate roadblocks and reduce timelines.

5 BENEFITS OF TRANSIT-ORIENTED DEVELOPMENT IN THE UNITED STATES

A recent study, "Factors for Success in California's Transit-Oriented Development", commissioned by the California Department of Transportation, identified the following 10 potential benefits of TOD. The study cites research showing that TOD can have the following benefits.

[1] Light Rail Transit

[2] NIMBY or Nimby is an acronym for the phrase "not in my back yard". The term (or the derivative Nimbyism) is used pejoratively to describe opposition by residents to a proposal for a new development close to them.

5.1 Economic Benefits

- Increase households' disposable income. Housing and transportation are the first and second largest household expenses, respectively. TOD can free-up disposable income by reducing the need for more than one car and reducing driving costs, saving $3000-$4000 per year.
- Play a role in economic development. TOD is increasingly used as a tool to revitalize aging downtowns and declining urban neighborhoods, and to enhance tax revenues for local jurisdictions.

5.2 Environmental Benefits

- Reduce rates of vehicle miles traveled (VMT). TOD can lower annual household rates of driving 20–40 percent for those living, working, and shopping within transit station areas.
- Reduce air pollution and energy consumption rates. By providing safe and easy pedestrian access to transit, TOD allows households to lower rates of air pollution and energy consumption. Also, TODs can help households reduce rates of greenhouse gas emissions by 2.5 to 3.7 tons per year.
- Conserve resource lands and open space. Because TOD consumes less land than low-density, auto-oriented growth, it reduces the need to convert farmland and open spaces to development.
- Decrease local infrastructure costs. TOD can reduce costs for water, sewage, and roads to local governments and property owners by up to 25 percent.

5.3 Social/Community Benefits

- Provide mobility choices. By creating "activity nodes" linked by transit, TOD provides important mobility options, very much needed in congested metropolitan areas. This also allows young people, the elderly, people who prefer not to drive, and those who don't own cars the ability to get around.
- Increase public safety. By creating active places that are busy through the day and evening and providing "eyes on the street", TOD helps increase safety for pedestrians, transit-users, and many others.
- Increase transit ridership. TOD improves the efficiency and effectiveness of transit service investments by increasing the use of transit near stations by 20 to 40 percent, and up to five percent overall at the regional level.
- Contribute to more affordable housing. TOD can add to the supply of affordable housing. It was recently estimated that housing costs for land and structures can be significantly reduced through more compact growth patterns (Cervero,2002).

6 BARRIERS TO TRANSIT-ORIENTED DEVELOPMENT IN THE UNITED STATES

The literature sorts barriers to TOD into three basic categories: fiscal (factors that detract from the financial feasibility of TOD projects, such as questionable market viability and lack of conventional financing); organizational (structural impediments lodged in the institutional fabric of transit agencies and other governmental entities responsible for projects); and political (land-use policies and NIMBY forces that impede multifamily housing and infill development more generally). Of course many barriers are interrelated automobile-oriented development patterns form barriers to TOD in large part because overcoming them raises costs and political flak.

6.1 Fiscal Factors

The market viability of the housing product is questionable. The market for high density housing is thought to be soft due to consumer preference for low density living. There is often a lack of conventional financing. Transit-based housing is a largely untested market. Markets fluctuate and the market demand for each element of a mix of uses seldom follows the same cycles (Bernick and Cervero,pages 139-140). For example the recession of the late 80s to early 90s hurt the office market.

6.2 Institutional Factors

The public transportation institution itself is part of the problem. The culture inside many transportation authorities is focused on operations keeping the wheels rolling. Land development in those cases is not

considered to be part of the core business. The skills required to be effective are outside of traditional transit planning expertise. The goal of using land use policies to boost ridership represents a major shift in American transportation planning. Prior to the mid- 1980s, transportation planners rarely sought to influence travel behavior by manipulating land use patterns. Furthermore, rail systems by their nature involve several stations, often in multiple jurisdictions and land use authorities. This level in intergovernmental land use policy coordination, while found in other nations, is not typical of American planning. Thus both in intellectual disposition and in the required amount of coordination, TOD is a departure for transportation planning in the United States (Boarnet and Compin,page 1). The public transit institution has been slow to adopt new policies, play new roles, and use new tools (Cervero,2002).

6.3 Political Factors

Local governments prefer retail developments at stations because of the sales tax revenue. Ironically, some governments oppose retail development at stations in order to protect other commercial areas in town such as the traditional central business district (Bernick and Cervero,page 195).

High-density housing usually increases demand for schools, city services, and public streets (Bernick and Cervero,page 140). TOD is not a priority in jurisdictions with other pressing problems such as crime and poverty (Bernick and Cervero,page 285).

There is often NIMBY political opposition. Ironically, this phenomenon can take the form of resistance to high density housing in more affluent communities where the concern is to protect against decline caused by those of a different race and class; and in less affluent communities where the concern is to protect against gentrification by those of a different race and class (Anastasia Loukaitou-Sideris, "Transit-Oriented Development in Integrating Rail Transit, Land Development And Telecommunications Mineta Transportation Institute).

7 KEY STRATEGIES FOR IMPLEMENTING TOD IN THE UNITED STATES

A review of practices from cities across the United States indicates that TOD is a unique form of urban development. How a station area is planned and developed will depend on the particular attributes of that station and surrounding community. However, the following key strategies are commonly found to be critical to the success of any transit-oriented development.

7.1 Get the Land Uses Right

- Ensure transit supportive uses: Transit supportive uses are high pedestrian generators that directly promote greater transit ridership. They also provide opportunities for multi-purpose trips that can be made as a pedestrian. Medium to high density residential, offices, high schools and colleges are significant transit supportive uses. Appropriate retail, restaurants, personal service and civic functions will support these major uses and generate activity in both peak and off-peak hours.
- Discourage non-transit supportive uses: Non-transit supportive uses generate little or no ridership. They consume large areas of land, or create bleak or unsafe environments for pedestrians. They are often dependent upon a vehicle for transporting goods, or require significant land areas for low intensity development and parking. Large format wholesale stores, warehouse storage, car dealerships, auto service centres and regional sports fields are examples of uses that are not transit supportive.
- Encourage a mix of uses: A mix of residential, office and supporting services in station areas can generate transit trips throughout the day. It provides opportunities for people to live closer to their jobs or to take advantage of reverse flow transit capacities. Workers can run daily errands within walking distance of their jobs; transit riders can access convenient services while at the station. Residents and visitors can continue a variety of activities in off-peak times.
- Locate the uses as close to the LRT station as possible: Locating a majority of transit-supportive uses within a 400 to 600 m walking distance of the LRT station makes transit the most convenient and attractive travel mode for the site.

7.2 Promote Density

- Promote density: Development densities are "as great as possible" within the context of a particular station and surrounding community. Minimum residential densities around rail stations are high enough to support higher frequency transit service and to foster lively, walkable communities. Housing forms include townhouse, walk-up apartment and high-rise buildings. Minimum employment densities are established in station areas to create a destination which generates transit trips.
- Density concentration and transition: The highest densities are ideally located closest to the station, to optimize transit rider convenience. This includes high-density housing and offices. Intensity of development can taper off away from the station, to create an appropriate transition and interface with the surrounding community.

7.3 Create Convenient Pedestrian Connections

- Walking distances are to be short: Pedestrian routes between the station and key destinations are short and direct. Key destinations are located within a 400 to 600 meter radius of the station. Circuitous routes are avoided.
- Pedestrian connections are to be continuous: Sidewalks and pathways are continuous routes that are easy to find and follow. Major connections to the station for pedestrians and bicycles are constructed at the outset. Routes are universally accessible to wheelchairs, strollers, scooters and other mobility aids.
- Accesses are to be direct: Sidewalks connect directly to the entrances of the station and buildings. Bus stops are located as close as possible to building entrances. Walking distances from the station to the nearest bus stop are generally shorter than the distance to the nearest parking space.
- People are to be at street level: Pedestrian routes are at ground level, with minimal stairs and grade changes. Adjacent buildings provide "eyes on the street" and informal security here. Pedestrian routes are located on public streets unless there are good opportunities to tie in to a safe, existing above-grade system.
- Separate vehicular and pedestrian functions: Vehicular and pedestrian ways are designed to minimize points of conflict. Sidewalk and pathway routes have as few driveway or parking lot crossings as possible.

7.4 Ensure Good Urban Design

- Create high quality streets: A pedestrian-friendly street is visually interesting and makes walking enjoyable. Trees, landscaping, wide, separate sidewalks and on-street parking protect people from vehicle traffic and create a pleasant pedestrian zone. Benches provide places for people to rest.
- Make the most of architecture: Architectural variety on the lower three to four storeys can define an interesting public realm. Articulated building facades incorporate attractive windows and varied architectural elements, and are built to the sidewalk. Upper floors of tall buildings can be set back to allow sunlight to reach the street and help reduce the sense of scale of the building.
- Relate the ground level to pedestrian uses: Foot travellers tend to relate to the ground storey of buildings. This level accommodates residential units, building entrances and retail shops oriented to the sidewalk. Surface parking lots, parkade accesses and blank exterior walls are limited along major pedestrian streets.
- All season design: Where possible, pedestrian connections and transit waiting areas provide weather protection in the form of awnings, building projections and colonnades. Ample enclosed shelters make waiting for transit more comfortable.
- Lighting, landscaping, and signs: Stations are well-lit and designed to accommodate "around-the-clock" activity. Landscaping features can define special precincts and encourage transit patrons to linger and explore the station area. Convenient and legible signs orient visitors to buildings and activities around the station.

7.5 Create Compact Development Patterns

- Compact Street Network: Frequent, interconnected streets increase the efficiency of transit circulation and offer more choices for pedestrians. Blocks of 100 to 150m in length keep walking distances short and provide alternative route options. A gridbased street pattern offers multiple accesses to the station and forms the overall development framework for long term transit supportive uses.

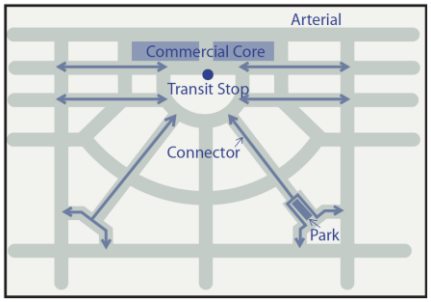

Fig. 2: Compact Street Network

- Cluster buildings: Buildings that are grouped together, or clustered, offer a "one-stop" opportunity to conveniently access a variety of destinations on foot. Clustered buildings can frame distinct character areas and create an easily navigable walking environment.
- Leave room to grow: Buildings can be thoughtfully sited on a property to accommodate future intensification. Placing buildings to one side of a parcel, instead of in the centre, leaves sufficient land that can be developed later. This will allow an initially low density area around an LRT station to intensify over time.

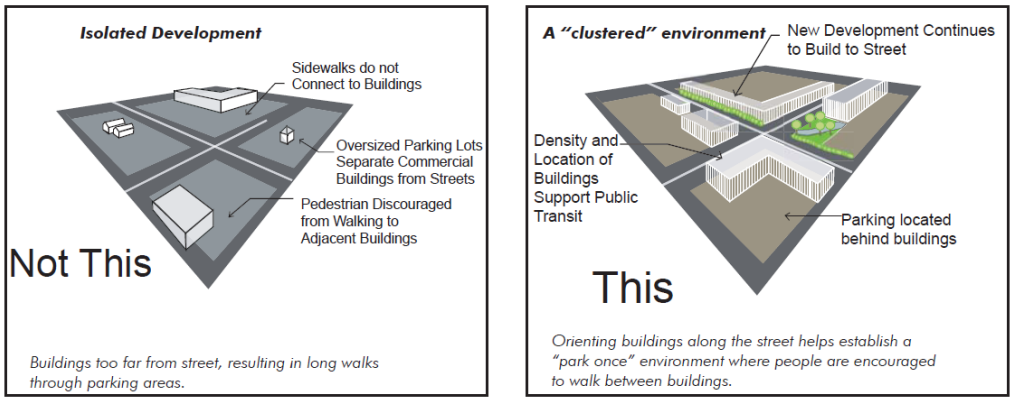

Fig. 3: Clustered Environment not Isolated Development

7.6 Manage Parking

- Accommodate the automobile: By design, TOD lessens the need for automobile use in a station area. However, accommodating vehicles is still critical to the success of a vibrant TOD district. Convenient parking and drop-off zones need to be planned for in all station area plans.
- Parking - enough, but not too much!: TOD provides an opportunity to reduce the amount of parking in the station area through increased transit riderships, reduced residential vehicle ownership and shared off-peak parking at public Park & Ride sites. Setting both minimum and maximum parking standards can help ensure the success of a station area as well as optimize transit ridership.
- Locate parking to the rear and sides of buildings: Parking lots are located at the periphery of the station area and to the rear or sides of buildings. This keeps the station and building entrances oriented to the sidewalk and to pedestrian users.
- Smaller parking lots: Surface parking areas do not overwhelm a station area. Larger parking lots can be divided into smaller lots and separated by landscaped walkways. These smaller lots also create an internal movement network and establish a framework for longer term intensification.

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- Phased parking from surface lots to structures: Structured parking consumes less land than surface parking and allows maximum development. Station areas are designed to allow for the evolution of parking from surface lots to parking structures. If parking structures are located along key walking routes, they can enhance the public environment with pedestrian-friendly facades.
- Bicycle parking: Bicycles can extend the local commuting range beyond the typical 600 m. Ample, convenient and secured bicycle storage locations are provided at each station, close to the entrance of the transit station.

7.7 Make Each Station a "Place"

- Create a Destination: A transit station is a destination in its own right, as well as a gateway to the rest of the city. A station area with a collection of unique places will attract visitors, while also serving transit patrons and the local community.
- Make buildings landmarks: Landmarks create notable places and aid in local wayfinding. LRT stations and other significant buildings with distinctive design elements can make the area attractive and memorable.
- Sightlines and views: Sight lines to and from the station help orient pedestrians to their surroundings. Views are critical for pedestrians to find their way. Sight lines can be terminated by important features such as the station, a community building, monument or public art.
-
- Orient buildings to the street: Buildings that are adjacent to and overlook public areas create a visually interesting and safer pedestrian environment. Buildings oriented towards the street edge can enclose important vistas and shape the public realm.
- Public open spaces: Open spaces near an LRT station emphasize the station as a public place. They provide comfortable waiting and drop-off areas for users and act as central activity and gatherin points for the local community. The station area can be strategically punctuated with sm parks or plazas, which might incorporate fountains or other landmark features.

8 CONCLUSION

There is considerable evidence that interest in transit-oriented developments is on the rise in the United States. Transit Oriented-Development shifts the focus from diffuse, automobile-oriented development to denser, mixed-use neighborhoods centered around transit station. TOD can have a myriad of social, environmental and economic benefits for people and communities, from reduced costs of living, better access to jobs, and economic growth, to healthier lifestyles and, through reduced automobile use. transit-oriented development is still challenged by a lack of public and private financing and adequate policies and legislation to encourage TOD construction.

The wise use of land around LRT stations and high volume bus stops is one approach to help the United States achieve its smart growth objectives. Strategically planned station areas help promote the economic, social, and environmental well-being of a city by:

- Highlighting transportation alternatives and increasing transit ridership
- Taking advantage of non-peak direction transit capacity
- Decreasing auto dependency and exhaust emissions
- Using serviced land efficiently to help create a more compact urban form
- Making better connections between jobs and housing
- Revitalizing commercial corridors and older communities
- Providing market housing in a variety of forms and price ranges
- Creating opportunities for affordable housing
- Providing increased neighbourhood and travel options for those not owning cars
- Making identifiable and walkable neighbourhoods

- Creating more street activity and a safer station environment
- Acting as a catalyst for private investment and development
- Increasing assessment values of vacant and underused land

The desire to coordinate the planning of land use and transit investment is a growing trend across the United States. Many cities and regions are promoting better use and intensification of land around major transit facilities as a means to achieve a number of their broader planning goals.

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Traffic Impact Analysis as a Tool for Planning Permiot Considewration in Lagos, Nigeria: Guidelines and Procedures

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1 ABSTRACT

This research based paper reviews the statutory requirements of developmental projects approval process and makes a case for the preparation of Traffic Impact Analysis (TIA) as a separate and distinct study for deserving proposed projects because of the pervasive nature of traffic. Because the Environmental Impact Analysis (EIA) report as one of the requirements for planning approval is required to cover such diverse issues as the socio-economic environment and the ecological character of the project, among others, the depth of impact measurement on each is often not detailed enough. This is more germane in such areas as the impact of the proposed project on traffic and transportation which represents a major challenge in a metropolis such as Lagos, as traffic remains the most concealed component of the Impact Analysis of any new development project. This paper posits that the impact of certain project on traffic and transportation is too far reaching to be subsumed under a generalized EIA study. This paper therefore recommends the inclusion of traffic impact analysis report as a statutory inclusion in the portfolio submitted for development approval process in Lagos. The paper advocates the need for the urgent enactment of necessary legislation to make this an obligation and also spells out the procedures and guidelines for its preparation.

2 INTRODUCTION

Approval for proposed development projects in Lagos statutorily requires developers, whether private or government, to prepare and submit alongside their proposals, an EIA report while applying for a development permit (LASG 2005). An Environmental Impact Analysis (EIA) report characteristically spells out the characteristic and conditions of the proposed project environment along physical, social, cultural, economic and aesthetic dimensions with a view to providing the baseline against which to measure real and potential impacts and changes to the environment arising from the execution of the proposed project: the nature of the projects in terms of its components, services to be rendered, end-users, sources and nature of wastes and associated problems: the nature and magnitude of environmental changes attributable to project activities and appraise their impact, positive and or negative, on the totality of its environment: and suggestion on how observable anticipated impacts could be ameliorated or managed in the light of available technology and within legislative limitations in order to eliminate or reduce the potentially significant environmental consequences as a way of achieving the objectives of environmental protection and sustainability.

Broad review of available EIA reports generally has revealed the contents of most of such reports to be too broad and the depth on specific issues considerably shallow. Because EIA reports are required to cover such diverse issues as the socio-economic environment and ecological character of the project, among others, the depth of impact measurement on each is often not detailed enough. This is more germane in such areas as the impact of the proposed project on traffic and transportation which represents a major challenge in a rapidly growing metropolis such as Lagos.

Traffic remains the concealed component of the impact analysis of any new development project. Therefore the impact of certain projects on traffic and transportation is too far reaching to be subsumed under a generalized EIA study. Till date, very few proponents, if any, of development projects in Lagos including major traffic generators like major shopping centers, new terminal facilities and large scale housing development projects; conducted and prepared a traffic impact analysis in order to obtain development permit. So far, a TIA study has not been requested as part of the portfolio that a developer must summit to approving agencies before building permit for a new development project is issued. Therefore this paper advocates the need for the preparation of TIA as a separate exercise for certain specific types of development projects. The paper justifies the need for enactment of necessary legislation and also spells out the procedures and guidelines for the preparation of a Traffic Impact Analysis

TIA should by law be a separate but integral document to be delivered alongside others for granting building permits for projects and uses of specified types and sizes.

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3 LITERATURE REVIEW

Public interest in issues that concern the environment and its protection and sustainability has in recent years become notable. This has come in conjunction with a number of legislation, national and international, regulating the use of national resources. An often quoted definition of EIA by Munn (1979) refers to the need "to identify and predict the impact on the environment and on man's health and wellbeing of legislative proposals, policies, programmes, projects and operational procedures and interpret and communicate information about the impacts"

GeoSystems and Technologies Inc. (2008) itemized the broad outline of an EIA to include the definition of the proposed project; description of the existing site characteristics and infrastructure including land use, water bodies, social, cultural and heritage information; assessment of public perception of the proposed development through public consultations; identification of policies, legislation and regulations relevant to the project; description of other project alternatives; description of possible short, medium and long term impacts, indirect and cumulative impacts; identification of any mitigation action to be taken to minimize predicted adverse impacts, with associated costs where applicable and practical; and development of an Environmental Monitoring Plan (EMP) to ensure that mitigation measures are adopted during the implementation stage.

On the other hand, the process of EIA preparation can be summarized as characterization (qualitative and quantitative) of the baseline environmental conditions of the study area, prior to the start of the project activities; identification and assessment of potential impacts of the proposed project; recommendation of practical and cost effective mitigation plans to limit plans to or completely eliminate negative impacts; recommendation of practical and cost effective post-developmental environmental management programme; preparation of a detailed EIA report, which will form the basis for the issuance of an EIA and the final clearance by the approving authority.

TNL (1999), in a report identified the objectives of an EIA study to include;

- Identifying negative and positive impacts that are likely to result from the implementation of a proposed project
- Generating mitigation options that can be used to reduce or completely eliminating the negative impacts of the projects during construction and those associated with the operation of the project after construction;
- Generating technical schemes which must be added to the design of the project, to ensure environmental benignness and;
- Developing an environmental management plan that must be in place to ensure continuous environmental soundness throughout the project lifetime (Thermosteel Nigeria Limited 1999).

The Nigerian Constitution in its environmental and directives of state policy on the environmental states that "the state will protect and improve the environment and safe guard the water, air and land, forest and wildlife of Nigeria" (Nigerian Constitution, Chapter 2 and Article 28).

The legislation that made the preparation of the impact analysis mandatory for development projects in Nigeria were focused mainly on assessing the impacts of projects on the broad environment. For instance, the National Environmental Impact Assessment Decree No 86 of 1992, Nigerian Urban and Regional Planning Law Decree No 88 of 1992, Environmental Impact Assessment Decree No 59 of 1992 and several states (including Lagos) enacted urban and regional planning and development laws. All these laws stipulated that before any person, corporate body or agency takes a decision to undertake or authorize the undertaking of any activity that may likely or significantly affect the environment, prior consideration of its environmental effects should first be taken; hence the need for the preparation of an EIA report.

Lagos State government recognizes the need to protect its territorial environment and has affirmed its commitment to the preservation of same. Hence … specifically, the Lagos State Urban and Regional Planning and Development Law of 2005 stressed that "where the application submitted (to planning authorities for approval) is in respect of any development of land area of four hectares and above, and other institutional, commercial, industrial complexes, such application shall be accompanied with an Environmental Impact Analysis Report giving the details of effects of the processed development on socio-

economic environment, traffic, ecology and communication network duly prepared by a Town Planner registered to practice in Nigeria".

This existing administrative and legal framework which has ensured that the impacts of development projects are subjected to pre-construction evaluation before a go-ahead is given to construct does not however include the preparation of TIA, specifically as a precondition.

A Traffic Impact Analysis (TIA) is a study carried out to predict the magnitude and effects that a proposed development project generated traffic will have on the transportation network. TIA is an important document in helping planning authorities in making decisions on land and its use. TIAs can also be used to evaluate whether the proposed developmental project is appropriate and what type of transportation facility improvements would be necessary. Traffic impacts could be direct or cumulative. A direct impact would result solely from the implementation of the proposed project while cumulative impact is based on list of past, present and probable future projects in the area. This means that a cumulative impact would occur as a result of traffic growth both the project and from other projects in the area.

Specifically, according to Edwards (2000), Traffic Impact studies help to

- Forecast additional traffic associated with new development;
- Determine the improvement that are necessary to accommodation the new development's anticipated traffic;
- Identity potential problems with the proposed development which may influence the developer's decision to build;
- Help to ensure safe and reasonable traffic conditions (volume, flow, etc) on streets after the development is completed;
- Reduce negative impacts created by developments by helping to ensure that the transportation network can accommodate the development; and
- Provide direction to decision makers and the developer of expected impacts
- TIS is to be prepared and submitted, if one of the following criteria applies to the project.
- The site to be developed for a residential use is to generate more than 100 vehicles per peak hour,
- The site to be developed for a use other than residential is to generate 250 vehicles per peak hour, or more than 2,500 per day, or
- The site to be developed for a residential use, is located on a low volume road, and generates 200 vehicles per day or more and at least doubles the existing volume of the road (Edwards 2000).

4 TRAFFIC IMPACT MEASUREMENTS

A traffic impact is an effect, either positive or negative, on the traffic of the adjoining roads and other transportation infrastructures that may be associated with a proposed project activity. The assessment of the proposed project may be based on a synthesis of such criteria as, the nature of the impact, directness of the impacts, spatial extent, duration, intensive or magnitude and determination of significance.

The study of the nature of impact is an evaluation of the type of effect the proposed activity would have on the affected roads and other transport facilities and traffic attributes or components. Its description should include, what is being affected and how. A direct impact refers to an immediate impact appearing because of the project activity while a secondary level. Spatial extent analysis is a description of the scale of potential impact, using the following parameters.

- Local, where the impact could affect the extended area adjacent to the site such as a neighourhood or town, probably affecting traffic up to 10km outside the immediate environment.
- Regional, where the impact could affect traffic in areas which include outlying parts of the city, transportation route, adjoining towns, etc; and
- National, where the impact could be as far reaching as national boundaries.

The duration criterion refers to the expected lifespan of the proposed project's traffic impact. This can be defined as;

- Short term, if the traffic impact will disappear with mitigation, or will be reduced in a span shorter than the construction phase; impacts that are predicted to last only for a limited period.
- Medium term, if the traffic impact will last for only the construction phase; thereafter, it may completely terminate; and
- Long term, if the traffic impact will continue or last for the entire operational period of the project, however, it will be mitigated by direct engineering or traffic control solution afterwards.
- Permanent, if the traffic impact is considered non-transitory. That is mitigation by engineering or human processes will not occur is such a way or in such a time span that the impact can be considered transitory.

Impact intensity or magnitude analysis refers to a description of whether or not the intensity or magnitude of the impact would be high, medium (moderate), low or negligible (no impact). Evaluation of potential traffic impacts on traffic components may be qualitative or quantitative. The factors used to describe intensity or magnitude include;

- Low, if the impact will not have significant influence on the adjoining traffic, hence it will not require significant accommodation in the project design or implementation. The impact may alter the affected transport environment in such a way that traffic processes or functions are not affected in any significant way, i.e., the existing road networks are not overburdened, or existing traffic patterns and flows are not altered or affected).
- Moderate, if the impact could have an adverse influence on the existing level and flow of traffic, requiring a modification of the project design or alternative implementation schedules. The affected traffic and transportation environment is altered, but the functions and processes will continue, albeit in a modified way.
- High, if the impact could have significant influence on the traffic environment, but cannot be mitigated or accommodated by the project design, but introducing alternative mitigation measures, such as road re-alignment at a particular stretch, construction of new parking facilities, widening of existing adjoining roadways, etc. Functions or process of the existing traffic environment is distributed to the extent where it may be affected temporarily or permanently.

Determination of significance criteria is an indication of the potential impact in terms of physical extent, intensity and time scale. It is an indication of the required level of mitigation, and is determined through a synthesis of impact characteristics or combination of effects. The various classes of significance are defined as follows;

- Negligible, if the impact is considered to be insignificant and does not require any mitigation efforts;
- Low, if the impact of the little importance, but may require limited mitigation;
- Moderate, if the impact is of importance and considered to have mitigation. Mitigation is required to reduce the negative impacts to acceptable levels or to maximize positive impacts; and
- High, if the impact is of great importance. Hence, failure to mitigate and reduce impact to acceptable levels could potentially negate development, or make entire project unacceptable.

5 METROPOLITAN LAGOS: CASE STUDY

Lying approximately between Longitudes 20 42’ E and 30 22’ E and Latitude 60 22 ‘N and 60 2’ N in the southwestern part of Nigeria, Lagos, the nation’s most populous city, Nigeria, with an estimated population of 18.5 million (2009 projections), is located south of Ogun State and 800km southwest of the nation’s capital, Abuja. The metropolitan area, an estimated 300 square kilometers, comprises 88.7% of Lagos State, a total of 19.87 square kilometers is centrally located within the coastal frontage of Lagos state, comprising of 17 local government areas (LGAs).

Lagos with its 29 industrial estates and 4 CBDs, is the commercial and industrial hub of Nigeria, is home to 70% of the country’s total industrial investment and 65% of its commercial activities and accounts for approximately 50% of the country’s manufacturing sector (Ehingbeti 2002, NEPAD City Lagos Profile, 2003 and Badejo 2009).

6 NEED FOR TRAFFIC IMPACT ANALYSIS STUDIES IN NIGERIA AND LAGOS

Given the high population density of Lagos metropolitan area (estimated 18.5 million people, on 3,577 square kilometers of land) with over 85% of this population on an area that is 37% of the land area in Lagos, the amount of pressure that the existing transport infrastructure system bears can be envisioned, especially in an urban environment with no efficient transit system. Lagos population is growing ten times faster than the population of New York and Los Angeles (in US), and more that the population of 32 African countries combined (Badejo 2009). This growth rate plus the chaotic character of the urban transport system has manifested a number of outcomes. Some of these, according to Badejo (2009), include long travel times on the road, poor road condition largely due to overuse and lack of maintenance, high level of emission and pollution from vehicles, deplorable road system, traffic congestion along major corridors of the state, among others.

According to Edwards (2000), "understanding the demands placed on the community's transportation network by development". Every development is a generator of traffic and some development projects can generate large enough traffic and so as to create congestion, leading to more public investment in the transportation network (construction of new roads, expansion or improvement of existing routes, new traffic control mechanisms, new terminal facilities etc.). Traffic congestion leads to economic costs as a result of longer travel times, air and noise pollution and accidents. As a road becomes more congested, drivers tend to turn to other roads not necessarily intended for thorough traffic (Edwards 2000).

The purpose of TIA study is to maximize traffic related impacts on the existing land use in the immediate vicinity of the proposed development, on the proposed development itself and on traffic conditions and traffic control devices that are not within the vicinity of the proposed development but are expected to be affected by increased traffic volumes.

7 METHODOLOGY

The methodology employed in this research is largely secondary dat. The secondary data for this research were sourced from various published and unpublished documented sources, such as urban and regional mater plans, policy documents published texts, journal articles, etc. a number of transportation and planning reports were studied and relevant information extracted

8 GUIDELINES AND METHODOLOGY FOR TIA

Traffic Impact Analysis (TIA) is developed to estimate the impact of new development on adjoining area's roadways and identify improvement necessary to mitigate that impact. For the purpose of determining what level of study must be completed for a proposed development, the following thresholds have been established. For project generating fewer than 100 net new peak hour trips, a Traffic Impact Statement is required, while for those generating 100 or more net new peak hour traffic, a Traffic Study has to be prepared.

A Traffic Statement includes a review of a site access, circulation and access management, and also provides driveway volume, distribution, site trips and roadway information; while a traffic study includes the review of site access, circulation, access management, safety, roadway links analysis and intersection analysis that will be significantly imposed by the development.

At the minimum, the TIS shall include site access review the circulation and access management components to be considered complete. On the other hand the Traffic Impact Study shall include at a minimum an introductory note which typically includes the description of the type, size, location and the expected construction duration of the project development. This is followed by an analysis of the existing condition which is usually presented in a tabular format and presents a review of the current conditions in the study area without the trips generated by the proposed development.

Intersection and Segment Analysis table, which presents an analysis of all road intersections and segments within the study area and the project analysis based upon the results from traffic volume estimates (trip generation), directional distribution (trip distribution), and total traffic projections are presented. The study area segments, intersections and the site access are evaluated for capacity constraints and operating conditions.

A complete future conditions analysis is also included in the study. This analysis includes all roadway links and intersection analysed in the existing condition section of the study and also includes a peak hour/peak direction Level of Service (LOS) analysis showing the future roadway conditions after applying the base traffic, the proposed project traffic, any other improvements.

As an additional inclusion, future conditions table and a future turning movement illustration are also to be included in all traffic studies. The future conditions table shall be consistent with the existing conditions table, for easy comparison; and provision has to be made for the analysis for roadway segments and intersections within the study area. The table, at a minimum should provide information such as, functional classification, Generalized LOS Tables classification, LOS capacity future projected traffic volumes, and the projected LOS (peak hour/peak direction for two weekdays). In some cases, a Saturday or Sunday analysis may be required. Segment identified in the future conditions table shall be consistent with those identified in the existing LOS table. The analysis for all intersections and segments within the study area shall be performed and the existing intersections peak hour segments with the projected intersection peak hour segments shall be compared; calculating the estimate LOS and volume-to-capacity ratios.

A future turning movement illustration shall be prepared as part of the analysis, showing the individual movements for the project traffic, projected background traffic and total traffic. A mitigation analysis section summarizes the overall impact of the proposed development on the study area and identify specific improvements required, timing for construction of those improvements, and the agency responsible for those improvements. All supporting documentations are to be included in the appendix.

9 CONCLUSION

Development projects, depending on their intended use and intensity of development, have varying level of traffic attraction, causing imposition of new traffic on the existing traffic on adjoining roads. As traffic increases, delays and convenience to commuters becomes increasingly costly and ultimately unacceptable to both the public and the decision makers. As developments become larger and more complex, their effects on local traffic conditions become more pronounced.

For a city like Lagos, when traffic flow and management is a major challenge and given the rate of its urban expansion, especially with its megacity status with its attendant attraction of mega projects, it has become imperative that proposed development projects are subjected to TIA so as to predict and mitigate its impact on traffic and transportation. This paper is therefore recommending the inclusion of traffic impact analysis report as a statutory inclusion in the portfolio submitted for approval process. The paper advocates the need for the urgent enactment of necessary legislation to make this an obligation and also spells out the procedure and guidelines for its preparation.

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Transition Analyses on Land Use and Land Price in Nagoya CBD during the Deregulation Decade

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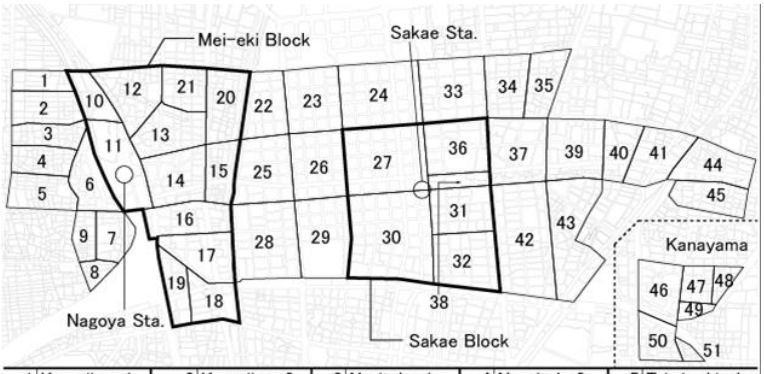
1 ABSTRACT

Following the examples of the United States and Western Europe, from around 2000 Japan has adopted a neo-liberal urban policy with the deregulation of downtown and a consequent encouragement of investment to this area. In April 2002, the Act on Special Measures Concerning Urban Reconstruction was enacted, and since then, intensions of landuse and land prices have drastically changed. This study refers to the first decade of the 2000's and analyzes the transitions of the CBD (Central Business District) of Nagoya, Japan as an example. Nagoya CBD locates on the center of the third largest metropolitan area in Japan with over 5 million people as well as Nagoya City with a population of 2.15 million.

In this article, we firstly give an overview of actual landuse trends between December 2001 and December 2006. Next, we deal with a comparative analysis of the especially retail agglomeration of the Meieki and Sakae cores within the Nagoya CBD in the 2000s, then show the actual state and changes of land prices in 2001 and 2006. Finally, we analyze of landuse change factors in the 2000s by analyzing and comparing data of landuse and land prices.

2 RESEARCH BACKGROUND, RESEARCH OBJECTIVES AND ITS COMPOSITION

Following the example of the United States and Western Europe, from around 2000 Japan has adopted a neo-liberal urban center policy with the deregulation of downtown and a consequent encouragement of investment to this area (Allmendinger, 2002). This study refers to this time as the "Urban Regeneration Period" and analyzes the transitions to the structure in the Nagoya CBD (Central Business District) as an example case; it is the 3rd largest metropolitan area in Japan with over 5 million people, and contains Nagoya City with a population of 2.15 million.



1	Kamejima 1	2	Kamejima 2	3	Noritake 1	4	Naoritake2	5	Takebashi-cho
6	Tsubaki-cho	7	Taikou 1	8	Taikou 2	9	Taikou3	10	Ushijima-cho
11	Meieki 1	12	Meieki 2	13	Meieki 3	14	Meieki4	15	Meieki5
16	Meiekiminami 1	17	Meiekiminami 2	18	Meiekiminami 3	19	Meieki-minami4	20	Nagono1
21	Nagono 2	22	Marunouchi 1	23	Marunouchi 2	24	Marunouchi3	25	Nishiki1
26	Nishiki2	27	Nishiki3	28	Sakae1	29	Sakae2	30	Sakae3
31	Sakae4	32	Sakae5	33	Izumi1	34	Izumi2	35	Izumi3
36	Higashisakura1	37	Higashisalura2	38	*see bellow	39	Aoi1	40	Aoi2
41	Aoi3	42	Shinsakae1	43	Shinsakae2	44	Uchiyama3	45	Imaike1
46	Kanayama1	47	Kanayama2	48	Kanayama3	49	Kanayama4	50	Kanayama-cho1
51	Kanayama-cho2	No.	area Name	38 is include Hisaya-cho、Buhei-cho、Shinsakaemachi、Toushin-cho					

Fig. 1: Precincts (cho-me) in Nagoya CBD

The Nagoya CBD has two main retail and office cores: an area around Nagoya Station (hereinafter referred to as Meieki); and an area around Sakae Station (hereinafter referred to as Sakae). In particular, the Sakae core has historically been considered the center of the CBD, but in 1999, the completion of a giant bulding complex above Nagoya Station, named the JR Central Towers, consisting of retail, office and hotel floors with 200,000 sq. meters had been a turning point for the city, and the development at the Meieki core

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attracted many investments. In April 2002, the Act on Special Measures Concerning Urban Reconstruction was enacted, and since then, a variety of landuses and their land prices have increased in the both cores. As a result, Meieki enjoyed a period of strong growth and mass-media reported that Meieki would pull ahead of Sakae during the 2000's. Such kinds of a boom with the drastic transition had been going on until they were finally depressed by the world financial crisis of 2007, as well as Tokyo.

In accordance with the divisions made by a office marketing report into the Nagoya CBD, the survey target area was defined as the 51 chome or precincts with a total area of approximately 560 ha (Fig. 1). They include around Meieki, Sakae, and Kanayama where is far a few kilometers south from the two cores, and also include the Designated Area of the Masterplan of City Center Vitalization, and the High-Priority Development Area in the Urban Regeneration Zone and so on.

The components of this paper is as follows. Section 3 gives an overview of actual landuse transitions between December 2001 and December 2006. Section 4 is a comparative analysis of the retail structure of Meieki and Sakae during the 2000's. Section 5 analyses the changes and the actual state of the land prices in 2001 and 2006, and Section 6 explores the characteristics of landuse changes in the Nagoya CBD in the decade of deregulation by comparing and analyzing data of landuse and land prices.

3 ANALYSIS OF LANDUSE IN THE NAGOYA CBD

3.1 Employed for Analysis on Floor Use

To aggregate floor areas amounts for each use in 2001 and 2006, the following three types of data were taken from the "Present Status: Building Use Survey" in Urban Planning Basic Survey published by Nagoya City: 1) building area; 2) the number of stories (excluding basement floors); and 3) building use category. Concerning the mixed use buildings, the floor area was calculated proportionally taking into consideration the relation of the widest and others; in this regard, for buildings with a total floor area exceeding 10,000 sq. meters, the aggregated results were verified by using the Zenrin Residential Map. Floor areas were calculated 61 subcategories of use and then classified into 7 categories: retail, office, residential, culture and welfare, industrial, hotel, and others.

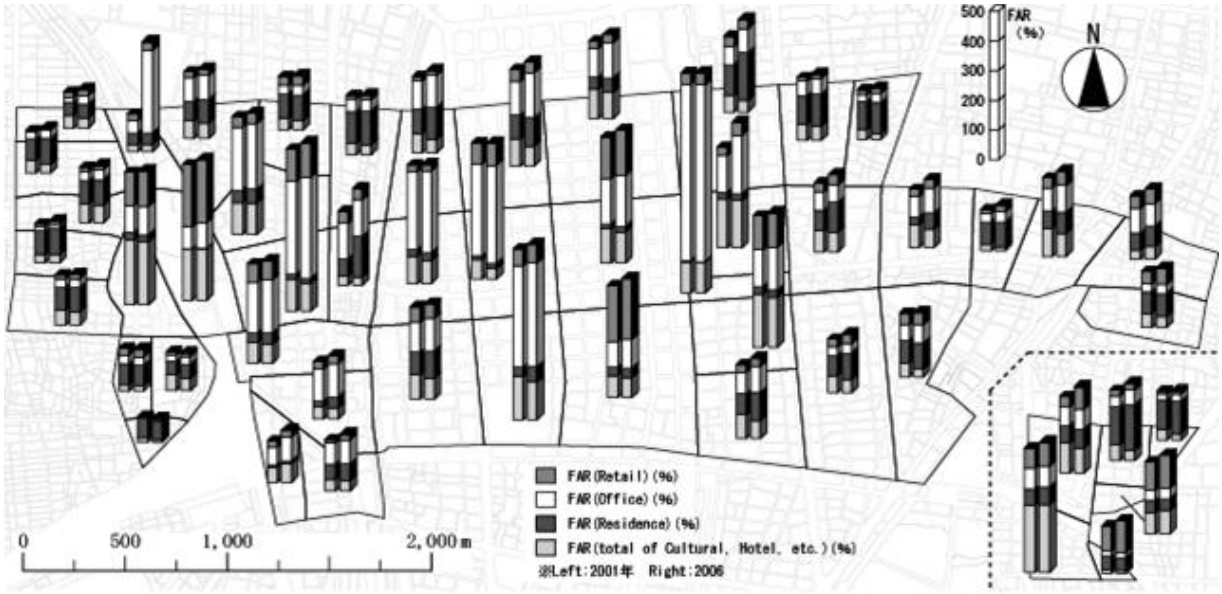


Fig. 2: Comparison between floor area ratios (FARs) in Nagoya CBD from 2001 to 2006

3.2 Transitions of Landuse from 2001 to 2006

Floor-area ratio (FAR) for each use category in each precinct is obtained by dividing the floor area amount of each use category in a precinct by the total area amount of the precinct, in other words, the total sum of blocks within the precinct, excluding Shirakawa Park and all of the roads. The FAR of the whole CBD in 2001 was 287% and in 2006 was 308%, giving a 21% increase (Fig. 2).

When spatial patterns around Meieki and Sakae were examined, the FARs of most precincts were 400% to 500%, and most along the Meieki-Sakae axis were 300% to 400%. However, to the west side of Tsubaki

Town, and the east side of Higashi-Sakura 1-chome, when compared to the Meieki-Sakae axis, many more precincts with FAR of less than 200% were found. The precinct with the highest increase, which was due to redevelopment, was Ushijima Town (245.0%). The next highest increases were found in Higashi-Sakura 1-chome (85.5%), and Meieki 5-chome (77.6%), and in the precincts with FAR of 300% or so, an increase in density was noticeable. The precincts with FAR of 400% or more also showed a 10% to 20% increase, which shows an ongoing rise in the density of the CBD. In contrast, decreasing densities were found in the following three precincts with FAR of 200% or less: Nakono 1-chome, Taiko 1-chome, and Taiko 2-chome.

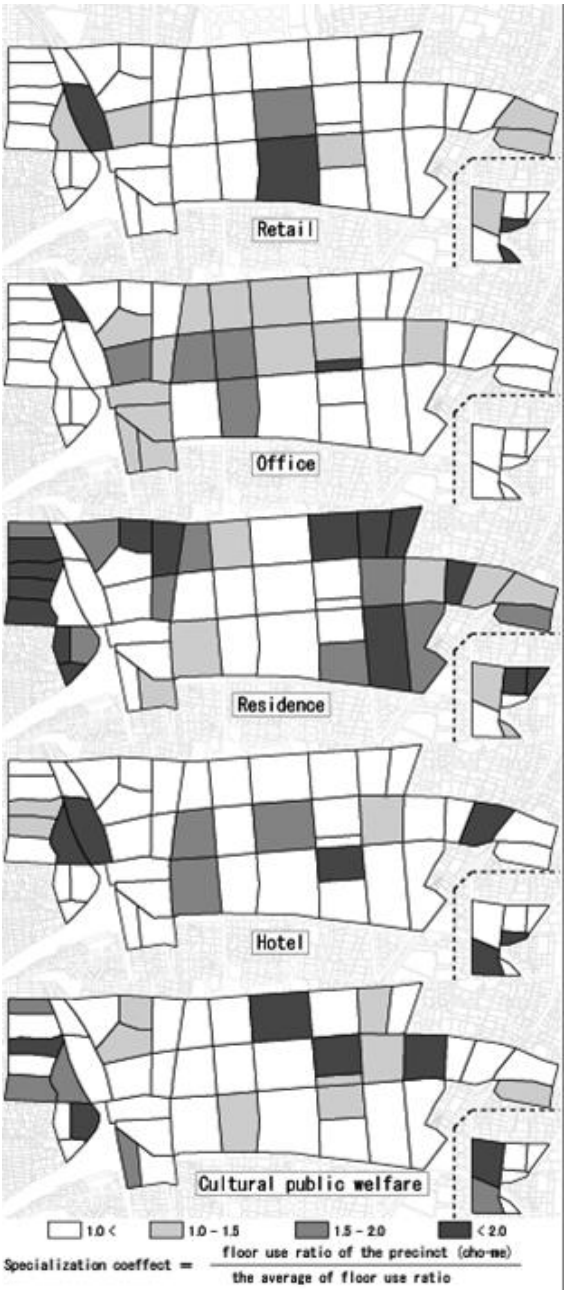


Fig. 3: Spatial patterns of the specialization coefficients in 2006

When examined according to the use category, a 4.4% increase in the retail FAR was found throughout the CBD. Increases in the Kanayama district stand out as seen in the following figures: Kanayama 1-chome (43.3%), Kanayama Town 2-chome (24.7%), and Kanayama 4-chome (17.1%). The increase in the office FAR was 14.7% throughout the CBD, which was larger than retail. When examined by precinct, increases were found in Ushijima Town (240.9%), which was affected by the redevelopment project, Higashi-Sakura 1-chome (74.0%), and Marunouchi 2-chome (36.3%). The office category also showed the tendency to increase in precincts with a high FAR in 2001. Concerning the increase of residential FAR, as seen in Meieki 5-chome (81.6%), Izumi 1-chome (59.5%), and Higashi-Sakura 2-chome (30.4%), many increases were found in precincts with FAR of 100% to 300%.

3.3 Analysis on Specialization of Landuse within Nagoya CBD

To examine the specialization of landuse in each precinct, focus was given to floor use percentages; the result obtained by dividing the floor use percentage of each area by the floor use percentage throughout the CBD was defined as a specialization coefficient, and this value was used (Fig. 3). When the specialization coefficient exceeds 1, this indicates that the land is specialized in the relevant use category. Next, with regard to each use category, areas with a coefficient exceeding 1.0 in 2006 were reviewed.

[Retail] Large values were found in the precincts around Nagoya, Sakae, and Kanayama Stations. Although the coefficient of Meieki 1-chome dropped from 2.44 to 2.37, and that of Sakae 4-chome dropped from 1.39 to 1.36, those of the other 9 areas generally showed an increasing trend of specialization. Particularly, the effect of the commercial complex in Kanayama 1-chome can be seen, where specialization was significantly developed with a coefficient of 1.43, up from 0.73.

[Office] The value was high around the Meieki-Sakae axis. Many with a coefficient of between 1.0 and 2.0 were found, and these form one specialized cluster.

[Residential] In many precincts other than the Meieki-Sakae axis, the value exceeded 2.0, and the pattern shows a reversal of the office trend. However, as seen in Marunouchi 1-chome, areas specialized in both office and residential can be found.

[Hotel] There was the same trend as retail, and high values were found in the precincts around Meieki, but unlike retail, large values are also seen around the precincts specialized in offices, such as Nishiki 1-chome and Sakae 1-chome.

[Cultural and Welfare] It was difficult to find any clear trends; however, high values were found in the precincts specialized in residential, and also in locations that provide easy access, especially around a station.

3.4 Comparison of Landuse Transitions between the Meieki and Sakae Blocks

The Meieki and Sakae blocks were aggregated and the totals were used (Fig. 1) to compare their landuse transitions (Fig. 4). It was found that over this period, offices increased in both blocks, but residential increased mainly in the Meieki block, while retail increased in the Sakae block. However, after the sum total of each block was aggregated, and compared to the grand total of both blocks, no dramatic change was seen in the ratio of Meieki to Sakae, and it was found that the amounts of major landuses had occurred equally in both blocks.

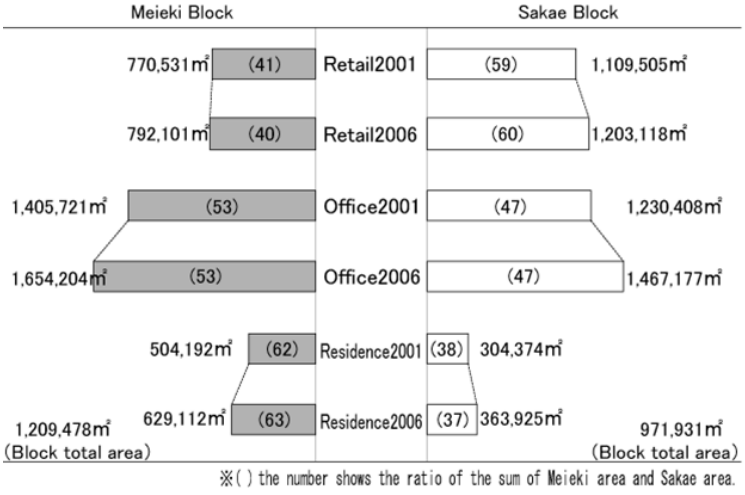


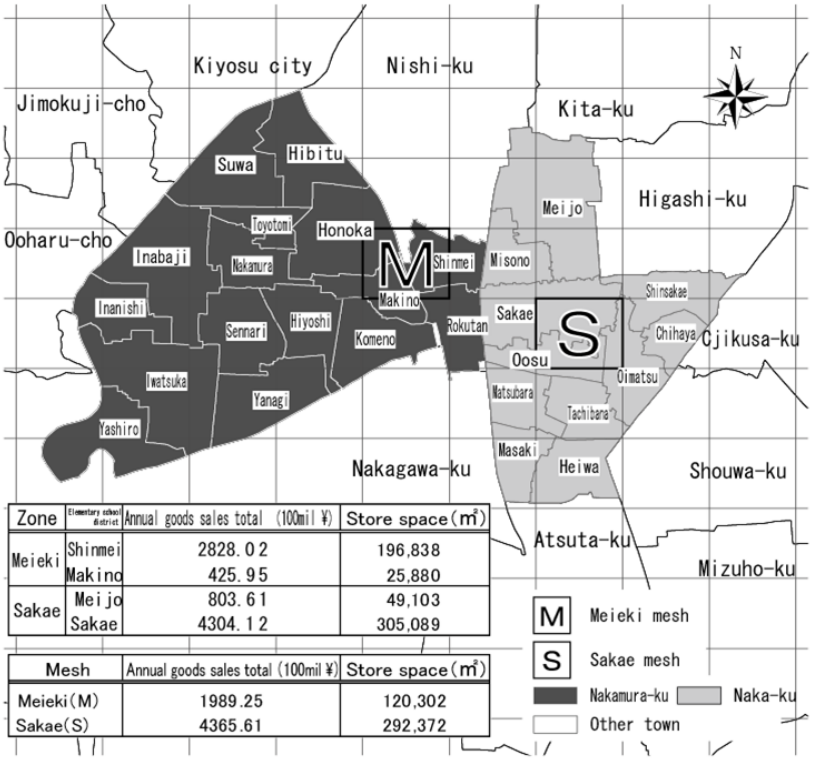
Fig. 4: Comparison of floor amounts between Meieki and Sakae block

4 COMPARISON OF CHANGES BETWEEN THE RETAIL STRUCTURE AOUND MEIEKI AND SAKAE

4.1 Data Employed for Analysis

Regarding changes in the 2000s to the two major retail cores, Meieki and Sakae, a comparative analysis was conducted (Kojima, 2010). The main data used was the Official Commercial Survey of 1997, 2002, and 2009, the National Census of 2005, and the Nationwide General Report of Large-Scale Retail Stores of 2000,

and 2008. In the Official Commercial Survey the Shinmei and Makino elementary school districts in Nakamura Ward were regarded as the Meieki zone, and the Meijo and Sakae elementary school districts were regarded as the Sakae zone, and the combined totals were aggregated (Fig. 5).



Zone	Elementary school district	Annual goods sales total (100mil ¥)	Store space (m²)
Meieki	Shinmei	2828.02	196,838
	Makino	425.95	25,880
Sakae	Meijo	803.61	49,103
	Sakae	4304.12	305,089

Mesh	Annual goods sales total (100mil ¥)	Store space (m²)
Meieki(M)	1989.25	120,302
Sakae(S)	4365.61	292,372

Fig. 5: Outline analysis of retail structure in Nagoya CBD

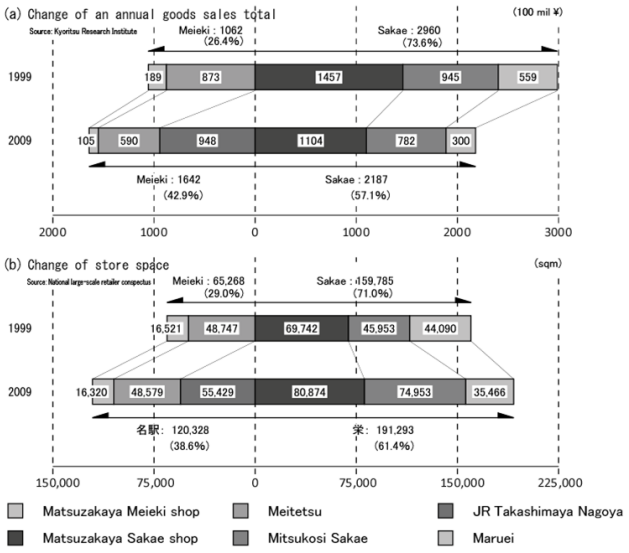


Fig. 6: Transition of the retail structure in the Meieki and Sakae zones

4.2 Transition Analysis on the Retail Structure in the Meieki and Sakae Zones

From 1997 to 2007, the fluctuating increase of retail floor area in both zones resembled a seesaw. Fig. 6 shows changes to the retail over this time, and indicates that the proportion of Meieki had become larger. Concerning the sales amounts, Meieki showed a significant increase, whereas Sakae was stagnant, and in 2007 the share changed to 4 : 6. In these ten years, the floor efficiency value decreased in both zones, which indicates the intensifying competition of this time. Fig. 7 gives data with a focus on large department stores, and the same tendency of significant growth in Meieki and a decrease in sales in Sakae can be found. We can also see that the superiority in the floor efficiency value was reversed silghtly.

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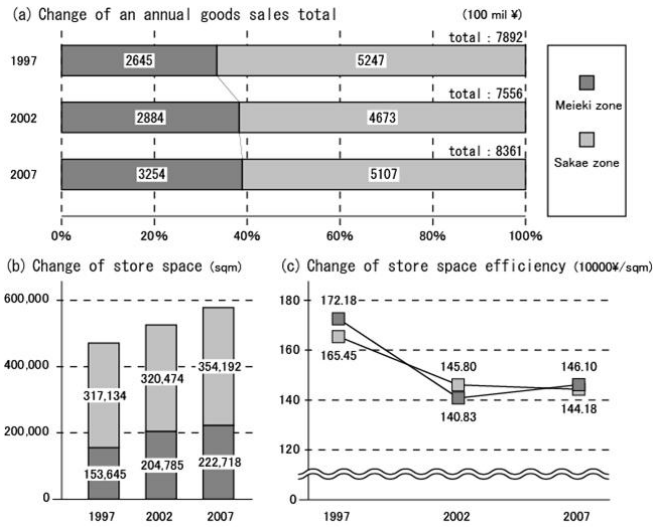

Fig. 7: Transition of the department stores in the Meieki and Sakae zones

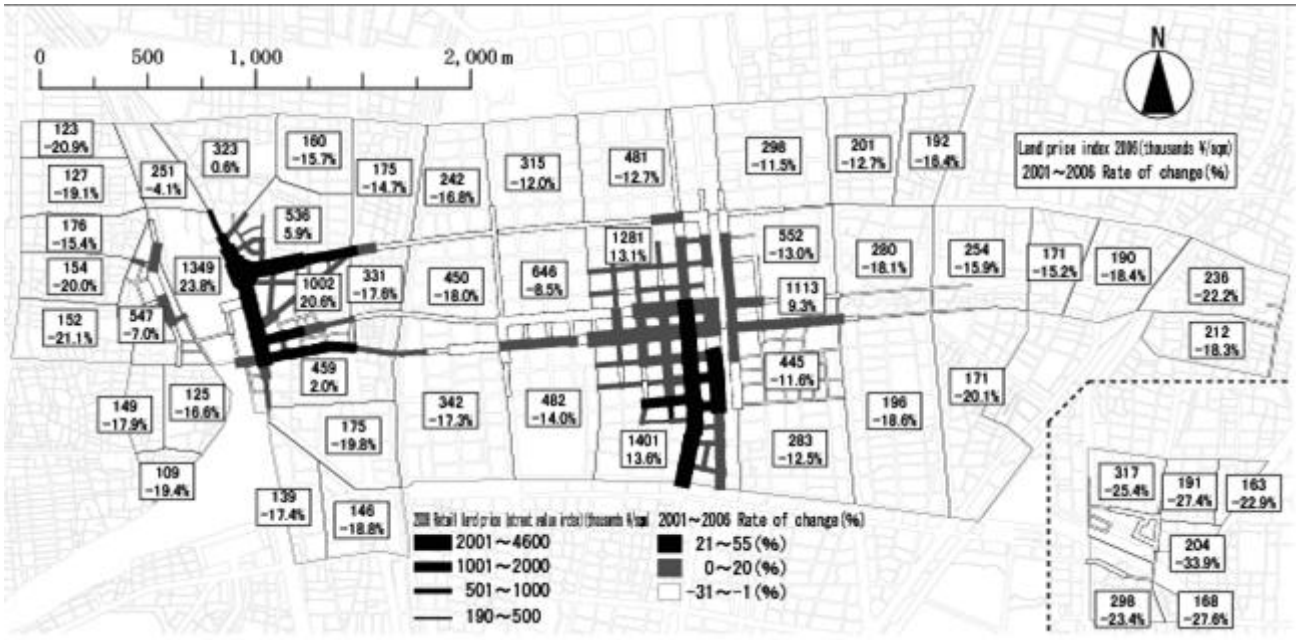

Fig. 8: Spatial patterns of land prices in Nagoya CBD

5 ANALYSIS ON RELATION BETWEEN LANDUSE AND LAND PRICES

5.1 Land Price Indexes as the Data and Their Spatial Patterns

In this analysis Inheritance Tax Street Value Indexes of 2001, 2006 published by the National Tax Agency were used. The street value indexes were classified according to areas, and the CBD there are four categories: advanced commercial, busy shopping street, ordinary combined commercial and residential, and ordinary residential. From among them, street value indexes of both of the advanced commercial and the busy shopping street were composed as a commercial street value index (thousand yen/sq. meters). In addition, as an index to compare land prices in an areal scale, a land price (thousand yen/sq. meters) created based on a arthmetic average of the street links was used. Fig. 8 shows both of the spatial patterns of the above-mentioned retail street value indexes and land prices.

Firstly, high values of the retail street value indexes in 2006 concentrated on major streets such as Meieki Avenue and Otsu Avenue, and their surroundings. Closer to Meieki and Sakae, land prices rise, and in particular, in Meieki Avenue the price rose substantially from 3,240 to 4,600. The highest street value index in the CBD in 2001 was the 3,590 of Otsu Avenue and this value increased to 4,360 in 2006, resulting in Meieki overtaking Sakae for the highest street value index. However, in other streets in the CBD, such as Sakura, Nishiki, Fushimi, and Hirokoji Avenues the retail street value index decreased.

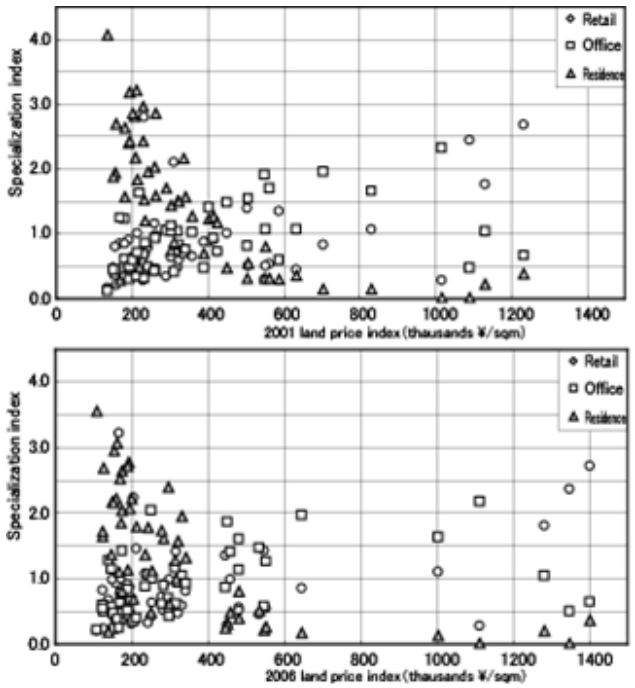

Fig. 9: Relation between Land price index and Specialization index

	Category		Variable
Explained variables	FAR	Y1	FAR 2006(%)
		Y2	FAR 2006(Retail)(%)
		Y3	FAR 2006(Office)(%)
		Y4	FAR 2006(Residence)(%)
	A fluctuated range of FAR	Y5	Change of FAR 2001-2006(%)
		Y6	Change of FAR 2001-2006(Retail)(%)
		Y7	Change of FAR 2001-2006(Office)(%)
		Y8	Change of FAR 2001-2006(Residence)(%)
Candidate variables	Precinct (cho-me) situations	X1	FAR 2001(%)
		X2	FAR 2001(Retail)(%)
		X3	FAR 2001(Office)(%)
		X4	FAR 2001(Residence)(%)
		X5	FAR 2001(Hotel)(%)
		X6	FAR 2001(Cultural public welfare)(%)
		X7	FAR 2001(Factory)(%)
		X8	The density of buildings 2001(number of build./ha)
	Precinct (cho-me) characteristics	X9	Specialization index 2001(Retail)
		X10	Specialization index 2001(Office)
		X11	Specialization index 2001(Residence)
	Land price index	X12	Land price index 2001(thausands ¥/sqm)
		X13	The rate of change of the land price index for five years(%)
	Accessibilities	X14	Dummy variable(Meieki)
		X15	Dummy variable(Sakae)

Dummy variable: "1" Meieki(or Sakae) and adjoining town area(is A), "1/2" The town which adjoins A(is B), "1/3" The town which adjoins B.

Table 1: Variable list for factor analyses.

Next, focus is given to the patterns of land prices in 2006. Sakae 3-chome had the highest land price with 1,401, followed by Meieki 1-chome with 1,349. These results are the reverse of the street value indexes, and this is because the high land price streets in the Meieki zone is distributed along a few specific street lines, and the pattern in the Sakae zone is broader with a grid shape. Concerning the increase ratio, however, Sakae 3-chome recorded 13.6%, and Meieki 1-chome showed a substantial increase with 23.8%. Moreover, Nishiki 3-chome and Meieki 4-chome, each of which is adjacent to the respective precinct, showed a similar tendency. On the other hand, in other 40 precincts – nearly 80% of the whole – showed a decrease of 10% or more. The land prices of the Nayabashi and Fushimi precincts located along the Meieki-Sakae axis also decreased; bipolarization in land prices was observed.

Furthermore, the relationship between the land prices and the specialization coefficients of 2001 and 2006 were examined based on the data in Fig. 9. The graph for 2001 shows the following trends: areas with a land price exceeding 1,000 specialize in retail; areas with a price exceeding 400 up to 1,000 specialize in offices; and areas with a price of 400 or lower specialize in residential. The graph for 2006 shows similar trends; however, a threshold was seen around 800 and a growing gap was seen between those areas with increasing and decreasing land prices.

5.2 Factor Analysis by Stepwise Multiple Regression Method

Analysis was carried out to examine the factors of the floor-area ratio (FAR) in 2006 and the percentage increase/decrease from 2001 in the FAR. For analysis of the explained variables, the FAR in 2006 and its increase/decrease were prepared; and 15 candidate factor variables were prepared and classified under precinct (chome) situations, characteristics, land prices and accessibility (Table 1). Prior to analysis, a correlation matrix was found, and the following variables in 2001 were suspected of having multicollinearity and eliminated: FAR (X1), commercial FAR (X2), office FAR (X3), and residential specialization coefficient (X11). Then, by using the stepwise multiple regression method, the standard partial regression and multiple correlation coefficients were found. Table 2 shows the results obtained through analysis. For analyzing the FARs, the multiple correlation coefficients were over 0.9 or more for all, and highly persuasive factors were obtained. On the other hand, the FAR increase/decrease (Y5) and the office FAR increase/decrease (Y7) gave relatively low multiple correlation coefficient values.

	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8
X1								
X2								
X3								
X4	0.285			1.030				0.624
X5	0.266	0.176						
X6	0.325		0.168			0.356		
X7		0.103	−0.100					
X8					−0.492		−0.323	
X9	0.159	0.576				0.561		
X10	0.610	−0.091	0.748	0.179				0.448
X11								
X12	0.379	0.509	0.214		−0.267			
X13								
X14						−0.462		
X15		−0.068				−0.270		
Multiple correlation coefficient	0.953	0.981	0.908	0.940	0.396	0.713	0.323	0.522

Table 2: Extracted candidate variables with standardized partial regression coefficient values (by stepwise multiple regression method)

Next, the selected factor variables were considered. With regard to the 2006 FAR (Y1), the values of the office specialization coefficient (X10, 0.610), and land price (X12, 0.379) were high. Similarly, for the 2006 office FAR (Y3), the office specialization coefficient (X10, 0.748) and land price (X12, 0.214) were chosen; office specialization and land prices contributed as factors. For the 2006 retail FAR (Y2), the retail specialization coefficient (X9, 0.576) and land price (X12, 0.509) were selected, and for the retail FAR increase/decrease (Y6), retail specialization coefficient (X9, 0.561) and a accessibility variable to the Nagoya Station (X14, -0.462) were the main factors. The period between 2001 and 2006 saw a rise of the seesaw in favor of the Sakae zone, which experienced an increase in retail floor area.

For 2006 residential FAR (Y4), 2001 residential FAR (X4, 1.030), and office specialization coefficient (X10, 0.179) were selected. In the residential FAR increase/decrease (Y8) as well, the same factors were at play, and it was found that the residential specialization areas became even more specialized. In addition, residential FAR (X4) in standardized coefficient exceeded 1.0, and it can be considered that this was because of a slight multicollinearity effect. Regarding the FAR increase/decrease (Y5) and the office FAR increase/decrease (Y7), the multiple correlation coefficients had a low value of less than 0.4, resulting in a difficulty in finding any contributory factors.

	Group Ⅰ	Group Ⅱ	Group Ⅲ
Category	<0%(minus)	0%–10%	<10%
The number of the cho-mes	8	22	21

Table 3: About the classification of three groups, and the number of the precincts (cho-mes)

	Discriminant coefficient (Group Ⅰ)	Discriminant coefficient (Group Ⅱ)	Discriminant coefficient (Group Ⅲ)	Partial F value	Lamda statistics	F value
X7	−2.332	−0.400	1.307	13.106	0.374	7.153
X9	0.996	−0.066	−0.310	1.771		
X11	−0.002	0.406	−0.424	1.425		
X13	−1.725	−0.004	0.662	5.448		
constant term	−2.274	−0.137	−0.712			

Table 4: The factor of the FAR(Office) change by discriminal coefficient

5.3 Factor Analysis of the Office FAR Increase/Decrease by Employing Discrimination Analysis

In the foregoing section there were two variables for which it was not possible to gain a clear understanding, and one of them, the office FAR increase/decrease (Y7), was selected for discrimination analysis. Firstly the office FAR increase/decrease (Y7) was classified into three ranges: less than 0% (Group I); 0% to less than 10% (Group II); and 10% or more (Group III) as shown in Table 3. These three groups were defined as group variables, and by using the same candidate factor variables, linear discrimination analysis was carried out for the three groups. As a result, with the four variables listed in Table 4, a good discriminant was obtained with the F value of 7.153, and an accuracy rate of 68.6%.

When the standardized discriminal coefficients were examined, the following was found: in the areas with a decrease, 2001 industrial FAR (X7) and the land price increase/decrease (X13) acted as strong negative factors; in the areas with a less than 10% increase, residential specialization coefficient (X11) acted as a strong positive factor; and in the areas with a 10% or more increase, 2001 industrial FAR (X7) and the land price increase/decrease (X13) acted as strong positive factors. It can be interpreted that this is because the shift from industrial use to offices caused a rise in land prices.

6 CONCLUSION

The results of this research are summarized below:

From 2001 to 2006, in each precinct of the Nagoya CBD, an increase of floor-area ratio(FAR) in each use was seen and a variety of floor uses was developed. Floor areas of both the Meieki and Sakae blocks kept increasing equally, and in this period, no significant decline in the position of the Sakae block was seen.

From 1997 to 2007, the retail floor amounts substantially increased, but the floor efficiency value greatly decreased; this was in accord with a general trend seen throughout Japan. Meieki and Sakae as two major retail cores with department stores as the main players were no exception to this phenomena; however, in this period, the increased floor area amount was noticeable in Meieki, and the share of sales also increased to 4 : 6.

Land prices in 2006, when compared to 2001, showed a broadening gap in the whole CBD with high prices and low prices. In relationship to each floor use, the specialization threshold was high led by retail specialization, and followed by office and residential specialization. Land prices were still high in Sakae, but Meieki had overtaken its rival to win the competition for the highest land price.

With regard to the 2006 floor-area ratio (FAR) and its fluctuations, the factors were analyzed, and for each use category FAR in 2006, its use category specialization coefficients in 2001 were major contributory factors, and a tendency on specialization or aggllomeration was recognized. In addition, analysis was conducted by classifying the office FAR increase/decrease into three groups; as a result, it was found that particularly 2001 industrial FAR and land price increase/decrease played key role factors. It can be interpreted that this was because the shift from industrial use to offices caused a rise in land prices.

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🏆 *reviewed paper*

Understanding the Relationship between Resilience and Sustainability: Emergency Planning and the Design of Urban Space

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1 ABSTRACT

The compatibility of, and conflict between, resilience and sustainability has received increasing attention in recent years, most notably in relation to the design, construction and operation of urban spaces. Considering that urban spaces can be fixed in time scales that range from several years to several decades and beyond, as well as the heightened influence of fiscal concerns at present and in the future, there is a need to understand and consider such interconnectivities at the earliest possible opportunity. Drawing upon ongoing research into the design of safer urban spaces, the relationship between resilience and sustainability was analysed through the exploration of whether emergency planning and the design of space could further both agendas. A state of the art literature review was conducted, as were eleven interviews with key stakeholders in the fields of emergency planning and resilience in the United Kingdom (UK).

Analysis of the above provided results indicating that a range of promising practice has been occuring in the UK, practice that not only increases the resilience of urban spaces to a range of hazards, threats and major accidents, but that is integral to the sustainability of the built environment itself. However, also apparent is the impact of the current fiscal situation, including the Government's extensive public sector spending cuts that are threatening the progress that has been made in relation to resilience and emergency planning; impacts which emphasise the need to identify long-term incentives and cost-effective solutions to the protection of the built environment. Conclusions drawn purport that whilst resilience is integral to sustainability and not merely compatible or conducive to it, a framework is required to further understand the integrated nature of urban space and how its users are made safer, built assets can be made less vulnerable to damage, and its natural environments are more protected.

2 INTRODUCTION

This paper is based on preparatory work for the development of an integrated security and resilience design assessment framework, as part of the Designing Safer Urban Spaces (DESURBS) project, which is funded under the EU Framework Programme 7 Security Programme. DESURBS explores urban space security issues, looking at how the involvement of local stakeholders in integrated security and resilience can improve urban security. The geographic focus of DESURBS is international, but concentrated research is being conducted in the cities of Nottingham (UK), Jerusalem (Israel), and Barcelona (Spain). Outputs of the project will include urban resilient design guidelines and a web-based decision support portal. The DESURBS project is a consortium of eight partners from five countries. This paper is produced by consortium partners at Loughborough University, with a particular focus on the Nottinghamshire region and the City of Nottingham itself.

2.1 Aim

The aim of the paper is to examine the relationship between resilience and sustainability, through the exploration of emergency planning and urban and building design, within the UK. This is being conducted in order to further understand the integrated nature of the built environment and how its users and assets can be better protected from the range of hazards, threats and major accidents that pose a risk to them.

2.2 Methodology

The methodology for this activity comprises a review of literature, together with semi-structured interviews with eleven key stakeholders involved in emergency planning and resilience in Nottingham and Nottinghamshire. The review used a web-based search of documentation, legislation and organisational information, most of which is readily available online, through local authority and government websites.

Several databases were also interrogated such as the Construction Information Service (CIS), Web of Science, ICE Virtual Library, and Health and Safety Science Abstracts. The key informants were sourced from member organisations of the Nottingham and Nottinghamshire Local Resilience Forum (LRF), which exists to "establish and maintain effective multi-agency arrangements to respond to major emergencies, to minimise the impact of those emergencies on the public, property and environment of Nottingham and Nottinghamshire" (Nottingham City Council, 2009).

2.3 Nottingham and its LRF

Nottinghamshire is a county in the East Midlands region of England with an estimated population of just over one million, about 350,000 of whom live in the city (Nottingham and Nottinghamshire Local Resilience Forum, 2011). Nottingham has main railway links to London (in the South) and Sheffield (in the North). The M1 motorway runs through the county, as does the A1 main trunk road. East Midlands International Airport is about 15 miles from the city. Nottingham has a vibrant city centre, renowned for shopping and entertainment. It is also home to several sporting facilities, namely the Nottingham Forest and Notts County football clubs, Nottinghamshire County Cricket Club and the National Water Sports Centre.

The LRF has several levels of involvement in emergency planning and resilience. The strategic (Gold) level consists of the Chief Constable, the Deputy Chief Executive of the Council, the local director of the Environment Agency, chief executives from the emergency services, and a representative from Nottingham University Hospital Trust. The tactical (Silver) level comprises middle management personnel, but includes the head of the County Council, and senior emergency planners. The operational (Bronze) level is made up of people who work on the ground responding to emergency situations and incidents. The Nottingham and Nottinghamshire LRF meets three times a year. A number of sub groups with specific areas of responsibility such as chemical, biological, radiological and nuclear (CBRN), pandemic influenza, and flood response meet six times a year and report to the LRF. The process they adhere to in terms of risk assessment and how that influences emergency planned is shown in Figure 1 below.

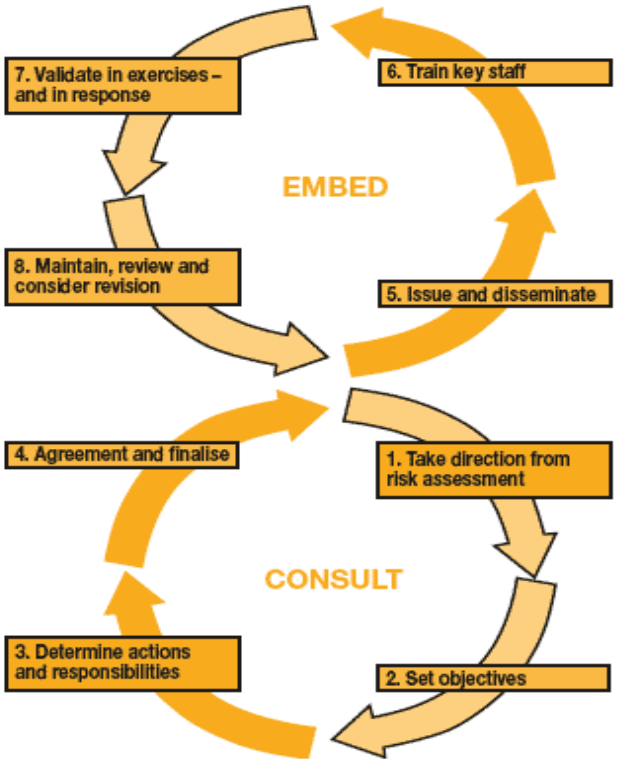

Fig. 1: Cycle of Risk Assessment and Emergency Planning (Nottingham and Nottinghamshire Local Resilience Forum, 2011)

3 RESILIENCE AND THE UK

Geis (2000, p.154) states that the 'built environment' encompasses the substantive physical framework in which society can function in its social, economic, political and institutional aspects. However, not only does the built environment facilitate the functioning of society, it also represents the majority of national savings and investment (Little, 2002; Ofori, 2008). Yet the built environment itself is not designed purely to accommodate these functions alone, as a vast array of legislated considerations and other options and pressures influence the design, construction and operation of the built environment. Pertinent to this paper is the array of hazards, threats and major accidents that can pose risks to urban space and those who use it, as the consequences of those risks manifesting themselves can be so profound as to nullify years of development and investment (Dainty and Bosher, 2008, p.358). Urban space must therefore be planned, designed, built, managed and operated so that it is, and supporting systems are, 'resilient'.

3.1 The Concept of Resilience

In order to understand what constitutes a resilient built environment, and what the term 'resilient' means, the origins of the term must first be explored. Sapountzaki (2007, p.298) and Klein et al. (2003, p.35) highlight that the Latin root of the word is 'resilio', which means to 'jump back'; what could be considered as returning to a previous state. Bosher & Dainty (2011) suggest that the concept of resilience primarily emerged in research concerned with how ecological systems cope with stresses or disturbances caused by external factors (see Errington, 1953; Blum, 1968), but has more recently been applied to human social systems (Manyena, 2006), economic recovery (Rose, 2004), engineering (Hollnagel et al., 2006) and urban planning and recovery after calamitous events (Vale and Campanella, 2005).

Holling (1973, p.14) asserted that resilience is the "measure of the persistence of systems and their ability to absorb change and disturbance and still maintain the same relationships between populations or state variables". However, as asserted by Bosher (2008, p.13), such definitions are evolving to capture that it is not sufficient for systems to simply 'bounce back' or return to a previous state, as the system needs to be a more robust version of this. Resilience can therefore be seen as the ability of an asset to cope with disruption, maintain essential operations, return to normal operations after the disruption has ended, and elevate to a more-informed state. Determining an asset's resilience will, therefore, always result in the question 'resilience of what, to what?' (Carpenter et al., 2001, p.779).

3.2 Within the UK

Within the UK, the resilience of the built environment has been given increasing attention over the past decade, with a range of obligations and incentives to aid in reducing the vulnerability of the built environment to the plethora of hazards, threats and major accidents that pose a risk to it (Harre-Young, 2012). Advancements have occurred particularly in relation to the two areas of emergency planning, and urban and building design, each of which will now be explored.

Emergency Planning

The UK has a well established formal system for emergency planning, namely the Civil Contingencies Act (CCA) 2004 (Civil Contingencies Secretariat, 2004). Prior to this, civil protection legislation dated back to 1948 with the notion of hostile attack from a foreign power. The year 2000 is known as 'the year of the 4 F's', as fuel shortages, severe flooding, foot and mouth disease, and Fire Service strikes highlighted the need to re-think emergency planning nationally, regionally, and locally, and that new legislative measures were needed to ensure that there was an adequate framework for such arrangements. The CCA has two parts: local arrangements for civil protection, and emergency powers, and it redefined the concept of 'emergency' to cover threats from international terrorism, the loss of communication systems, as well as such risks as biological or chemical contamination of the environment.

The CCA stipulates two categories of front line responders (category one and category two responders) and identifies their duties and responsibilities relating to 'localised incidents through to catastrophic events' (Civil Contingencies Secretariat, 2004, p.2). Category one responders, or 'core responders', are the emergency services, all principal local authorities, National Health Service bodies and key government agencies. Category two responders comprise 'co-operating responders', such as utility companies, transport operators, strategic health authorities, the Health and Safety Executive, and voluntary agencies. The CCA

also describes the duty of these agencies to cooperate in a Local Resilience Forum (LRF), based on each police area (HM Government, 2004), although in many instances, such forums (co-ordinated groups of category one and two responders who undertake risk assessments and carry out mitigative activities accordingly) existed in other forms prior to the Act coming into force.

Urban and Building Design

Urban and building design has also been used to advance resilience, and has arguably been seen as a 'universal remedy' to an ever-increasing array of socio-economic problems, policy priorities, and risks and threats that contemporary society faces (Bretherton and Coaffee, 2009, p.35). The use of such design has traditionally been associated with territorial control in the face of terrorist threats, through the regulation, restriction and control of access, and ensuring surveillance coverage (Coaffee et al., 2009, p.489). Rogers and Coaffee (2005, p.323) assert that government policy has been concerned with making the environment of cities more attractive as a whole, whilst also improving safety and security. HM Government (2010, p.5) states that the incorporation of counter terrorism into the built environment is to be achieved within the overall aim of creating high quality public places. Whilst Harre-Young (2012) highlights that the protection of places can occur through the use of organisational measures such as business continuity management, concern regarding the modification of the built environment remains a constant presence, as highlighted by Coaffee (2010, p.940): "we need to consider the 'physical' changes brought about through counterterrorism measures being embedded in the urban landscape as a result of heightened terror threat levels". Harre-Young (2012), however, highlighted that urban and building design that leads to increased resilience can have a number of advantages, including the ability of measures for specific risks (e.g. counter terrorism or flood risk management measures) being able to do more than their intended outcome, and that commerical and fiscal gains can be accrued by doing so, all of which furthers the resilience of the built environment and its longevity.

4 PROMISING PRACTICE

Evident above are the ways in which emergency planning and the use of urban and building design can increase the resilience of the built environment and those who use it to a vast array of hazards, threats and major accidents. Further still, analysis of literature and of the data collected from the interviews with key stakeholders involved in emergency planning and resilience shows that there is not only promising practice occurring that needs to be highlighted as such, but that increases in resilience can be an integral part of the sustainability of the built environment.

4.1 Resilience in its own Right

Feedback from respondents strongly suggested that the Nottingham and Nottinghamshire LRF is an effective mechanism which facilitates an integrated multi-agency response. A number of reasons were suggested for this, which included debriefing practices, the testing and exercising of plans, business continuity planning, communicating with the public, the engagement with and role of voluntary services, and the extent to which community resilience has been encouraged and developed. Three of the most important aspects that were evident were the relationships between stakeholders, emergency response, and the input of stakeholders into urban design itself.

Relationships

At an organisational level, it was raised that the success of the Nottingham and Nottinghamshire LRF is due to: "the fact that they look at every single department, every single group that should be there, not just it's Police, Fire, council" [Interview(I)11. Senior Manager, Voluntary Service]. This inclusive approach allows a wide range of sub-groups to be created, which are generally seen to be an effective way of working: "If you want to produce some meaningful work which is done with cooperation, which is a requirement of the Act, then you really need those sub-groups in place" [I8. Senior Manager - Planning Organisation]. Good governance and management of those involved was stated as being essential to the effective working of the LRF [I5. Emergency Planner - Planning Organisation]. Noted was the Secretariat to the LRF and that it alternates every two years between the City and County Councils, which results in a slight competitive aspect that typically has positive impacts [I7. Emergency Planner - Fire and Rescue Service].

Individual personalities were emphasised as being an important factor in the effective working of the LRF: "I think the partners work well as a group. I think it is personality. And the chairs of most of the standing groups all work well together" [I4. Manager - Care Trust]. The fact that key stakeholders know each other and their ways of working together strengthens the resilience of relationships within the group and ultimately, their effectiveness in planning for and responding to emergencies.

Response

All LRF partners can activate command and control procedures when a situation that cannot be managed using normal management structures occurs [I6. Manager - Health Trust]. When this occurs, a Gold (strategic) Commander is identified from the lead agency, followed by lower levels of Silver (tactical) and Bronze (operational). These roles can be subject to change, as for example, a fire might result in the Fire Service leading Gold, yet the site could become a crime scene, which would result in the Police taking over. The protocols for response are well known and rehearsed among the stakeholders and can be operationalised extremely quickly. Therefore, in a major incident, everyone is familiar with the different roles and who to communicate with: "a big factory going up in smoke, they [the Fire Service] would let us know… So then we would deploy people to site, we'd open our incident room up at our Nottingham office, that's our area incident room, and we've got a hierarchy of roles that we would send out and they're trained to go to the right place at the rendezvous point and speak to the right people and respond in a professional way" [I8. Senior Manager - Planning Organisation]. In situations which exceed the capacities of the local agencies, mutual aid is invoked with agencies from other regions, with those arrangements also going through periodical testing and exercising.

Input into Urban Design

The Police, the Fire Service and the Environment Agency have input into the design and planning of urban buildings and environments. Specifically in relation to counter terrorism, domestic extremism, and hazardous sites and substances, the National Counter Terrorism Security Office (NaCTSO) co-ordinates trained Counter Terrorism Security Advisers (CTSAs), who are Police staff embedded within each Police Force to undertake threat and risk assessments and provide advice to a range of stakeholders. The Police also have a number of Architectural Liaison Officers (ALOs), who provide advice to those planning new builds on matters relating to 'lesser crime' than terrorism. As there is no legal obligation for organisations to adhere to any advice given, this is therefore couched in terms of developing and increasing business continuity, which is evident in literature (Harre-Young, 2012). Fire regulations exist for all new buildings and the Fire and Rescue Service has legal responsibility for their enforcement. However, the Fire and Rescue service only has statutory rights over enforcement of legislation from "the point at which the building is finished and then occupied" [I7. Emergency Planner - Fire and Rescue Service].

4.2 Contributions to Sustainability

The relationship between resilience and sustainability has been evident in literature for a number of years, with notions of 'turquoise design theories' to denote the typical associations of resilience/security with the colour blue, and sustainability/environmental with the colour green (Perelman, 2008). The developments in resilience, emergency planning, and urban and building design, as previously outlined (Bosher and Dainty, 2011; Coaffee, 2009), have arisen most notably through the emergence of resilience as the key discourse in relation to security, and being an objective of society through to individual buildings. Perelman (2008) states that this is the very essence of 'turquoise design' and the true meaning of resilience; resilience is the merging of security and safety concerns with the broader goals of sustainability and sustainable development.

Coaffee (2008, p.4636) states that "in future decades it is most likely that the sustainability agenda will provide the most appropriate policy vehicle for the achievement of resilience, with security seen as an essential element of corporate and organisational responsibility alongside economic, environmental and social concerns". Such assertions are also evident in a range of governmental and non-governmental literature (Fussey et al., 2011; Coaffee and Bosher, 2008; Zimmerman, 2008). However, how such practices are carried out and incorporated is unclear, although a number of synergies have been identified. For example, Harre-Young (2012) identified that the incorporation of counter terrorism measures mitigated the impacts of a range of other threats, hazards and major accidents, prolonging the longevity of buildings and urban space, and also highlighted a range of environmental benefits.

Integrating Resilience and Sustainability Approaches

Coaffee and Bosher (2008) provide examples of how the potential synergies between resilience (specifically security aspects of resilience) and sustainability might include developing landscaping systems that are both 'green' and can conform to Crime Prevention Through Environmental Design (CPTED) principles. For example, ponds and strategically planted trees can be used as physical barriers against vehicle-borne crime such as 'car bombs' and 'ram-raiders', instead of using expanses of concrete and rows of steel bollards. It is also possible that such ponds and landscaping features could be used as part of sustainable urban drainage systems (SUDS) that are designed to reduce the occurrence and impact of flooding in urban areas (Coaffee and Bosher, 2008).

It is also suggested that integrating security systems with other built systems at the design stage (whole building design) can reduce energy use, as can the use of thick thermal walls or window film, which better insulates a building while providing additional blast resistance or fire protection (Coaffee and Bosher 2008). Arguably, in the future a more inclusive and joined-up approach to integrating resilience and environmental sustainability should be advanced through the greater collaboration between a wide range of stakeholders - architects, engineers, planners, the police, insurers, surveyors importantly, the public, who are, or should be, involved with the planning, design, construction, operation and management of urban spaces. However, while the respondents in Nottingham were generally open to these types of integrated approaches, where resilience and sustainability could be coalesced, a number of barriers were identified that would undoubtably impede the transition from theory to practice; these barriers are discussed in the next section.

5 BARRIERS TO PROMISING PRACTICE

Despite the promising approaches that have been identified within Nottingham and beyond, barriers to such practice being further developed and incorporated are evident, most notably the fragmented nature of the construction industry itself (Bosher and Dainty, 2011). However, other factors were also identified through the key informant interviews, those being fiscal constraints, strategic sign-up, communicating with the public, and the use of tools and hardware, all of which impact the potential of emergency planning and the design or urban space and buildings.

5.1 Fiscal Constraints

The LRF is not a legal entity and there is no budget for its activities; associated costs are met by the relevant agency or sector involved. All respondents expressed concerns about the current fiscal situation, and in particular, the impact of the UK Government's spending cutbacks to public services such as emergency planning. This has resulted in prioritising resources to the groups that have the 'biggest impact' [I7. Emergency Planner - Fire and Rescue Service] and staff cut-backs resulting in some issues being left until a later date [I1. Emergency Plannger - Local Authority], which ultimately affects resilience [I4. Manager - Primary Care Trust]. The full impact of budget cuts is yet to be quantified or qualified, but the fear is it will result in a lack of insurance against incidents, "because if you want that insurance policy, you need that resilience" [I9. Emergency Planner - Police Force]; without it, progress that has been made in relation to resilience and emergency planning could be lost. Within these constraints, there is a need to identify long-term incentives and cost-effective solutions for the protection of the built environment.

Harre-Young (2012) has identified such incentives and solutions in the context of counter terrorism design features, which can include reductions in risk and injuries, competitive gains for engaged stakeholders, revenue generation, increases in reputation, increases in property and area values, and potential insurance incentives. As an example, Harre-Young (ibid.) highlights that exclusion of traffic from a given area (measures that can be used to do so are presented in Figure 2) can be a costly approach to incorporate, depending on the size and context of the space being protected, yet there are numerous benefits, apart from the mitigation of not just vehicle-borne terrorism, but: the mitigation of other forms of crime (such as ram-raiding), reductions in noise and air pollution, less soiling of buildings, increased safety of pedestrians within, and increased footfall that has resulted in increased turnover for retail outlets within the protected zone. It is therefore argued that the incorporation of resiliency measures are a fundamental aspect of sustainability, due to the measures being able to protect and sustain the life of urban spaces that they protect. The aforementioned incentives, therefore, could be suitable for making the costs of some resilience measures more viable or acceptable in both financial and aesthetic terms, and therefore aid in supporting business

cases for incorporating what could be costly resiliency measures, as well as the overcoming of the other constraints that are outlined in the rest of this section.

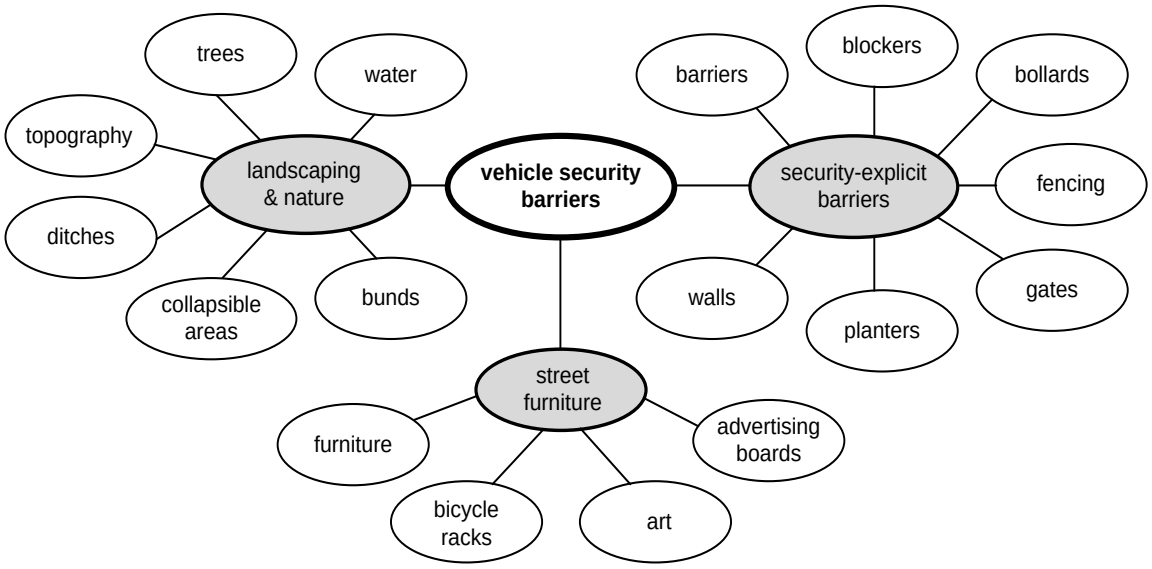

Fig. 2: Measures that can be used to exclude vehicles from a given area (Harre-Young, 2012)

5.2 Strategic Sign-Up

Getting senior management to engage with the LRF process was noted as being difficult, as those in senior positions prioritised issues as they saw fit, rather than according to those defined by the LRF. An example is the need for key decision makers to attend meetings: "you need people there who have got the authority to make decisions, that could spend millions if they needed to" [I10. Manager - Ambulance Service]. There were also concerns about the quality of the multi agency plans as these are difficult to achieve without high level support; "it's about getting people's buy-in for something that you might perceive as important but actually they think it's somebody else's job to do" [I5. Emergency Planner - Planning Organisation]. Authorising the mainstreaming of resilience issues within organisations is an area for improvement, and a lack of awareness of agency involvement in the LRF prevents personnel from engaging with the process, with an example being given of a community safety department not being involved in a 'warning and informing' sub-group, despite the potential benefit of their involvement.

5.3 Communicating with the Public

The UK Government's Community Resilience Programme (HM Government, 2011, p.5) aims to "increase individual, family and community resilience against all threats and hazards". An important aspect of this aim is the requirement to facilitate discussion between all stakeholders, including central government, emergency services, the voluntary sector and communities on good practice. Giving the general public, and specifically local communities, this shared responsibility in ensuring community resilience is arguably a sub-text to the UK Government's strategy to devolve resilience decision-making to the regional and local levels so that interventions are more likely to be self-sustaining.

Central to the Communitry Resilience Framework is effective risk communication at local level to increase awareness and enhance public response. Although there are advances in this area, some interventions that would increase resilience require legislation, in order to, for example, allow mobile phone broadcasts to be made "and just blast everybody's mobile phone to say there's been an incident in Nottingham city centre, please make your way to wherever, and that technology exists" [I9. Emergency Planner - Police Force]. A flood warning system used by the Environment Agency to warn the public of flood risk exists, however take up of this is low, as homeowners "don't want to know because it potentially affects their insurance" [I8. Senior Manager - Planning Organisation]. Consequently, the Environment Agency is considering how to make membership of this list the default position.

5.4 Use of Tools and Hardware

While different agencies use various tools and hardware, there is no common information management system subscribed to by all, although all stakeholders can subscribe to the secure National Resilience Extranet (NRE) which was developed by the Civil Contingencies Secretariat to provide access to restricted documents. Although agencies have been encouraged to do this, not all have done so, with one reason being that it can cost between £15-20,000 per organisation. Atlas Incident Management System (AIMS) is used by several responders however, including the Ambulance service, the Police, the Fire and Rescue Service, and the County and City Councils. The system works through the logging of information and the actions that are required, the allocation of someone to achieve those actions, and whether this has been completed or not [I7. Emergency Planner - Fire and Rescue Service]. The above challenges of strategy, finance and communication are areas that underpin all aspects of resilience; without addressing these broader issues, the success and long-term sustainability of the multi-agency response enshrined in the LRF cannot be guaranteed, despite the skills and efforts of the individuals and organisations involved.

6 CONCLUSION

This paper has explored the interconnectiviites between resilience and sustainability in relation to emergency planning and urban design within the UK. Ideally, the design, construction and operation of urban space should be based on principles that are both sustainable and resilient. With this as a starting point, ensuring resilient management and operation of these spaces naturally follows. However, a further challenge is to manage the existing urban built environment to ensure that effective emergency planning is in place and resilience is maximised. The Nottingham case study highlights a range of promising practice in the UK that increases the resilience of urban space to a range of hazards, threats and major accidents. Central to such successful practice has been the effective individual and organisational relationships, familiar structures for command and control, and level of input into the design of urban space. These examples demonstrate that resilience is actually an integral part of the sustainability of urban space, and not simply compatible with it.

However, such progress is threatened by the potential impact of fiscal constraints and in particular the public sector spending cuts, the difficulty in securing senior management engagement with the LRF, and communication and engagement with the public and local communities. These factors are inevitably linked as increased prioritisation is demanded by restricted budgets. Research has already shown that incorporating resiliency measures can also lead to environmental benefits and increased sustainability, so there is a need to identify such cost-effective solutions for stakeholders so that they continue to prioritise the protection of urban space. However, further investigation is needed to better understand the integrated nature of urban space, how its users are made safer, how its natural environments are better protected, and how urban space can be made less vulnerable to the vast array of hazards, threats and major accidents that pose risks to it.

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Urban Development 2050: Resource Efficiency as Guiding Principle for Rebuilding European Cities

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1 ABSTRACT

Results from the FP 7 project SUME (Sustainable Urban Metabolism for Europe) show the long term im¬pacts of urban form and alternative spatial development paths of European metropoles on resource flows such as land consumption and energy consumption (until 2050).

For the first time, the concept of urban metabolism has been used in a spatially explicit way, demonstrating the effects of transformation of urban form on resource flows. By analysing the current and future spatial dis¬tribution of population and jobs, the transport system and urban building technology, impacts have been mo¬delled. The potential effects or resource-oriented urban planning are substantial: the expansion of the agglo¬merations analysed can be reduced altogether, especially in dynamic cities. The fastest growing agglomera¬tions in the group are Munich, Stockholm and Vienna, where the expansion to 2050 can be greatly reduced by -68 %, -57 % and -75 % respectively. This differentiated spatial development pattern has a great impact on the potential to provide and use attractive public transport.

In order to follow these strategic recommendations, it will be essential to develop a cross-sectoral approach in urban development, integrating urban planning, housing policies, energy policies, infrastructure provision and transport policies. Such integrated, coherent approaches for the development of new and existing urban quarters, however, are hardly being found nowadays. This disjunct, sectorial policy approach is presenting the greatest challenge in bringing about a sustainable, resource-oriented restructuring of European cities.

2 SUME APPROACHES

Results from the FP 7 project SUME (Sustainable Urban Metabolism for Europe) show the long term im¬pacts of urban form and alternative spatial development paths of European metropoles on resource flows such as land consumption and energy consumption (until 2050).

For the first time, the concept of urban metabolism has been used in a spatially explicit way. By analysing urban form and transformation pathways and depicting current and future spatial distribution of population and jobs, the transport system and urban building technology, impacts have been modelled. This has been done in four integrated approaches:

(1) Approach 1: In a long-term scenario approach 2050, alternative urban development perspectives (a trend-type versus a resource-minded development path) have been applied in a consistent way for seven case studies (agglomerations of Vienna, Stockholm, Oporto, Newcastle, Athens, Marseille and Munich), providing with the spatial distribution of population and workplaces in 2050. Demographic and economic development dynamics, of course, are the main parameters influencing the potential to change given urban form.

Results from urban develop¬ment scenarios and metabolism models (below) have been integrated. While the scenarios provide the spatial allocation of population and workplaces and estimate the future use of urbanised land, the metabolism models' focus is lying on estimating building- and transport-related energy flows.

The potential effects or resource-oriented urban planning are substantial: the expansion of the agglomerations analysed can be reduced altogether, especially in dynamic cities. The fastest growing agglomerations in the group are Munich, Stockholm and Vienna, where the expansion to 2050 can be greatly reduced by -68 %, -57 % and -75 % respectively. This differentiated spatial development pattern has a great impact on the potential to provide and use attractive public transport.

In four case studies (agglomerations of Vienna, Stockholm, Oporto, Newcastle), a comprehensive application of all four SUME approaches (see below) was performed.

(2) Approach 2: The spatially explicit urban metabolism model allows for systematic simulations of the functional relations between socio-economic developments and their consequences on the urban metabolism. Based on the scenarios´ spatial allocation of population and workplaces, the metabolism models' focus is on estimating building- and transport-related energy flows (for four key case study agglomerations, Vienna, Stockholm, Oporto, Newcastle). The model can be extended to include greenhouse gas (GHG) emissions and other resource and waste flows. The model was designed in a modular, incremental and flexible way in order to be applicable at different levels of spatial and functional aggregation, ranging from the low spatial resolution applied in the SUME cross-city com¬parisons to relatively detailed and data-rich analyses of selected areas within a city.

(3) Approach 3: Since cities are built in a step-by-step way, with larger or smaller development projects changing the existing structures, it is important to understand the projects' individual contributions to the improvement of the overall performance of a city/agglomeration. The Metabolic Impact As¬sessment (MIA) is a novel methodology to evaluate the effect of proposed urban development pro¬jects on the metabolism of a city. It is a decision-support tool geared to analysing and understanding the complex metabolic consequences of new urban projects or urban plans, e. g. in terms of energy flows associated with the project, for heating, cooling and transport.

MIA addresses a common problem found in many cities throughout Europe and elsewhere: Seen in isolation, a project may look quite attractive and contributing to a sustainable performance regarding energy, land use and material use. However, when plugged into the existing urban fabric of buildings and infrastructure, the impact analysis may show a contribution to a worsening of the metabolic performance. Thus, only projects in the right location and with good infrastructure can provide a positive contribution to the overall metabolic performance of a particular city. This is shown in the four case study projects in four cities.

(4) Approach 4: Urban agglomerations' development processes are very complex. Many factors inter¬sect to generate the spatial pattern that we see in the built environment today. Hence also the proces¬ses, actors and their respective rationales were under scrutiny in the SUME project: 'producers' of the urban fabric, such as landowners, developers and investors, are important players, but they are not the only actors who matter: 'consumers' are also crucial. This group includes individuals and companies who use buildings and spaces in cities, not just the inhabitants of homes and offices, but also visitors to the city, whether for work, shopping or recreation. Sustainable, re¬source-oriented ur¬ban development policies need to understand these complex interactions of pro¬ducers and con¬sumers, and will have to be integrated urban policy packages, addressing both sides and – as has been shown in the analyses of the four case study cities – will have to be coherent over different policy sectors and municipal boundaries.

3 SPATIALLY EXPLICIT METABOLISM MODELLING

Urban metabolism encompasses all flows of energy and material resources of a city or agglomeration; in SUME the relationship between urban form and urban metabolism has been analysed in a long-term development perspective to 2050. It is about the contribution of urban development and reconstruction towards more resource-efficient cities. With the majority of the global population living in urban areas, the question of how existing cities can be rebuilt in more resource-efficient and climate protecting way, is key to our common future. If global efforts to address climate change are to be successful, they will need to integrate city requirements and environmental management capacities (UNEP/UN Habitat 2009).

The urban metabolism concept investigates the biophysical interaction between a society and its environment, by accounting for resource use (energy, materials, land, etc.) and outputs to the environment, and linking these with social, economic and technical parameters. Here, the concept of urban metabolism for the first time is being used in a spatially explicit way, demonstra¬ting the impact of urban form on resource flows, by analysing the spatial distribution of population and jobs, the transport system and urban building technology. This is performed in a long-term scenario approach, projecting the urban development perspectives of seven European urban agglomerations. For four of these agglomerations, a spatially explicit metabolism model has been developed and applied.

Urban forms have been developing over periods throughout history, and can be changed substantially only over longer periods and/or through dynamic restructuring. In search for the potential to reduce urban resour¬ce consumption, the SUME project estimates the potential to transform urban building and spatial

structures to 2050 by applying alternative spatial development policies for a given demographic and economic develop¬ment path. Urban agglomerations in Europe show extremely different spatial dimensions: some are compact and confined; many are fragmented and spread out spatially. Urban transport systems are of very different qualities: some with attractive, well integrated public transport provision; some with reliance on individual transport. Technical building standards – often related to the period of construction – also vary widely, adding to the impact of greatly different climatic conditions. All these differentiations are included in the term 'urban form' as it is used here.

BASE and SUME scenarios – the space for action in seven agglomerations

In the SUME project two different storylines are at the core of two urban development scenarios elaborated for seven cities: a BASE scenario, understood as a continuation of urban develop¬ment policies supporting past spatial development trends; and a SUME scenario, defined as a path of sustainable spatial development. The 'space for action', as referred to in this project, is the choice between these two scenarios, meaning whether or not the SUME principles are being applied in urban development over an extended period. The SUME scenarios – geared to improve urban resource efficiency – are guided by the so-called 'four SUME principles'* for future urban development:

- Principle 1: Spatially focused densification: Promoting a minimum density standard for any new quarter and redevelopment of existing low-density quarters in areas with attractive, high-level public transport
- Principle 2: High-density development only with access to high-quality public transport: Focusing new high-density developments exclusively in areas close to public transport networks (especially those with job and service functions)
- Principle 3: Functional mix in urban quarters: Providing a mix of functions (i. e. residential, jobs and services) in close proximity to each other at the local level, allowing for short-distance access
- Principle 4: Combine urban development and building (object) reconstruction: Improving the thermal quality of buildings and using the opportunity to improve the spatial qualities of urban quarters[1]

* To increase the impact, these principles should be applied in combination with each other.

It seems clear that the importance and potential impact of each of the four principles depends on the current urban form of the respective city. The varying range of potential future improve¬ments in terms of land use and energy consumption is analysed in the subsequent case study cities presented below.

4 RESULTS FROM URBAN DEVELOPMENT SCENARIOS AND METABOLIC MODELLING

4.1 Urban development scenarios in 2050

Urban development scenarios have been elaborated for the so called Urban Morphological Zones (UMZs[2]) of different cities. Comparing the urban development scenarios shows that there is a great potential to impact urban form over time if a consistent set of policies is being applied, as assumed in the SUME scenarios, and if there is some growth. It is important to note that growing cities have a great¬er opportunity to improve existing spatial structures than stagnating agglom¬erations (comparing BASE and SUME scenarios). Therefore, the case study cities with substantial growth perspectives (especially Stockholm UMZ and Vienna UMZ, but also Marseille UMZ and Munich UMZ) show the greatest differences between the alternative scenario futures – there, spatial planning decisions will have a major impact on future metabolic performance.

Comparing BASE and SUME scenarios also shows that the differential between the policy sets add up and become resource-relevant over time: There is significant room for improve¬ments, if past spatial development has not been consistently sustainable (as in the case of Vienna: filling up spatial gaps near major lines of transport and moderate densification in underused but well serviced areas can have a major

[1] Likewise, these efforts should be seen in combination with Smart City initiatives, improving the production of renew¬able energy and the intelligent distribution of energy flows.

[2] The continuously built-up area of an agglomeration, as defined by UN-Habitat (200 m max. distance between buildings, based on the CORINE land cover data).

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impact). On the other hand, the case of Athens also shows the limits to a strategy of further densification: here, densities are already high enough to provide attractive urban transport systems; expanding and improving the transport system is a key for more sustainable transport in this agglomeration.

The BASE scenarios show a substantial expansion of the UMZs for the fast growing cities, ranging from a growth by 24 % in Athens UMZ to 30 % in Marseille UMZ, 41 % and 47 % in Munich UMZ and Stockholm UMZ to 54 % in Vienna UMZ. These results are due to population increase, a pro¬por¬tional growth of jobs and a continuing increase of the per capita floor space consumption.[3] It has been assu¬med here – based on the empirical evi¬dence of the past – that the historic trend of floor space increase will con¬tinue in a stable eco¬nomic development, but the per capita growth will slow down compared to past decades.

From this 'baseline' of expected development, the so-called SUME scenarios demonstrate a develop¬ment path which should provide for lower resource consumption (land use, energy, materials) and can be reasonably achieved through concerted urban development policy packages. SUME scenarios focus on inner-city development, high-level public transport axes and more compact development on the fringes of the existing UMZ.

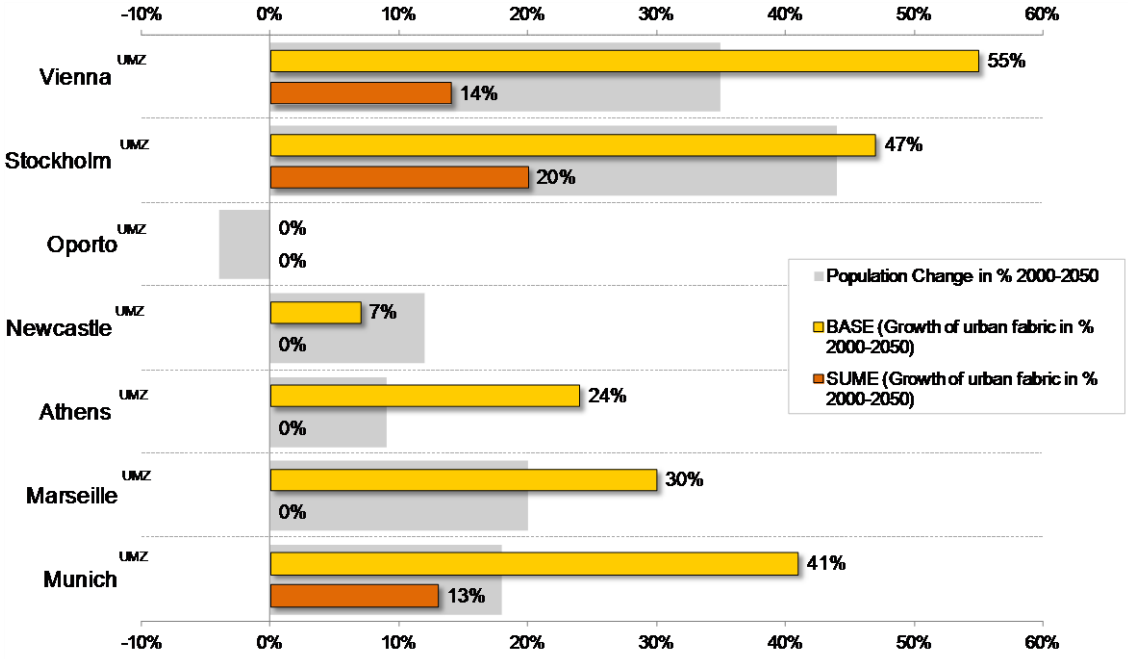

Fig. 1: Spatial development scenarios: Population growth and expansion of the Urban Morphological Zones (UMZs), comparing BASE and SUME scenario. Source: SUME Working Paper 1.2 (2011).

The potential effects – the results of the search for an 'action space' – are substantial: the expan¬sion of the agglomerations analysed can be avoided altogether in Oporto UMZ and Newcastle UMZ, mainly due to their small demographic development, but also in dynamic cities such as Athens UMZ and Marseille UMZ. The fastest growing agglomerations in the group are Munich UMZ, Stockholm UMZ and Vienna UMZ, where the expansion to 2050 can be greatly reduced to 13 %, 20 % and 14 % respectively. This differentiated spatial development pattern has a great impact on transport, with a direct ef¬fect on the potential to provide and use attractive public transport. This effect has been ana¬lysed through a combined transport and diversity-pattern indicator, which shows a considerable de¬terioration in all BASE scenarios and the need for concerted policy measures – as in the SUME scenarios – in order to maintain or slightly improve the existing level of public transport provision.

4.2 Overview results from metabolic modelling for the four main case study cities

The individual case study city results for the two spatial development scenarios, with their spatial distribu¬tion of jobs and residents, localisation of services and central functions and fast lines of public transport, were used as input for the spatially disaggregated modelling of energy flows in the four cities (Vienna, Stockholm, Oporto, Newcastle).

[3] Defined as average per capita residential floor space in m².

The table below, an overview of the main results for the agglomeration aggregates is given for both, the building and the transport model results. It shows the final state of development in 2050, comparing the per capita energy demand figures for heating and transport in the BASE and SUME scenarios. The main results show that today's energy demand can be reduced by 60 % to 80 %, varying between cities and scenarios. In general, a SUME-scenario-type agglomeration development will reduce energy consumption between 10 % and 40 % by the year 2050 compared to the BASE scenario.

	Vienna UMZ	Stockholm UMZ	Oporto UMZ	Newcastle UMZ
Per capita energy demand for space heating in 2050 (GJ p. a.)				
2001	**42,8**	**57,0**	**22,8**	**50,6**
BASE scenario	**16,1**	**18,0**	**9,9**	**18,3**
SUME scenario	**9,2**	**11,1**	**8,8**	**9,8**
SUME vs. BASE (abs.)	**-6,9**	**-6,9**	**-1,1**	**-8,6**
SUME vs. BASE (%)	-42,7 %	-38,1 %	-11,1 %	-46,8 %
Per capita energy demand for transport in 2050 (GJ p. a.)				
2001	**11,2**	**15,3**	**17,8**	**13,3**
BASE scenario	**5,6**	**7,3**	**5,1**	**4,0**
SUME scenario	**3,9**	**5,7**	**4,9**	**3,5**
SUME vs. BASE (abs.)	**-1,7**	**-1,6**	**-0,2**	**-0,4**
SUME vs. BASE (%)	-30,0 %	-21,8 %	-4,9 %	-10,7 %

Fig. 2: Metabolic modelling results: Per capita energy demand for heating and transport 2050 in four cities (UMZs). Source: SUME Working Paper 2.3 (2011).

The following figures show the modelled development of energy demand in the periode 2001-2050 and the space for action between BASE and SUME scenarios for the examples of Vienna and Oporto – the two UMZs with the highest respectively the lowest action space in terms of energy demand.

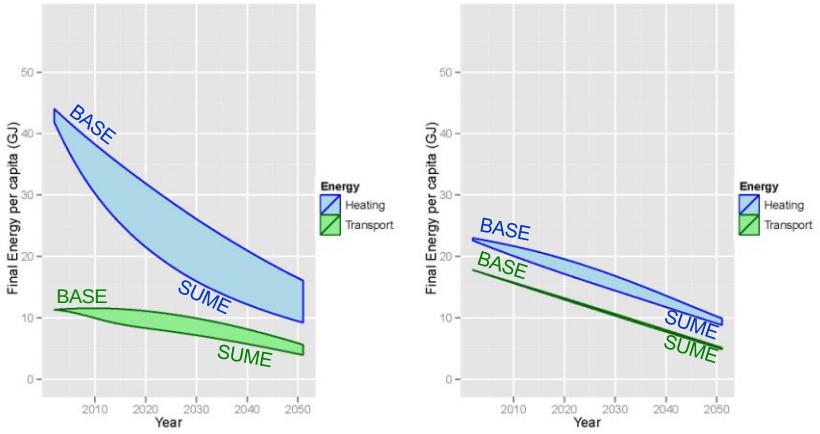

Fig. 3: Metabolic modelling results: Per capita energy demand for heating and transport 2001-2050 in Vienna (left) and Oporto (right) UMZs. Source: SUME Working Paper 2.3 (2011).

The results demonstrate that, even in a future agglomeration development which will use all available tech¬nological improvements, there is a great differential between a BASE- and a SUME-type development: A higher replacement or renovation rate of buildings and a better spatial focus of new developments with respect to public transport accessibility will reduce energy con¬sumption by 30 to 40 %. Only in special situ¬ations like in Oporto, where relatively small changes are anticipated for both components – buildings and transport – will the differential between the BASE and SUME scenarios be less than 10 %.

5 METABOLIC IMPACT ASSESSMENT (MIA) FOR URBAN DEVELOPMENT PROJECTS

In principle, Metabolic Impact Assessment (MIA) can be applied to different types of planning proposals – policies, programmes, plans and projects. However, within the scope of the SUME project, it was applied to detailed plans of large urban development projects. It has been recognised that at strategic levels, MIA's application will be complex and demanding. At a local level, data is more easily identified and the analysis becomes more objective.

Within the general objective of SUME, to analyse the impacts of urban form on resource use, the application of MIA has focused on specific components of urban metabolism, namely energy, land use, water and materials. Moreover, in each case study some limitations of data have caused further restrictions.

The four case studies in the European cities of Vienna, Stockholm, Oporto and Newcastle have demonstrated the application of this new method. The case studies show the impact of projects, compare them with the performance of alternative projects and of the relevant districts within the agglomeration. Applying MIA can lay the ground¬work for improving planning proposals in key aspects of urban metabolism and also contri¬bute to a necessary assessment of alternative locations for such projects within the urban fa¬bric. MIA shows that it is essential to include the impacts of urban development projects regar¬ding infrastructure needs and transport in the agglomeration context, because a) unexpected effects in other sections of the complex transport network can be detected; and b) underuse of existing infrastructure in certain districts can be determined. Both of these potentially lead to substantial project modifications.

6 METABOLISM-ORIENTED, SUSTAINABLE URBAN DEVELOPMENT STRATEGIES

To improve the metabolic performance of a city or agglomeration, urban spatial development strategies should focus on the application of the four SUME principles for developing new settlements and for rebuilding existing quarters. This would be an ongoing process with a clear strategic orienta¬tion:

- Containment at the level of agglomerations: reduce urbanisation expansion to a min¬imum, keep travel distances low, provide for good spatial access to public transport routes and attractive service there. Currently most growth happens in the spaces be¬tween transport axes in areas out of reach of attractive public transport.
- Spatially focused densification in low-density urban outskirts: key strategy in growing cities to avoid expansion and improve transport service quality.
- Locate services and offices at transport nodes and allow for a mix of functions at neighbour¬hood level: the busiest nodes of agglomerations' public transport systems are attractive for office and service space, and most advantageous for the location of jobs with excellent access to public transport. At a neighbourhood scale, it is also important to have a functional mix within each of the urban regions' neighbourhoods to provide for services and access to daily supplies at short distances.
- Improve agglomerations' public transport systems: some urban regions have comparatively high densities, but do not provide well developed public transport systems – there exists a great potential for improvements, particularly at agglomeration level (reaching out from the core city into the surrounding urbanized area).

Urban development policy packages (see below) need to be oriented towards the following:

- All urban growth and the life-cycle turnover of built structures should be used as potential to improve the existing urban form, both in terms of spatial structures and object qualities – urban growth in this sense is not an enemy to sustainable development but can be a partner in getting there.
- Large urban development projects can be located and serviced with infrastructure in such a way that they improve the overall performance of a whole area of a city/agglomeration (see MIA).
- At the level of users/developers, all ongoing relocation and renovation activities have the potential to improve urban form qualities, if continuously directed regarding location, building standards and functional distribution (residential, services, jobs).

Renovation and building rehabilitation programmes for urban quarters should reach beyond solely improving thermal qualities, but include raising inner-city attractiveness (green spaces, pedestrian/bicycle mobility, services) and putting metabolism-relevant technology in place (this means connecting this spatial strategy with smart city initiatives, e. g. including energy networks, storage and production of renewable energy).

In order to follow these strategic recommendations, it will be essential to develop a cross-sectoral approach in urban development, integrating urban planning, housing policies, energy policies, infrastructure provision and transport policies. Such integrated, coherent approaches for the development of new and existing urban quarters, however, are hardly being found nowadays, presenting the greatest challenge in bringing about the sustainable, resource-oriented restructuring of European cities (see policy recommendations below).

When following these general recommendations, it is important to note how different the starting conditions and development perspectives in European city regions are: urban form, density and fragmentation and the quality of existing transportation networks demonstrate tremendous differences. Adding to this complexity,

the outlook for future population and economic development ranges from fast growth to stagnation or even decline and out-migration.

As a result, fast growing urban agglomerations have a greater potential to improve their exis¬ting urban form overall – stagnating agglomerations need to focus on strategic use of their turnover potential and improve¬ments to existing urban quarters.

The second challenge for those urban regions, however, comes from the fiscal side, since stagnating cities usually have only very limited financial resources with which to improve public transport systems and support an aggressive renovation strategy. Those city regions will need most attention and support from the national and/or EU levels of government.

A portion of these recommendations have been applied in the SUME case study cities; still, in most cities and their respective urbanised regions, it seems to be a long way from a coherent and complete implemen¬tation of the recommended development strategies.

7 METABOLISM-ORIENTED, INTEGRATED POLICY PACKAGES

Based on the SUME findings, we recommend that at the EU, national and municipal levels, the metabolism-oriented spatial development strategies as described above should be incorporated into urban policies, strate¬gies, and plans. At all levels, these policies may be encouraged through:

- using an urban agglomeration perspective (e. g. UMZ) as the basis for information gathering and comparison, as well as coordinated policy development and implementation;
- introducing metabolic standards for urban areas as a way of raising awareness and policy development;
- using comparative, long-term metabolic scenarios for information, coordination and action;
- encouraging Metabolic Impact Assessment (MIA) as an additional method of evaluating new developments and improving the conditions of existing areas.

A coherent, integrated policy approach for sustainable, long-term urban development should encompass five key elements, addressing both sides of urban development, producers and consumers:

Governance, planning and building regulations; incentives; education and raising awareness; direct pro¬vision; and promoting behavioural change.

Governance, planning and building regulations

Planning processes need to be integrated in governance structures that allow for cross-sectoral strategy and decision-making. Anchored in such a comprehensive governance structure, plan¬ning processes should be designed and equipped in a way that they can proactively elicit the participation and contribution of non-governmental actors (both private and public). It is increasingly important to strategically bundle public and private resources together. Commit¬ment of stakeholders and strategic leadership through the municipalities become the crucial characteristic of future sustainable urban development.

Urban redevelopment of existing quarters, smart city initiatives or agglomeration-wide transport systems are examples where such a cross-sectoral approach – also reaching beyond adminis¬trative boundaries – is nee¬ded. Judging from the four case study agglomerations, implementing the four SUME principles will be chal¬lenging for policymakers, requiring much more effective governance structures.

Incentives

Understanding the market mechanisms and the dynamics of property values and property development is a starting point for the design of effective incentives, by which cities can give targeted stimulus and guidance to actors in urban development processes. Effective sets of incentives need to be wide-ranging (crossing administrative boundaries), precise (in relation to development patterns) and long-term. Intervention is necessary to alter development patterns, foster specific built forms and behaviours, and discourage others.

Tax breaks, subsidies and grants in various combinations have been common incentives; in financially less buoyant times, differentiated tax increases and pricing related to behaviour patterns, etc., may be introduced as effective measures. Again, as the experience from the case cities has proven, both targeting and a compre¬hensive approach will be key to success.

Direct provision

Direct intervention by public authorities can steer development towards more sustainable patterns of urban form as described by the SUME principles. Where municipalities have played a direct role in urban develop¬ment, their effectiveness in delivering SUME principles has been noticeable. In the case studies, Vienna, where over half of the households live in either subsidised or municipally-owned housing, may stand out as an example of a municipality's strong, direct role in urban development. Innovative housing competitions are used for large subsidised housing projects, combined with direct provision of infrastructure projects.

In this approach, the active acquisition of building land at reasonable prices is crucial, as in Sweden, where municipalities have the power to acquire land and set up construction and housing management companies. However, these approaches are more geared to greenfield development – a complementary instrument for the redevelopment and densification of existing urban quarters is still lacking.

Education and raising awareness

It is crucial that both the producers and users of the built environment have a high level of awareness of the issues, whether through promotion of standards, codes of practice or under¬standing of the social, cultural and psychological aspects of sustainable development which are key to changing behaviour. Combining this with (and promoting) financial incentives, to stimulate sustainable urban develop¬ment and to reduce CO2 emis¬sions, will increase the effectiveness of awareness-raising initiatives greatly. According to a Stockholm prac¬titioner, the 'pricing of unsustainable solutions could generate better knowledge on sustainable solutions'.

Promoting behavioural change

'Social practices' in relation to individual behaviour play a key role in implementing sustainable urban development strategies. All the case study cities need to do more in this area: the mismatch between the po¬licies' intentions and their actual – visible – implementation often contributes to the reluctance on the part of consumers to adopt more sustainable lifestyles.

Positive examples – encouraging mixed-use developments, thermal improvement, shopping street redevelop¬ment, pilot projects such as large, innovative passive house development (e. g. over 700 flats in Vienna's Aspanggründe) – have had a number of positive impacts, such as improving the thermal quality of existing and new buildings. Encouraging wider involvement and participation at every stage of policymaking can help build broader community support for policies.

8 GOVERNANCE, INSTITUTIONAL CAPACITY AND STRATEGIC EU SUPPORT

Given the complexity of contemporary urban systems, the capacity to design and implement effective urban development strategies depends on the quality and capacity to coordinate interdependent actors within and beyond the formal governance structure.

Working 'in between' the legal system, development processes, the political system and community concerns to achieve public realm benefits is difficult – requiring organisational structures, platforms and pro¬cesses capable of developing, guiding and implementing sustainable strategies. These (new) organisational forms and activities also need personnel skilled in grasping urban dynamics and understanding legal issues, often in relation to complex technical and/or political issues.

Commitment to adopt the four SUME urban development principles is the first step; to bring the relevant actors together into a workable organisation and an effective governance structure is a major challenge. Only then will coherent strategies and policy packages be drawn up, equipp¬ed with resources for implementation and guided through the implementation process. It is clear that work will be required to ensure that the institutional framework necessary for policy implementation is in place.

The lessons from cities which have been more successful in implementing policies to shape urban form in more sustainable ways include:

- Open planning processes with broad participation, so that citizens are fully aware of the factors being considered. If the reasons for the four SUME principles being adopted are made clear, along¬side the targeting of consumers discussed above, this increases the likelihood of building consensus and should increase the level of acceptance.

- Governance structures to maximise plan effectiveness: fundamentally, if the governing bodies in an agglomeration lack the capacity to act collectively, it will be impossible to adopt the four princi¬ples. Proactive organisational development strategies are essential to improve governance capacities.
- Cross-sectoral policy coherence: this also reflects the conclusion that policy context is vital. Inte¬grating land-use planning with transport, legal structures and incentive patterns, energy planning and other policy areas is essential, needing political support and coherence across tiers of governance.

Institutions and policies at EU level

Urban planning is not a formal competence of the EU. Nevertheless, various EU policies and programmes can have substantial impacts on the nature of development in urban areas (e. g. Structural Funds, the Com¬mon Transport Policy, the Air Quality Directive, Birds and Habitat Directives and procurement regulations). These European policies can also exert various indirect influences on urbanisation patterns, some of which can be supportive to sustainable urban development, but others may be obstructive. Promoting sustainable urban development has been at the heart of the EU's regional policy since its inception in 1989.

At the European level, greater attention needs to be given to issues of resource efficiency and urban development in allocating research money (Horizon) and also in the use of structural fund money. Programming, ex ante evaluations, project selection and assessments need to prove that the EU-co-financed project will have a positive net effect in terms of the resource efficiency and the application of advanced technical standards, not a contribution to an ill-defined "economic competitiveness".

However, European cohesion policy will only be effective in supporting sustainable urban development when supported by legal systems within member states that affect land-use planning and development, such as incentives and taxation – particularly taxation related to property – and zoning. Decisions on these policy areas remain the preserve of national, regional or local authorities.

The common challenges to the quality of life in towns and cities are frequently beyond the control of local agents alone. Since the EU has no direct mandate for urban affairs, its involvement in urban affairs must always be sensitive to the subsidiarity principle. However, the performance and development of cities and towns clearly has a European dimension, which must be addressed with supportive action at the EU level. SET-PLAN and Smart City Initiatives, as well as the Research Framework programmes (Horizon 2020), already do have a major impact and will increasingly do so in the future.

It is important, however, that the governance of complex spatial urban development strategies is understood as an essential key for success. Therefore, research and pilot actions, awareness and knowledge exchange will be extremely important in improving urban governance. EU support here will be most valuable, if urban redevelopment is not to be lost within discussions of purely technological 'solutions'. The design and implementation of effective governance structures for agglomeration development also require innovative encouragement on the part of the EU.

The review of actors and institutions involved in urban development has illustrated that the management of urban issues is complex, and is influenced by a multitude of issues and stakeholder interests. These need to be considered and reflected in any policy response. At the European level, policy requires consistency in its urban approach, based on an audit of the impacts of EU policy in terms of the implications for the urban level, and by developing supportive cross-sectoral policies for the urban area. To achieve this, closer partner¬ship with the local level of governance is key, while respecting the multi-level nature of governance in Europe and the specific local division of roles and responsibilities.

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Urban Governance and Contribution of Climate Change Consideration and Energy Efficiency: Case Study of Hashtgerd New Town, Iran

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1 ABSTRACT

Local government, as subset of national state and an organizational framework of city development have a great impact on efficiency and function of the city towards reaching sustainability and energy productivity; and determine interactive of urban management with the main subject of this paper, meaning climate change and energy efficiency. This paper is about best actions and policies that could change the local government of Hashtgerd new town in Iran,[1] to a key and effective elements to develop and optimum execution of urban energy consumption and decrease of CO2 gases. Main efforts were on conformity of environmental conditions and making approaches and actions native, extracted from successful experiences of leading countries. The research approach to encounter with this issue is a combination of applying a multidisciplinary view, urban planning strategies, integrity of urban management and organizational capacity making. Finally, an action plan has been produced, which is a new plan for integrated and coordinated local management in Hashtgerd new town that have a specific look on energy consumption optimization, decreasing of CO2 and sustainability.

In current situation, municipalities, as key elements of local government system in Iran, are responsible mostly in execution of urban development plans and have limited rights in preparing, approval, review and amendment of it. They encounter with several problems such as multiplicity of decision making institutions, implementation of parallel managements, ambiguity of authorization and responsibilities and power, absence of coordination, lack of institutional capacity and urban disintegration (including functional, political, planning, benefits (beneficiary and influential), spatial and structural disintegration). In addition, separation of urban planning and its execution section, resulted in abundant problems and challenges and is one of the main factors of non-fulfillment of comprehensive and detailed plans in urban areas.

New towns, unlike the existing towns have the potential to be energy efficient from the start of their construction. Sustainable urban development and efficient management system at local level are the two essential factors in this context. On the contrary, for new towns in Iran (such as Hashtgerd new town) no special local government system is defined and its position is not clear. This is resulted urban fragmentation, dual management because of interference of authority and responsibilities of New Town Development Corporation and municipality. Thus, due to mentioned insufficiencies, related actions about decreasing climate change, energy efficiency and sustainability, which are in planning and urban designing stages are left from the scope of authorities and responsibilities of urban management and adequate capacity and preconditions for taking any action are missing.

As a result, establishment of an intra-section institutions as an interactive point and homogeneity of organizations and institutions in Hashtgerd new town is necessary. Actually, this institution besides the city council that is a public and elected institution could help to increase the horizontal co-operation across multiple sectors at local and municipal level and the vertical co-operation between central, regional and local level. Also may provide more linkages and interaction among peoples, private sector and non-governmental stakeholders. The aim for establishment of this institution is to provide a multi-level governance framework for the management and planning of the city, to effectively tackle climate change and increase energy efficient urban development.

2 INTRODUCTION

Climate protection is an urban issue. Urban areas produced a high proportion of Greenhouse Gas (GHG) emissions, especially in high income countries. Also, cities are vulnerable to the impacts of climate change, particularly in developing countries. In addition, there are strong argues which support the relevance of the

[1] New town of Hashtgerd is located 80 km west of Tehran. This new town is the case study of Young Cities project that is a German-Iranian research and development project set up for five years until 2013. The young cities project belongs to a worldwide ‘‘family’’ of ten research project that are funded by the Federal Ministry of Education and Research of Germany and dedicated to the question of energy efficient urban development in future megacities.

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city level and climate protection. While, cities are places of aggregation of knowledge and wealth, they result in political matters. City levels are an effective scale for political interferences that have fewer obstacles than national and international levels. Also, local political and governance structures could be effective in policy making scopes such as transportation planning, urban planning, urban design and land-use planning and conduct them towards adaptation policies. The said scopes have significant influence on decrease of climatic change and energy consumption because they determine spatial and physical structures and affect energy consumption, directly or indirectly, and therefore diffusion of GHG. Thus, effective solutions need application of the most proper factors and actions in different spatial, physical, institutional, managerial and planning levels, which is resulted in improving of climate change adaptation and mitigation actions in various spatial levels.

This paper is about best actions and policies that could change the local government of Hashtgerd new town in Iran, to a key and effective element to develop and optimum execution of urban energy consumption and decrease of CO2 gases. Main efforts were on conformity of environmental conditions and making approaches and actions native, extracted from successful experiences of leading countries. This aim achieved through exploring good case studies on urban governance of climate change in pioneer and leading countries so that how climate protection is being addressed within local government and engaged with the different forms that through which governing take shape . In fact the processes and power through which governing is arranged is the matter of interest. However, the competencies and powers of municipal governments in these leading countries and Iran differ significantly. What can be achieved at the local level depends critically on the nature of central-local relations, and local competencies for climate protection. I begin by identifying the essential factors behind the growth of local climate governance. I then explore the current situation of urban governance system in Iranian cities (new towns in particular), and the role that local government can play in area of climate change policy and energy conservation . This leads to the formulation of potential, challenges and a model which shows the preconditions and reforms need the current urban governance system in new towns in Iran. The paper concludes by providing a local climate action plan through a multi-sector network approach. Thus, this research has examined both the character and capacity of local authorities particularly municipality and emergence of new forms of governance.

2.1 Local governance and climate change protection

Key determinates for governing climate change in cities

Review of literature shows in order to understand how climate change mitigation is being governed locally it is important to consider: actions across the different modes of governing, potential for local authority action on urban policy sectors, local governance capacity and multi-level governance. Bulkeley and kern (2006, p2243) have identified four modes of climate governance for a local authority. Table 1 outlined the key determinates for governing climate change in cities.

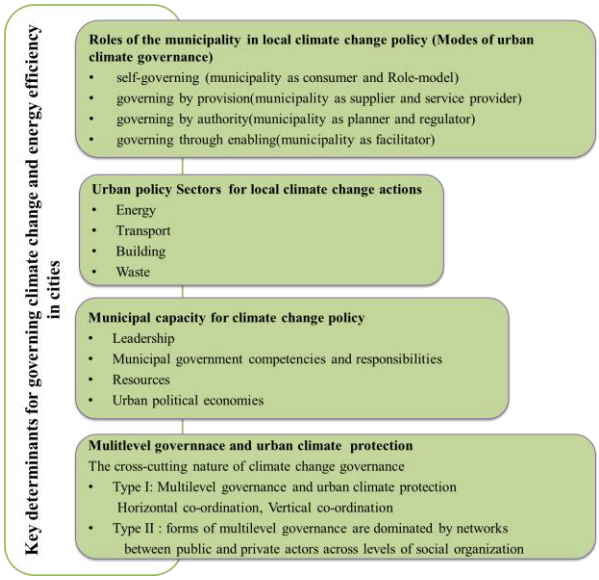

Fig.1: Key determinates for governing climate change in cities. Source: Author

Local governance capacity

A range of authors such as: Alber and Kern 2003; Betsill and Bulkeley 2007; Collier 1997; Schreurs 2008; Bulkeley and Betsill 2003; Bulkeley and Kern 2006; Qi et al 2008 identified crucial factors that shape local capacity to address climate change. The most frequently pointed factors are: leadership; municipal competencies; resources; and urban political economies. Table 1 shows these factors and their importance.

Key factors	Characteristics
Leadership (committed individuals)	In terms of the role of individuals as leaders within a municipality. The degree of institutionalization of climate change agenda by policy entrepreneurs and political champions is critical to local governance capacity.
	Available opportunities for municipalities to perform leadership roles with respect to their peer communities. E.g. the ability of London to position itself at the forefront of the movement of 'global' cities to address climate change through the formation of the C40 network gave strength to internal policy commitments to address climate change.
Municipal government competencies and responsibilities	Competencies, power and duties of municipal government in the key sectors of energy, transport, planning and waste are critical in shaping the capacity for local climate change policy and action. National policy and central-local relationship play very important roles. However, The capacity challenges facing municipalities with respect to their competencies and responsibilities are only partially derived from their relation with national government, but also dependent on their relation with other partners, and on the ability for local governments to create an enabling environment for local civil-society action. It demonstrates that municipalities have competencies both to shape their own emissions profiles, and through the use of different modes of governance (see 2.1) can affect the emissions generated at the local level by a range of actors and activities. Research shows that when competencies for regulation, provision and enabling modes coincide, capacity to act on climate change can be achieved at higher levels.
Resources	Local authorities' financial and human resources can deploy in relation to address climate change. Limited human resources can make a significant difference to the extent and efficacy of measures to address climate change. While lack of finance for basic service provision is acute in many cities, this is also a key issue in relation to the mitigation of climate change for investment in low carbon energy and transport infrastructures. Both, external and internal source of funding are critical. Significant difference in the local capacity to address climate change can happen through secure funding from external sources like national governments. Presence and ability of individual political champions or policy entrepreneurs are the key factors for securing internal funding. Innovative financial mechanisms within municipalities such as energy performance contracting can overcome their inflexible budgetary structures.
Urban political economies	Climate protection is a political issue, where different actors and groups have their own understanding of the problem and responding upon. A key aspect in this regard relates to the priority which is accepted locally. Often climate change responses considered as a negative connotation that slow economic growth and hinder development of basic needs. However, reframing or linking climate change problem to other pertinent local issue such as air quality can mobilize local action on climate change effectively.

Table 1: Local governance capacity for urban climate change mitigation. Source: adopted from Bulkeley et al. (2009)

Multi-level governance

Vertical and horizontal co-ordination (multi-level governance) is another key factor regarding capacities of local governance for climate action. According to Betsill and Bulkeley 2007; Abler and Kern 2008 evidence to date presents that municipal climate change mitigation policy remains concentrated in environmental departments, fragmented, and often isolated from national and regional climate change policy. This is due to dispersed nature of climate change governance which caused a highly fragmented strategies and actions. Therefore, a multi-level approach has increasingly been highlighted and demanded by different authors and expertise in the context of cross-cutting nature of governance (see Betsill and Bulkeley, 2007:448; DeAngelo and Harvey 1998; Bai 2007:24; Crass, 2008:7; Alber and Kern 2008:6). Regardless of the constitutional form of government, multi-level governance calls for a narrowing or closing of the policy gaps among levels of government. It also provides a flexible framework to understand relationships between different actors

horizontally across and vertically between different levels of government. The integration of climate change policies with other policy sectors such as transport, planning, economic development and etc. call for a greater co-ordination between different agencies and policy division within municipalities which calls horizontal co-ordination. On other hand, the vertical relation of different levels of government can enable or constrain municipal responses towards climate change mitigation. According to literature co-ordination of competencies and resources and national level commitment and political will play important roles regarding vertical co-ordination.

2.2 Urban governance and climate change in Iran

In case of Iran, energy consumption and climate change consideration in urban areas is more significant due to its rapid population growth, young population and massive uncontrolled urbanization. One of best example in this regard, which is research area of this study, is the city of Tehran and its surrounding new towns which forming the Urban Growth Center, has a considerable impact on climate change and energy consumptions. Nevertheless, climate change in Iran is not high on the agenda and has low priority. Iranian cities are vulnerable to climate change and have potentially significant contribution to global GHG in the medium to long term, but their responses represents hitherto mostly neglected area for research. However, in recent years, the Iranian government has started to realize the importance of energy efficiency, the use of renewable energies, and is trying to apply them in developing different energy policies and strategies. At the national level, government has implemented the main national policy on energy-efficiency within its Five-Year- Development-Plans (FYDP). Several sectorial policies have also been ratified and several energy-related organizations have been established in governmental institutions. But results have not been very successful due to institutional problems such as parallel institutional structures and a lack of effective coordination. On the local level, which stands in the center of this research study, existing sectorial and national policies for energy efficiency and climate change mitigation have not been very successful yet. Local actors due to highly centralized and sectorial political structures have comparably low influence for these matters. In the case of municipalities, there is a lack of recognition and knowledge concerning the municipal role in improving energy efficiency and climate change mitigation. Also, there is an absence of a well-defined autonomy for municipalities regarding energy issues at the local level. In addition, municipalities are hindered by limitations associated with the power and competencies of municipal authorities and financial resources to implement energy efficient activities. On the other hand, organizations responsible for the planning and management of new towns such as the New Town Development Corporation, the city council, etc. are currently not sufficiently aware and have not performed adequately in this regard up till now (which is also the case in Hashtgerd new town). The importance of energy conservation and CO2 reduction becomes readily apparent if one considers first the growing trend of new town construction in Iran, and second that these new towns, unlike existing ones, have the potential to be energy efficient from the start of their construction. Here, I review each of these factors in turn. This problem is also obvious in new towns of the country.

Macro administrative- executive system in Iran

Studies and assessments about current situation of urban governance system in Iran demonstrated different problems. A large part of these problems are the result of inappropriate macro administrative-executive system of the country. The main features of this system are expressed in detail below.

Political- social history of Iran demonstrates that regarding political development level and its social-economical structures, it is classified in centralized systems. Factors such as long record of absolute governments and severe political and administrative centralization resulted in non-acceptance of innovation in creation of policy making and legitimacy (Ghavam, 1993). This is resulted in the fact that the current organizational structures were under dominance of dative and formal elements and there was less space for informal and selective elements. The mentioned general conditions caused tendency of managers and managerial systems towards absolute power and dominant of formal authorities and did not permit participation of management systems to informal and public participation. This problem is tangible especially in urban governance system that inherently needs more active participation of peoples and informal groups and had wide consequences. On the other hand, dominance and partial priority and/or absoluteness of the authorities on formal rules and regulations resulted in the fact that top managers have significant effects on their organizations and to fulfill organizational objectives and sometimes personal

benefits, ignore rules and regulations. Moreover to centralization and shortage of general participation mechanisms in the records of society's political culture, weakness and defects of management system and its supervisory mechanisms, gaps and defects in regulations, and inconformity of them with managerial realities and necessities caused more difficulties. The state's administrative organizations were generally established based on sector classification and have sectorial function with vertical relationships in all around of the country, while macro administrative- executive system of the country needs existence of organizations with spatial and multi- section functions. Current relationships are vertical and unilaterally top-down; in a way that decision making is done on top and execution is done on the bottom and there is no significant possibility for interference and participation of the lower levels in decision making process (Hamin, 1992). This macro system includes Iranian urban governance as well . In fact urban governance has been shaped in the framework of this macro system and act based on it. Consequently, these shortages and difficulties have a dominant impact on urban governance system as well.

Urban governance structure: related organizations and their relationships with urban management

Urban governance structure in Iran could be classified in three levels of macro (national), regional and local levels. In macro level, ministries or organizations are placed that their working scope is all around of the country and are capable of decision making about local government. Main units of political division in Iran are: country, province, county, district, city and village. The political division system sets out the spatial framework in which different organizations operate. Usually, all administrative organizations in Iran follow the levels set out by political divisions. Thus, the government system has a hierarchical order. There is no independent local government organizations in regional level, but available organizations are accounted as province branches of the ministries and state organizations that could be act in the province level and effect on urban management in that levels. In local or urban levels, except from municipality, which is the main element of local government in Iranian cities, other organizations, including official or unofficial ones are running the city. Official elements include municipality, city council, governor, county planning council and organizations related to infrastructure and urban services like water, electricity and gas departments.

Current objectives and policies in Iranian local government system are classified based on three resources: 1- Five-year economic, social and cultural development plan of the country; 2- Urban development plans and; 3- Regulations of municipalities. One of the main resources for determination of local government objectives that involves in macro targeting, is the five-year development plans. These objectives and policies are called urban development chapter that have a significant relationship with local government (Taheri, 1992). Knowing objectives and determining resources of the objectives and policies is essential. Objectives give meaning to management and determine what is necessary and why. So, by study and analysis of current objectives in Iranian urban government system we understand importance of decreasing CO2 and optimization of energy in cities and their managerial systems, and necessity felt by the authorities, planners and national, regional and local policy makers. Study and analysis of the objectives and policies demonstrate the following problems and weaknesses: Lack of codified specific and specialized objectives and policies: objectives are implicitly propounded in the scope of local government in the framework of urban development discussions and have not a special part in official documents of the country's managerial and planning sections. This reflects the lack of legal recognition and enforcement of local government and urban management scope in policy making, planning, legislating, and executing as a principal. This marginalized local government and its objectives. Lack of an integrated and comprehended view: Interest and benefit Interference of influential organization and institutions in developing urban policies and objectives, frequent change of top managers and immoderation in basic principles related to local government caused dispersed sectorial approaches which often proved to be expensive, inefficient or even a total failure. Lack of a long term view and approach and no appropriate relationship between objectives and policies: One of the reasons for not fulfillment of the objectives and policies is shortage of specific relationships between macro and micro urban development objectives and the provided policies. It is as a result of excess consideration of micro urban management level, particularly municipalities and not regarding the role and responsibilities of other interfering organizations (at national, regional and local levels) in local government system.

Urban development plans, integrated urban management system and institutional capacity

In current situation, municipalities, as key elements of current local government in Iran, are responsible mostly in execution of urban development plans and have low rights in: decision-making, preparing plans,

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supervision on plan preparation, approval, review and amendment. This problem originates in the fact that planning and executing system of urban development in Iran is defined basically in separated rules, indeed of one hand, urban development planning system is ruled by Ministry of Housing and Urban Development that includes wide expertise, which relates directly with urban development planning in all around the country under the supervision of Supreme Council of Urban Development and Architecture. On the other hand, implementation system of the approved plans is defined variously and a executive system is provided to the municipalities (Kazemian, 1995). This matter results in a severe distance and separation what is propounded in the plans and what is done by the municipalities. This is also one of the factors of non-fulfillment of comprehensive and detailed plans in urban areas. Also, in this planning and implementing cycle, no specific position is accounted for public participation in the planning. Actually, submitting planning to the Ministry of Housing and Urban Development is decreased participation in planning to the minimum. On the other hand, municipality has not established an appropriate position for public participation, or if it does exist, it is in the primary levels. In execution section, municipalities encounter with several problems, of which the most important are: the multiplicity of decision-making organizations, duties and responsibilities overlapping and parallel managements in different urban scopes, ambiguity of authorization and responsibilities of organizations and lack of coordination between other influential organizations in execution part of the plans . This matter emphasized on the current urban disintegration in Iranian cities. The disintegration include functional, political- planning, benefits (beneficiary and influential), spatial and structural disintegration. Another important aspect, is capacity and effectiveness of municipality organizational structure, their human and financial resources (Barakpur, 2010). However, in some cases, establishing working groups, agreements are concluded between these organizations, because of several reasons, including changing of managers, violation in benefits, inflexible nature of the organizational structure and no tendency towards participation for solving the common and complex problems, cooperation is not continued. Thus, two key factors, meaning integrity and cooperation between organizations and related institutes are established less. As a result, resources wasted, current situation became unorganized, cities are not appropriate and balanced, unfair and violation of Citizen's public benefits. So, necessity of intra-section institution as an interactive point and homogeneity of organizations and institutions is observable. Next part discuss this matter in detail (see 3.2).

3 A LOCAL CLIMATE ACTION PLAN IN THE NEW TOWN OF HASHTGERD

3.1 Current situation in Hashtgerd new town

New towns in Iran like other old cities, encountering all problems and challenges that mentioned above, affected by inappropriate process of management and urban development plans; a process that was encountering with different problems and could not fulfill expectations and development perspectives. Based on my research, in new towns no special urban management system is defined and its position is not clear. Even, the New Town Development Corporation (NTDC) that is specifically responsible for new towns, has not fulfilled any research on this matter and relies on other problems of the new towns and believes that this issue is included in other discussions.This is resulted in various problems, of which the most important is urban differences, dual management because of interference of authority and responsibilities of NTDC and municipality. At present Hashtgerd NTDC and the municipality possess equal authority, since the town is developed enough to have a municipality, but not completely to dissolve the NTDC. This fact, quite often brings the two organizations into conflict, which is unhealthy for the development of new strategies and action plans and may cause delays and problems. Thus, lack of a distinguished and integrated system, we could not be involved in the research synthetic issue, which is the relationship of urban governance with optimization of energy and decrease of CO2 gas. Therefore, the primary weakness shall be removed partially and then the combined issue can be involved. The research approach to encounter with these issues is combination of applying interdisciplinary view, urban planning strategies, integrity of urban management and organizational capacity making. My attempt was to find out the expert opinion, definition and understanding of the local climate protection actions and policies according to the functions and powers of local actors and municipality. Also, the preconditions needed for an effective implementation of local climate protection action plan. Following this, Stakeholder analysis approach was undertaken using a qualitative research method. Different levels of stakeholders, including city policy-makers, expert's member from municipality and city council, energy providers and community members were interviewed as either

individuals or focus groups. Interviews with actors within the municipality and NTDC revealed that not much is done regarding climate protection and energy efficiency and that these officials are little concerned about the climate change consideration, energy consumption pattern and efficient use. It seems that the critical role that energy plays in economic development, social welfare, and environmental sustainability is underestimated. This stems from the lack of awareness and information and the absence of an ethical consumerism culture, but could also be due to an optimistic dependency on fossil fuels (in which Iran is quite rich). Another obstacle is the absence of a dedicated budget for an energy efficiency program. However, to maintain a sustainable development which is the target of new towns, energy management in a sustainable manner is essential. Communication with the Technical Committee of Urban Development Studies and the Center for Cooperative Affairs of Hashtgerd NTDC, revealed that the scope of work of NTDC is mostly in infrastructure and urban development and their activities in the field of construction of residential units is done by participating in cooperative projects by transferring the land to public and private investors and developers. Therefore NTDC as a client and also as an executive organization must have a proper control on the construction and execution of projects. Hence one of its responsibilities is controlling the implementation of code19.[2] But since necessary measures and actions for energy conservation in buildings are costly and developers have to spend more money, the overall cost of the project will increase and consequently NTDC's share of the profit will decrease. Another important deficiency and objection which is directed to the City Council as legislator and decision-maker is the absence of policies and regulations regarding energy and climate protection (Jasbi, 2008). The City Council has to define a program, allocate staff and funds and institute policies to achieve continuous improvement in energy conservation and climate. Implementation of code19 of the National Building Code in Hashtgerd New Town is negligible. Energy auditing has not been carried out on any of the existing buildings. Since March 2007, the Municipality made the implementation of code 19 compulsory for all new constructions. This is clearly stated in building licenses issued by the local government. Issuance of the building license, depends on the provision of energy efficient concepts (e.g. envelop insulation, double-glazed windows, etc.) in the detailed design. But corruption, bribery, carelessness and lack of cooperation between responsible organizations and also lack of proper supervision hinders proper implementation. The fundamental reason behind this is that officials, residents and developers do not realize the importance of implementing this regulation and hence do not consider it seriously. In their opinion it is more of a theoretical concept and a farfetched ideal. Interviewing municipality officials revealed that the municipality is not actively involved in cultural training and awareness rising with respect to energy efficiency and use of renewable energy sources at organizational or community level. Without proper education through adequate programming, changing the attitude of the citizens will be very difficult. Community participation in matters and decisions, concerning the city is negligible. And as mentioned before the key issue is the absence of a well-defined energy management-climate mitigation sector within the municipality.

3.2 Formation and evolution of the intra-section institution

In this part of the paper, the actions taken against the problems and recommended approaches are provided. Based on the mentioned aspects, final part of the paper is about establishment of a coordinating institution for urban development planning and management system in Hashtgerd new town. Finally, I have provided an action plan that has a specific look on energy consumption optimization and decreasing of CO2. The aim for establishment of this institution is management and planning for city development, which is as a homogeneous point and unity for decision making in intra-section levels and particularly, between central and local governments. This institution should be established based on an interaction and homogeneous relationship to conduct towards more sustainable development of city. This institution, aside from interrelationship between effective organizations, could facilitate the fulfillment of development plans. In

[2] The Iranian National Building Code consists of common and consistent mandatory elements and applies to all activities related to construction of buildings, including demolishing of existing buildings, construction, change of purpose of a building, expansion of an existing building, and reinforcement of structures (NCEDO, 2003).According to code33 of the National Construction Engineering Disciplinary Organization (NCEDO), the Ministry of Housing and Urban Development is responsible for supervision on the implementation of national buildings regulation and codes in the design and construction of all buildings. Based on this code, the Ministry of Housing and Urban Development has made an effort to publish national regulations consisting of 20 codes, of which code 19 deals with energy conservation in buildings.

fact, this intra-section institution, away from any sectorial and organizational approach, could result in closeness of the government, municipality, city council and people, urban planning system and executive system. To establish the intra-institution, there is a need to take specific actions. Preparation of legal fields as the primary necessity for taking actions, establishing appropriate administrative fields according to institution's policies and objectives and designing the process and completeness of the institution are the most important things. In the first stage, which is creation of the institution, relates to institutional establishment idea based on specific aim. This stage that is based on mutual understanding and agreement builds initial ideas and aims. Here, regarding special problems in urban planning and development, several special approaches are considered. First, urban development plans are prepared by this institution. Since urban development plans (both comprehensive and detailed) define different policy sectors, regulation and guidelines, intersectional relationships and integrated decision making in conformity with organizational objectives, from one hand, and in conformity with fulfillment of appropriate development aim, on the other hand, can be achieved through integrated approach of this institution . In this period, organizational nature of the institution is not independent, but relates to central authorities such as Ministry of Housing and Urban Development of its related organizations and the most activities shall be established based on agreements (Andalib, 2011). Another important approach, which should be included in the organization's programs is involving energy consumption optimization and decreasing climate change in different urban scopes. Actually, in this stage, we only rely on the agreed titles and points and use already existed administrative and financial supports; because the institution has not independent identity and managerial body. The next stage is called institutional stabilizing stage. Here, which is in fact a new period of cooperation, moreover to the Ministry of Housing and Urban Development and municipality, the city council is also entered. Actually, an agreement shall be concluded by and between these three organizations as the main founders of the institution in order to facilitate the establishment of the institution. City council as an elected organization plays a significant role to stabilize this institution. Then, by defining of budget for the institution and approval of annual plan and budget, it will have stable identity and found legal status. But, it should be mentioned that to change an institution from a temporary and agreement stage to legal and formal one, and enters urban management and development planning, needs the parliament approval. At this point the institution enters a stable situation with persistent and permanent identity. As a result, considering problems establishment of an intra-institution in Hashtgerd new town is necessary. Actually, this institution besides the city council that is a public and elected institution could help more relationship of the peoples and government. The following diagram shows stages of establishment and evolution of the institution.

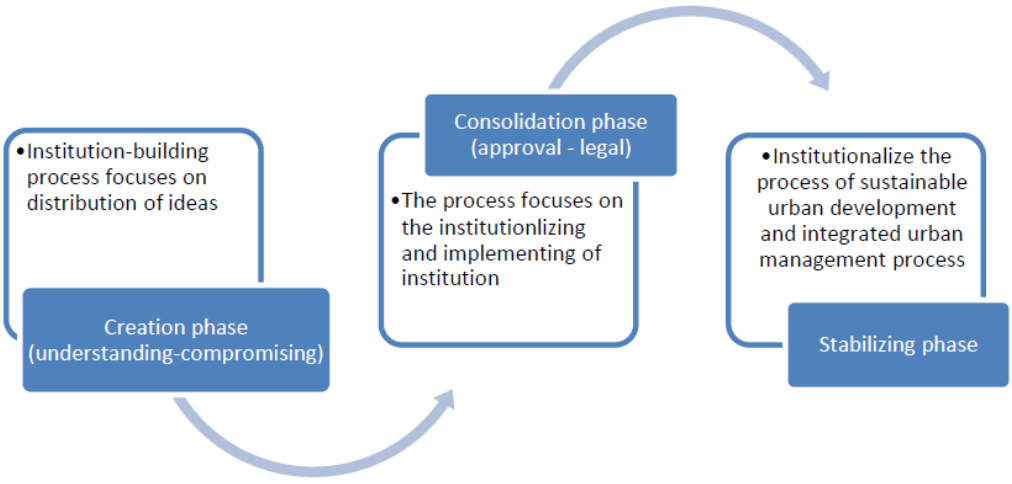

Fig. 2: Stages of formation for coordinating intra-institution. Source: Author

3.3 Development of action plan through a multi-sector network

The intra-institution not only integrates the urban management and planning in Hashtgerd new town, but also helps the local government in providing the action plan to combats climate change. The overall objective of the action plan is to enable local government to sustainability increase energy efficiency and reduce GHG emissions in their own operations and communities. This action plan which will be formed after stabilizing stage of intra-section institution operates through a network governance approach. So that, a multi-sector

network in an open dialogue has to be build inside the intra-institution. In this network participants are a diverse group of actors and organizations from public, private and non-profit sectors. This is because success in the institutionalization of a network as described by Milward and Provan 2006 can only be achieved when the goal formulation and the decision of participation are not dependent of one party or some parties. In this network all participants would strive for a common goal next to their own mission. The starting point is to determine and exchange initial views, their specific view on climate change and what to do about it. Therefore, the first attempt is to make the climate change and energy optimization as a topic of broad interest. After that groups will be formed according to their interests. Themes around climate change topics will agree upon and workshops will be held and fundamentals of the future structure of the network identify. According to output of workshops of each group, different alliances in relevance to their urban policy sector will be set up. The best way to organize such network is to set up a separate administrative unit (here called central board) to support the network, its alliance and activities. This unit plays a key role in coordinating and sustaining the network. Therefore the structure the network consists of the central board and its alliances. The central board is under the direction of intra-section institution.

4 CONCLUSION

In summary, this paper reviews the factors that are important in influencing the development and implementation of urban governance and planning for climate change mitigation. Also the specific local competencies and powers for climate protection and how climate change policies are institutionalized at the local level have been discussed. In Iran, lack of desirable inter- sectorial coordination mechanism as well as integrated urban Management (as part of an integrated spatial management system in the whole country), and lack of policy integration is one of the most basic constraints in implementation of urban development programs including urban energy efficiency and climate protection programs. On the other hand, the study also showed that there are several organizations responsible for some dimension of planning of the city, but not one of them is designed to take the city's unique needs into account. None are enough empowered to bargain the priorities of citizens and municipality as central core of local government. Communication between different agencies, utilities and the city administration are fragmented. Strategies and action for energy conservation and climate change mitigation like improving air quality are often deployed in a highly fragmented manner. Municipality and its affiliated agencies and departments are frequently marginalized within administrative system so that they lack the power and authority needed to co-ordinate policy across a municipality. Therefore they are not able to implement the policies that are required. Climate change mitigation cuts across many sectors such as energy, transport, planning, finance, education and etc. Hence, the current local government system is increasingly calling for greater co-ordination within municipalities and demanding mainstreaming, coordination, and cooperation across government agencies.

Most of the cities that are active in optimization of urban energy consumption and decreasing or conforming actions in climatic changes have an effective and strong local governmental and managerial system. In these cities, discussions about climatic changes, energy efficiency and sustainability in local government system are constituted, and using potentials in the cities, governmental and managerial system could promote and develop these matters. Efficiency of urban governance, results in more sustainable and greater effectiveness of urbanism, have correlation to factors, including political stability, managerial and social integration, economical rise, skill, policy makers and appliers motives. In this condition, framework and organizational characteristics of urban governance, particularly role of execution of governmental, public and private sectors, have significantly essential effects on its success. We also need to consider the Iranian cities and off course new towns don not have a long history on climate change climate protection policies. A systematic climate protection strategies and action plans were not adopted in Iranian local government. Neither found that in municipalities. This very new and unknown subject is intangible for local authorities which makes changes and reactions more difficult in this situation. In addition, integration of climate change policies with other policy issues, the required capacity within the internal organizational structure of municipality is essential. Therefore it is clear that where there is a lack of capacity which is also in the case of Iran the potential of local climate change strategies and policies will be limited.

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Urban Nomads. Building Shanghai: Migrant Workers and the Construction Process

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1 ABSTRACT

This paper takes a close look at the interrelated phenomena of international business migrants and rural migrant workers in Shanghai, China. Through separate case studies of each group's role in the construction process in this rapidly developing world city, we observe them in parallel and shed light on the spatial implications of both groups' migrant status. In doing so, we determine that both groups live in "cocoon worlds", albeit in different ways. We recognize that both groups live in a state of permanent temporariness in Shanghai, and, drawing on work by Lefebvre (1974) and others, we assert their temporary "right to the city" and thus call them "Urban Nomads".

Our uncovering of the stark inequalities and harshly inadequate living and working conditions affecting rural migrant workers in the construction industry in Shanghai leads to our development of a concept of "Fair Building", a socially conscious architecture that calls for accountability in ensuring that rural migrant workers' needs are taken into account so that their living and working circumstances can improve. We address several central arguments for a socially just and sustainable form of urbanization by offering possible strategies for future construction. We propose scenarios wherein urban planners, designers, and architects could include fair building processes in their concepts and builders, contractors, and construction managers could support the fair realization of projects. The arguments for Fair Building ultimately form the framework for our concluding section – the project Lüxing Laoshi, a mobile vocational school for migrant construction workers. This educational program works toward a solution by addressing all participants in construction to support a building process that goes beyond the traditional audience and contributes to a socially conscious architecture.

2 INTERACTING WITH URBAN CHINA – AN INTRODUCTION

"Looking through the window of the little kiosk, the xiaomaibu, one is confronted with a framed view of a typical scene of Shanghai street life: people passing by on bicycles with huge loads on their bike trailers, school children in their uniforms stopping to buy snacks, motor bikes honking. The street is particularly vibrant and busy in the morning. People rush by on their way to work while eating their breakfast, while elderly men and women sit all day at the lane's entrance, children play with toys, near the gate guard and the residential committee's leaders.

This scene is displayed as a movie inside of the original kiosk where it was shot – now located now inside the ddmwarehouse gallery at the Red Town, Shanghai Sculpture Space. For the exhibition "Double Act" 2010 the young Chinese artist Xu Zhifeng aka Shaw worked together with the German artist Petra Johnson to record this spontaneous and authentic Shanghai street culture that is slowly being erased through rapid urbanization. Localized kiosks in Cologne, Liverpool, and Shanghai have been connected with video feeds over the internet, so local residents can communicate across great distances.

The intention is to transform the kiosk from a provider of products for daily use for those in its immediate surroundings into a cultural space connected to the world. The art project gives a small glimpse of recent urban transformations and their environmental effects, as well as China's shift towards the West. The removal of the kiosk also stands as an example of the reckless urban development taking place in China that often doesn't consider local communities. Now this xiaomaibu has disappeared from the streets of Shanghai and has been replaced by one of the shiny new large-scale apartment compounds" (Clarissa & Ulrike's Research Notes, November 2010).

The example of the xiaomaibu (小卖部 , the little kiosk) shows the importance of mapping the social transformation of Shanghai. Here we are employing critical urban studies as a way of reading between the lines of urban space and adding new perspectives to it. To understand the "dichotomous organization of space and society" and how society organizes itself, contextualization is needed that includes local specificities as well as globalized patterns (Madanipour, 2003, p.102).

The development of megacities is a global phenomenon that is particularly visible in contemporary China (and especially Shanghai). In no other country is the process of urbanization occurring at such a large scale and with such speed. In the familiar debate about the quality of buildings that are erected at such speed in China, it is often forgotten that construction is more than the materialized end result. Following arguments from critical urban studies, space is not just a (material) object, nor is it a pure idea; it is also a societal process of production (Lefebvre, 2009 [1974]). It is crucial to understand production of space as a social phenomenon. Thus the main focus of our analysis lies in the relationships between the production of the built environment and the people who are involved in the construction process.

2.1 Construction – a Process

Construction processes are highly depended on capitalism and urbanization processes and are also influenced by the changing balance of social forces, power relations, socio-spatial inequalities, and political-institutional arrangements (Brenner, Marcuse, Mayer, 2009). In the context of this paper, when dealing with marginalization, exclusion, and injustice during the construction process we refer to the need for a profound engagement in the planning phase to achieve greater social and environmental equity by critically examining how space is produced in China. Therefore when considering processes in construction it is important to understand the overall linkages between the involved, their role, their position in the process, and their dependencies.

According to project management principles a stakeholder is a person, group or organization, who has a direct or indirect stake in a process. They can affect or be affected by the process action, objectives, and policies (Wiegand, 2008). Successful project realization implies that particular attention needs to be paid to an efficient project organization structure and to the involvement of qualified experts. Thus a building process can be broken down into a concrete timeline beginning with the project idea and concluding with the actual use of the building. Based on internationally approved models such as HOAI[1] a construction process can be divided in project phases and scopes of action for various disciplines and areas of expertise that are required to deliver the contractually agreed-upon end results.

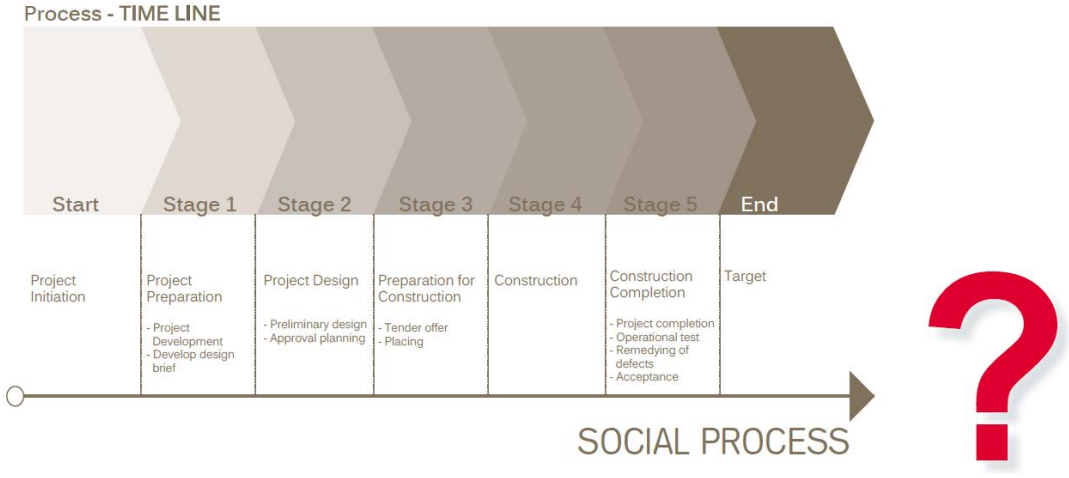

Fig. 1: Stages of the construction process according to the HOAI

While project management studies have analyzed in detail the organization of construction processes, they have not yet considered sufficiently the social processes imbedded therein, nor have they considered that some people involved change their residence according to the building project they are currently working on. The discipline of project management describes the production of material space as a process driven by the three key variables of time, cost, and quality, and has defined the positions of participants involved in the process. The focus is usually on a smooth progression of work on the site and on important interfaces between different disciplines.

However, on the construction site more than just material space is produced. The process of construction needs to be linked to the much larger process of the production of social space, including perceived,

[1] HOAI (deutsche Honorarordnung für Architekten und Ingenieure, German Fee Structure for Architects and Engineers)

conceived, and lived space as defined by Lefebvre. In China, construction workers actually live on site, which makes the building site a 'lived space', adding a whole new layer to the traditional operations at a site.

2.2 Urban Nomads – a Different Concept of Mobility

This paper is an examination of a very specific group of people: individuals who are involved in various construction processes over time. The ongoing building boom in China has caused them to following their work without settling permanently due to the temporary nature of building projects. Among the people involved in the construction process in China, two groups must be emphasized: internal/rural working migrants and international/global working migrants.

Despite the many obvious differences between rural and global migrants, upon closer examination there are a surprising number of similarities that characterize these two social groups. They are part of the so-called immigration society at the same time as being part of the emigration society. Migrating individuals have effects on the society of origin and simultaneously on the receiving society. One of these measurable effects is the transfer of money by foreign workers to the home country – the remittances.

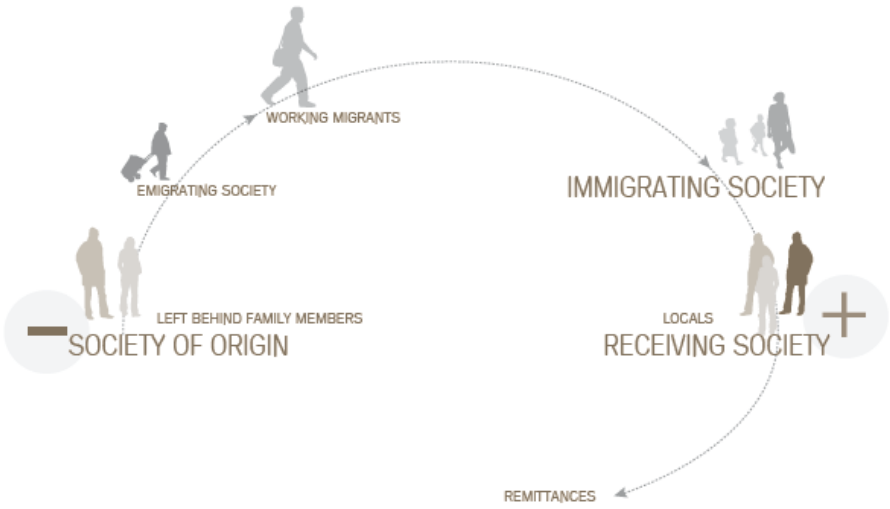

Fig. 2: Societies influenced by migration

Within the vast field of migration we are particularly interested in working migration within the construction industry. Explicitly, this means that we are focusing on peasant migrants who come to the city to work on construction sites as construction workers on the one hand, and on the other hand we are observing Western business migrants who come to Shanghai to work in the construction business mainly as planners, designers, managers, and builders. Both groups are involved in the construction process, but at quite different stages of the process – whereas the construction workers are executers, responsible for manually erecting the buildings, the global migrants are in most cases active in preparation and control.

This juxtaposition is of course a simplification of the much more complex realm of urban production but what makes this observation so relevant in the discourse on migration – they are permanently temporary urban citizens with unique explicit and implicit spatial needs. They repeatedly change their habitat according to their work as they move from place to place. And in this continuous life phase of moving, rural and global migrants constantly seek to connect to emerging opportunities and change their circumstances accordingly. While most migration studies focus on social circumstances, our observations emphasize the social and spatial nature of migration.

By trying to highlight this potential we will call them URBAN NOMADS. Urban, because the phenomenon is particular to the urban environment and nomads, to make a clear distinction between people who have made one or many major moves which are complete and those who are in recurrent temporary living situations caused by their work, for example by the unsteady nature of construction projects. While migration is usually a topic discussed by sociologists, anthropologists, politicians, and other social scientists, the discussions on nomadism are in many cases related to the spatial aspects involved in such mobile lives.

Explicitly, we want to highlight and further observe how urban nomads interact with space, as well as how social issues are implicated in this interaction.

3 SHANGHAI – HEAD OF THE "CONCRETE DRAGON"

The title refers to the call by Deng Xiaoping in 1982 to make Shanghai a role model for Chinese development, merged with the book "The Concrete Dragon" by Campanella (2008), which describes the rapid urbanization of China. The scale of China's economic transition and social transformation is evident in its economic growth rates, which average nearly 10 percent per annum over the last 30 years (HDR China, 2008). Rapid urbanization can be seen as one of the key characteristics of contemporary China. This urbanization has fundamentally altered the image of today's Shanghai with its consumer-driven attitude (Davis, 2000). Hence, the changes in urban space are manifested not only in a "flood of new construction", but also in the change of urban culture and the lifestyle of residents, including their attitude towards life, consumption behavior, and political outlook (Schein, 2006).

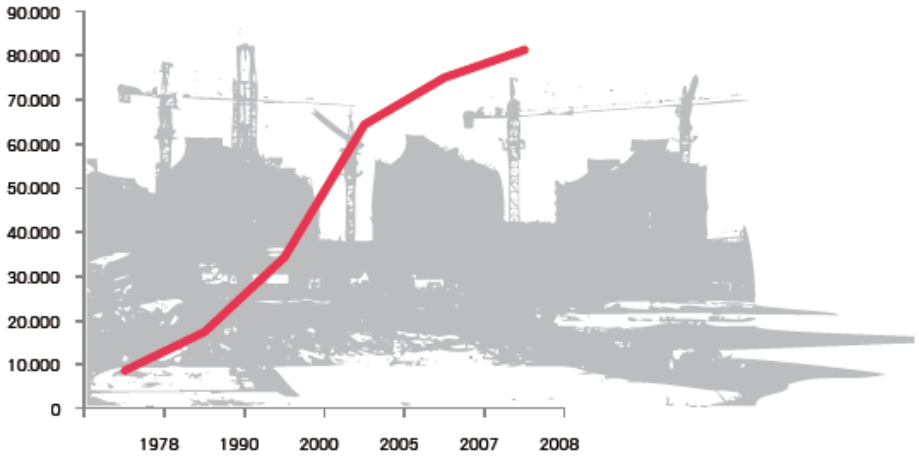

Fig. 3: m² total floor area Shanghai by year - including various functions: staff dwellings, stores, offices, plants, schools, villas, warehouses. Source: Shanghai Statistical Yearbook 2009

According to the results of the 2010 census (National Bureau of Statistics, 2011) Shanghai's population has reached over 23 million with 14 million registered and nine million floating inhabitants without a proper registration. As one of the megacities of the twenty-first-century Shanghai plays back and forth between what it means to be modern and what it means to be Chinese (Keith, 2010). As a result of the continuously growing population new buildings are rising everywhere and are usually in the form of high-rise buildings due to limited land supply in the inner-city. At the moment Shanghai has 988 skyscrapers, with another 158 planned or under construction (Shanghai Urban Planning Exhibition Center, 2010). This number changes constantly, as do the people involved in the process of construction by changing their place of residence.

Fig. 4: Construction Site near Shanghai

3.1 Construction Sites as Research Field

When looking in greater detail at the field of our research – construction sites in and around Shanghai – some special features become apparent. Construction sites are situated in the setting of existing urban development; they dominate the changing urban landscape and at the same time are themselves rapidly

transforming these spaces. Further, similar to the observed groups who are in a permanent state of temporariness, construction sites as a research field are also constantly changing. Thus, like transitory people, the place itself is impermanent.

4 CASE STUDIES

Within the framework of labor migration in the research field of Shanghai, we have taken a dialectic-discursive approach: on the one hand we examine local internal working migration, and on the other hand we look at the phenomenon of global migration within the Chinese construction industry. The results are not directly compared, but rather give an understanding of their circumstances.

4.1 Global Urban Nomads

The word migrant is nearly always used in reference to the working class and is therefore associated with a subaltern status. But there is another flow of migrants who are typically neither victimized nor spoken of as migrants. Their key driver for migration is also work, but the circumstances are completely different. They are international migrants, better known as expats, who move around the world from one working place to another. Expat is short for expatriate, and the word expatriate comes from Latin and means being outside the native country. The word is used to create a distinction along socio-economic lines between the aforementioned group and manual labourers who also move from one country to another. The usage varies depending on context and individual preferences and prejudices.

Expatriates have the ability to remain mobile, to make the most of their opportunities, and to follow the flows of global commerce. They are flexible executives– or "flexecutives" (Pico Iyer, 2001 in Herbstreuth, 2005). Due to their high level of education and professional skills they have both economic and social capital (Beynon, 2008).They quickly adapt to new urban environments; but do the new urban environments respond to their needs?

Research Approach

As European researchers we first asked ourselves how we could best approach this provocative topic of working migration within the construction industry in a different cultural setting like China. On the one hand we have the advantage of discovering China and its construction industry through the eyes of outsiders - as two architects. That gives us the chance to recognize difficulties that those involved do not realize or see anymore because they are surrounded by them every day. On the other hand we were part of the observed group as expatriates. Among other things this allowed us to gain greater insight into the challenging situation of being a "global nomad" living in a foreign culture. In ethnography these methods can be described as a participatory micro-approach, which is based on the personal experiences of action researchers. "Action researchers, however, are insiders' researchers. They see themselves as part of the situation" (Tornaghi, 2010, p.35).

Social Networks

A network of internationally connected people living in Shanghai has organized an infrastructure tailored to suit arriving foreigners; thus, when expats come to Shanghai they are greeted with numerous offers upon arrival including survival packages and support services. These support services on arrival are manifold but also have their cost; the more extensive the offer, the more expensive it is. In a similar manner, the Chinese media have adapted to the needs of foreigners, and expats have accordingly been recognized as consumers in the media sector. Nevertheless, expats usually rely on information from familiar media sources from their home country. Expats have been recognized as a target group with strong purchasing power, and their new demands have strongly influenced supply.

Spatial Conditions

The reasons why foreigners have been recognized as a consumer group in Shanghai are largely tied to historic events. Regulated by law, they have been concentrated in communities within Special Economic Zones. With demand being closely linked to capital, they have also influenced the supply of space in the city, which has led to a transformation of the residential landscape. The foreign housing market is characterized by an apartment design imported from the West and adapted to the new requirements of living in Shanghai, but as a result this cocooned living has led to further segregation between local residents and the expatriate

communities. This can be seen in the city wherever foreigners have been defined as a consumer group, influencing commercial retail spaces and other commercialized open spaces.

Fig. 5: Scale model of Rainbow city compound

Working Challenges

Also historically determined was the need for modernization in China's cities after Mao had prevented city development for three decades. The current building boom in China's cities that has attracted such great numbers of foreign architects has resulted in an extremely rapid pace of development. The example of the Dutch Co-Working space shows how quickly the market has adapted to the new needs of foreign temporary residents; this example can also be seen as a spatial reaction to the latest type of nomadic lifestyle. In spite of this spatial development, Western architects are often not up to the challenges they face, due to unfamiliar aspects of the foreign culture and a completely new scale and context of architectural production. We have observed that, in the course of adapting to the new working environment, architects often remain silent or uninterested when dealing with situations where working and living conditions of other participants in the construction process clearly do not meet international standards of safety and decency.

4.2 Rural Urban Nomads

In China the term dagong is used to describe the phenomenon of labour migration quite accurately – literally "being employed" – and stands especially for rural people seeking work elsewhere and for people working in temporary or casual jobs. Rural migrant workers are a special group resulting from China's economic transition and are called nongmingong (农民工) – peasants who have become migrant workers.

Migration in China, with all its possibilities and obstacles, is inevitably connected to the national household registration system – the hukou (户口) system. This system determines the movement of individuals by dividing China's population into rural and urban citizens and thereby creating a two-class system.

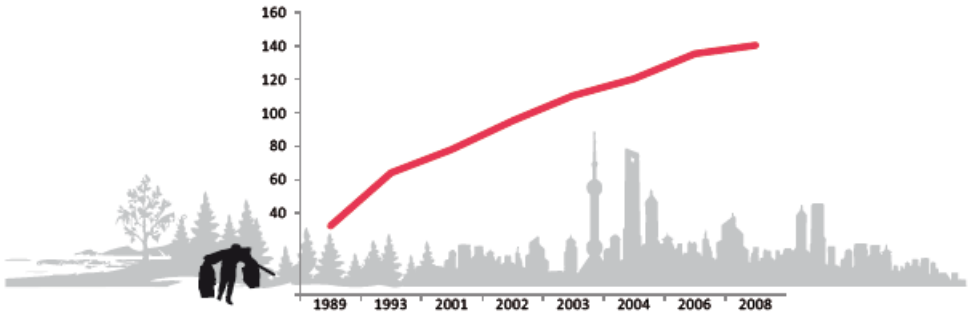

Fig. 6: The number of rural migrant workers in various years; Source: Chinese National Bureau of Statistics, 2009

In order to understand the various causes that led to rural working migrants' living and working conditions, it is helpful to take a closer look at their present situation.

Research Approach

The use of different approaches was essential in order for us to come to a better understanding of the group under investigation – rural urban nomads. The following description is based largely on interviews, debates,

and construction site visits that were part of our empirical research in fall 2010. The research took place at several construction sites in and around Shanghai.

While we were part of the research group in the case study of global urban nomads, our research on rural urban nomads was conducted from the "outside". We pursued an approach that combines bottom-up research methods and personal narratives as a powerful means to link migrants to qualitative survey field data and the literature. We have used pseudonyms to protect the privacy of interview participants, but our intent is to try to give voice to marginalized individuals in society.

Working Conditions

The situation faced by rural migrant workers arriving in Shanghai stands in stark contrast to that of international migrants, as no comparable welcoming services are provided for the rural migrants. Becoming oriented and settled in the vast city happens mainly with the help of relatives already in town, or through fellow workers from the same place of origin. The job search and employment contracts work in the same way, which results in complex dependencies among family members and people from the same village that are based on trust.

Generally, migrant workers endure extremely lengthy working hours that do not allow for sufficient rest overnight. The lack of mechanisms to ensure that labour rights are upheld leads to job exploitation on several levels: often workers are not paid the agreed-upon wages, have to work unpaid hours of overtime at night, and are subject to considerable uncertainty with regard to future work. They often have little savings left after sending remittances home to their families. Due to hukou regulations, migrant workers are excluded from the social benefits provided by the state, and regional differences in social insurance prevent highly mobile migrant workers from effectively insuring themselves. In conclusion, it is obvious that minimum standards of human rights and labour regulations are consistently violated by the existing working conditions on construction sites in and around Shanghai.

Living Conditions

The living conditions of migrant construction workers, like their working conditions, do not meet housing standards as defined by Article 25 of the Universal Human Rights. The prefabricated dormitories on site, where construction workers tend to live, usually have no insulation and are far from meeting standards of decent living. They have one water source, which is usually outside, and no access to hot water. The shelters offer no privacy with up to six people living in one small room; additionally, living on site exposes them to enforcement (e.g., of working hours) by the employer. Precarious circumstances for construction workers can be found worldwide and while at first glance in Chinese cities there do not seem to be whole districts with substandard housing such as slums, there are huge numbers of people affected by these low living standards. Just as construction sites are scattered throughout the city, substandard dwellings for workers are decentralized and not always immediately visible.

Fig. 7: Taicang construction site visit

Social Situation

Given the situation of a rapidly growing construction sector enabled by over 40 million construction workers in China, it is incomprehensible that they still don't get social recognition for being the motor of the economic miracle. Since about 80% of urban growth in China is caused by rural-urban migration (Fan, 2008). The integration of these migrants into urban life seems long overdue if the objective is ensuring the

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existence of a humane urban environment. An analyze of the "degree of intermingling" in urban spaces of rural construction workers is rather redundant, as the reasons for their isolated life within the city and for their non-use of public (open) space in Shanghai have been shown in detail in the previous chapters.

While the hukou system is being reformed by the government, it hasn't had a positive impact for the migrant workers yet. However, the national framework for working and living conditions can't be changed by the employer, but of course other layers can. The intensification and extension of the urbanization process with all its side effects for the people involved has led to various survival strategies and support programs, but the turning point where public opinion – including temporary residents – is actually changing the ways in which the urban environment is currently managed, has yet to come.

4.3 Reflecting on Both Case Studies

Reflecting on the two case studies and our research methods, we are aware that we have provided insight into only a small number of the many aspects of the urban phenomena occurring in China's cities. Social reality can be approached from many different ways and from different angles, thus we had to make the difficult decision of which scientific approach to take to best illuminate the urban phenomenon of migrants within the construction process in Shanghai. As described in the research methods of both case studies, we chose different approaches for the two social groups, including participant observation, ethnographic research, and action research.

5 SYNTHESIS OF RESEARCH FINDINGS

Chinese urbanism in general and in Shanghai in particular is extremely rapid. It is not only economic and political changes that have led to this rapid urban development, but structural changes in society have also made the ongoing transformation of urban China possible. Post-reform urban development has been driven by increasingly opening policy, as well as the progression of the market economy on the one hand, and rising consumerism and individualism on the other (Davis, 2000). In 1984 real estate enterprises began dealing with the urban housing market, which was previously regulated by the Chinese state. With the implementation of new reforms different income groups emerged and led to the rapid development of urban housing in the 1990s. The Chinese urban housing market began to integrate the needs and demands of consumers and paid more attention to comfort and higher living standards. At the same time the freedom of choice in housing led to the differentiation, reconfiguration, and segregation of urban space (Li Xiangning and Zhang Xiaochun, 2008).

This dynamic urbanization can be seen not only in physically perceivable urban space, but also in the fast-paced working and living conditions to which the inhabitants are subjected. (Ribbeck, 2000). While society adapts quickly to new circumstances (for example, working migrants and specialists from abroad recognize and take advantage of opportunities), architecture does not seem to take the resulting new requirements of temporary life into account during the process of architectural production. As city planning in Shanghai does not succeed in meeting the quantitative requirements of the latest developments in migration flows, it is clear that "planners of Shanghai's municipal development often ignore [migrant workers] as if they did not exist" (Wang Xiaoming in Bridge and Waston, 2011, p.401).

When conducting research on temporary residents of Shanghai, no matter which circumstances led them to being temporary, it becomes obvious that they are disadvantaged when compared to local urban citizens. Excluded street communities are not considered part of the public by politicians, architects, and planners. They are not viewed as communities of their own. They lack legal and political power in China and therefore these groups are excluded from city planning and architectural practice. The basic human rights of decent living and working conditions are not regulated for them by the formal system and, while global urban nomads are often able to compensate for the lack of state benefits at their own cost, rural urban nomads cannot afford this kind of support on their own. They have the social status of being guests or aliens in the city and therefore have no political voice in decisions. There is a trend in Chinese real estate business to du shen da zao (度身打造), a term literally meaning "measuring your body to make it just for you". But these purpose-built and tailor-made areas are only for selected consumer groups. Although migrant workers are building the city, they have not managed to create a visible and empowered urban nomadic society; the migrants are usually invisible and marginalized in architectural culture and discourse as well as in practice.

Expats have been discovered as consumers of support services, media, and residential compounds and other enclosed spaces, but their needs as temporary citizens within the urban realm are not sufficiently taken into account by designers and decision-makers. Depending on the planning systems in question – public or private – foreigners only influence projects where affluent consumers are the target group. Beyond this, we believe that expats are more than a consumer group reliant upon capital; they are permanently temporary urban citizens, and this status calls for their further sustained social, political, economic, and spatial engagement. In this paper we argue in support of urban nomads' contributions to city life. The human potential of cities is determined by users of the city; these users are intimately implicated in the potential of these cities to provide the benefits of better urban and social infrastructure to their residents. In a city where certain areas are home to more "aliens" than local residents, it is imperative that city planning take the needs of these residents into account, ideally through a participatory planning process.

6 CONCLUSION

6.1 Situating Our Work within the Research Landscape

In terms of the position of our paper among other scientific work, the multilayered approach we have taken has engaged with several areas of research within the interdisciplinary field of critical urban studies. Our research bridges the disciplines of urban studies, project management, business studies, and migration research, as we have engaged with existing concepts of urban nomads in architecture. By doing so our intent was to forge a link between existing investigations and the present work.

Much work in migration studies has described in detail the divergent circumstances of migrant workers worldwide and within China. In an approach that differs from typical research on migrants, we have emphasised two aspects of these workers' mobility: a survival-based decision of people with no alternative combined with a strategic choice made by individuals actively realizing their identities. Further, we have highlighted the exceptional nature of the observed social groups, who are both not only migrants but also permanently temporary residents.

The rapid transformation of the urban environment is often described in the economics and business studies literature. This work highlights the ongoing building boom as representative of constant growth and as attractive to consumers. Although very precise in providing statistical data, these surveys are often quite one-sided as they do not consider the social and cultural aspects of this urban development. Similarly, the discipline of project management focuses on the construction phases and mechanisms to control them rather than on the actors involved in the process. We are left wondering: what are the mechanisms to supervise a fair and ethical construction process?

However, there are two reasons why we might have come to different conclusions than other scientific researchers. On the one hand we have taken an approach that combines scholarship from the above-mentioned disciplines, which has helped us to grasp the complex urban development occurring in Shanghai and has enabled us to make these observations a critical urban study. On the other hand, we had special access to the research field by approaching it from two sides at the same time. Various perspectives on two such different – but also similar – groups of working migrants gave us the opportunity to look at them through different eyes and thus not victimize them but rather search for possibilities for improvement of their circumstances. Although it directly addresses planners and architects, this paper is relevant to anyone working in the field of construction in China or planning on working there. To us, a critical discussion and consideration by architects and planners of the social circumstances in the construction industry in China is urgently needed; our analysis intends to be a beginning to just such a critical look at present circumstances. This paper illuminates particular areas within the production of space in Chinese cities where basic human rights and international labour rights are compromised and where change is urgently necessary.

6.2 Outlook and Prospects

Dealing with the topics of labour migration, multiculturalism, and the diversity of local and transnational identities will be a challenging issue in Shanghai over the next few years. Hence it remains necessary to further encourage intercultural exchange in planning as well as long-term project implementation. Based on the needs of Shanghai residents – even if they are just temporary like the observed groups – the aim should be to create liveable and unique environments. Increasing awareness of cultural and social issues among

architects, urban planners, and designers could lead to cities being shaped not only by economic and political decisions but by a greater focus on the inhabitants' needs. We strongly advocate and support such an approach and emphasize this through the call for "Cities for People, not for Profit". We call for an urbanism that responds to human needs rather than to the capitalist imperative of profit-making (Brenner, Marcus, Mayer, 2009), although of course both concerns are a part of urban development and must coexist.

In the age of globalization, and particularly in China, buildings are becoming bigger, higher, and increasingly complex. And while additional technology and greater numbers of people are involved in the building process, it seems as if the profession of architecture has hardly changed. Successful architects still see themselves as creators, as master builders and designers of the built environment, where success, reputation, and image usually count more than shared social responsibility. Here we wish to add a social layer to the ongoing green building debate and promote the transfer of concepts like "Fair Wear" and "Fair Trade" to the construction industry. While a trend toward sustainable urban development has become measurable through certifications like LEED, this is a call for "FAIR BUILDING", which entails the need for an ability to track building processes and building transactions on a social level.

Throughout our research we have contemplated how we, who at the time were not directly involved in any construction processes, could go a step beyond simply describing the present circumstances. Following the approach of Social Entrepreneurship we found a way to position ourselves with our concept "Lüxing Laoshi," which aims to improve the social consequences of the production of space.

Our idea is to establish a training program for migrant construction workers in order to strengthen their working skills. We propose to do this by setting up a part-time education centre in a vocational school that focuses on building trades and handcrafting skills. The training program aims to provide adequate education for rural migrant workers and encourages improved cultural understanding of global migrant workers. As there are so many different stakeholders in the construction process, it is now more important than ever that those involved have the skills necessary to understand and communicate with one another. By providing the needed infrastructure in the city, by intensifying existing networks, and by providing the opportunity for regular and spontaneous interaction, Lüxing Laoshi supports migrant workers involved in the construction process and helps them to determine the course of their own lives.

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🏆 *reviewed paper*

Urban Safety of the Public Spaces in Belgrade, Serbia

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1 ABSTRACT

This topic deals with the field of urban planning and design and it is closely associated with the social context and theory of safety. Researching the elements of fear of physical urban environment and population inhabiting it, the focus is on the prevention, in the social and technical fields, which can reduce or eliminate negative perceptions of the users. Determining the standards for furnishing classified urban public spaces, which will contribute to their safer use, has been implemented by defining the conditions, reasons and patterns of the occurrence of personal feeling of (un)safety and by analysis of preventive measures that can contribute to higher quality and more intensive use of public spaces in Belgrade.

Previously conducted researches in Belgrade were within the domain of social studies (feeling of safety of a specified group of residents within limited space), or their starting point was in the concrete institutional or technical measures (surveillance and CCTV). By analyzing the theoretical hypothesis, case studies and by sublimation of all available information for specific space, with numerous comparative evaluations, the general image of the level of safety in public urban spaces of Belgrade has been created. By this method, the social, physical, economical and environmental aspects, as the inputs for planning alternatives, preferences and decision making have been gathered in one place.

This paper incorporates the information provided by the relevant institutions and the poll of the citizens, as well as analysis of spatial urban elements, typology of their use and their condition from the aspect of safety. Finally, it provides recommendations for urban planning measures and architectural design elements for implementation that will contribute to better public spaces use and higher level of safety and security.

The practical application of the results relates to creation of information base, upgrading of cognitive aspect and opening the possibility for new researches, recognition of the process, monitoring of changes, elimination of consequences, promotion of urban planning and architectural design profession, realization and maintenance of public places and creating the legal framework.

2 SPATIAL, SOCIAL AND ECONOMIC ASPECTS OF RESEARCH OF SAFETY IN BELGRADE

The relation between the planned and implemented in the urban planning practice in Belgrade has been debatable for quite some time. Although it is considered that urban planning on the territory of Belgrade has a tradition and that it has shown results, the discontinuity and inconsistency in the implementation of planning documents is apparent, their lack of respect and the fact that due to poor perception of priorities and interests the plans "do not produce" fast enough and in advance. Chaotic social system, followed by constant political and economic instability has certainly been translated to the spatial level of the city, which naturally must not be an excuse. On the other hand, the plans of previous epochs have been criticized for its determination, which did not correspond to real conditions, needs and abilities, and have therefore remained unimplemented. Modern urban plans are based on more extensive research, after the European models, through studies and analyzes prepared that should clearly indicate the existing space deficiencies and potentials, and in further phases verify the solutions proposed and provide creative development. If urban safety has been set as a goal, it is necessary to define the current condition and specify the factors that affect the reduction of a feeling of security by associating them with specific spaces. In order to prepare a strategic plan that covers the territory of Belgrade, a series of researches and analyses of available data at disposal to the numerous city institutions have been conducted, the evaluation of the existing situation has been made and targets provided for future development, which are of great importance for this study since they provide a range of information on average condition and further expectations. These data, related to the current situation and planned spatial and socio-economic development of the city, are important for considering the possibilities of setting another development goal - a safe environment for living.

In order to better perceive the socio-economic context of Belgrade, the Master Plan of Belgrade provides the overview of the social development, which partly explains also the attitude of the present citizens to urban

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life: "In the development of society in terms of urbanization, in the past, one may differentiate rural, industrial and urban characteristics of the society and the city. By degree of urbanization our society is still at the bottom of the list of Central and Eastern European countries. The share of urban population in total population, only in the early 1990s exceeded the half (53 %), where, from demographic viewpoint, we became predominantly an urban society."[1] Demographic data provide a clear image of the rapid growth of urban population as a result of immigration, but also of mortality and drain of the young people, which classifies our society in the category of old populations. It can be concluded that Belgrade is on the way of becoming a metropolis in terms of the regional center, owing to its size, importance and numerous functions and activities, although, from historical viewpoint, this development has encountered many obstacles which have slowed it down significantly. Aspiring to take a prominent position on the map of Europe, the city must find a way to leave the" provincial" habits and style behind, while at the same time preserving its unique identity and charm. According to the Tourist Organization of Belgrade in the first five months of 2009. the number of foreign tourists was greater by nine percent than in the same period last year.[2] The visit to Belgrade is on the upscale, and generally stated reasons are good amusement and entertainment, cultural and sports events and conference tourism.

3 LEGAL AND PLANNING REGULATIONS AND EVALUATION OF ITS APPLICABILITY FROM THE VIEWPOINT OF SAFETY IN URBAN PUBLIC SPACES

Pursuant to the Constitution of the Republic of Serbia of 2006,[3] being the supreme legal document of a state, the rights of citizens were defined, especially the right to life, dignity and free development of personality, human and minority rights and freedoms, inviolability of the physical and mental integrity, the right to freedom and safety, freedom of movement, non-discrimination, prohibition of racial, ethnic and religious hatred and regulated status of the foreigners. The Law on Planning and Construction of 2009 as a legal act related to the topic of urban planning, does not address the topic of safety in urban public spaces, except that it addresses the requirements for equal accessibility. This field has also been directly and indirectly affected by implementation of: the Law on Amendments to the Criminal Code of 2005, the Anti-Discrimination Act of 2009, the Law on Prohibition of Manifestations of Neo-Nazi or Fascist Organizations and Associations and the prohibition of use of Neo-Nazi or Fascist symbols and hallmarks of 2009, the Law on the Amendment of the Law on Prevention of Violence and Misbehavior at sports events of 2003, the Police Act of 2005, the Law on Offences of 2005 and the Act on Communal Police of 2009. The current By-law which specifies the standards and norms related to the accessibility is the Regulation on conditions for planning and design of the buildings related to unobstructed movement of children, the elderly, the handicapped and disabled dating 1997.

In conclusion, it could be pointed out that the existing legal framework provides a general possibility for the application of preventive measures and increase of the level of safety of the citizens in times when using the public spaces, because there are no legal obstacles and contradictions in the viewpoints. On the other hand, there is no legal obligation to implement these measures, especially not from the aspect of urban planning and design, except for measures related to the principle of accessibility. Until the eventual creation of the legal framework in the form of ordinances or regulations, it is possible to work on education of both the professional sector, and also the citizens and the decision makers, and to propagate this principle and advocate in public, to cooperate with police but also with the non-government organizations and in accordance with the possibilities, introduce applicable rules and standards in urban document by own professional authority, especially in the segments related to regulation of the public areas and spaces.

The current Master Plan of Belgrade dating 2003, covers the territory of 12 urban municipalities,[4] i. e. about 80 % area of administrative boundaries of the municipalities or 77602 ha. They are included as per the character of different space units, from the central urban zones to peripheral rural areas (the central zone – 3206 ha, the middle zone – 8532 ha, the external zone – 21962 ha and the peripheral zone – 43902 ha),

[1] Master Plan of Belgrade 2021, Chapter 1.2. Society
[2] http://www.tob.co.rs
[3] http://www.parlament.sr.gov.rs
[4] According to the By-law of the City of Belgrade from 2008 and pursuant to the Law on Capital City. The higher-order plan which includes the overall area is the Regional spatial plan of the administrative areas of the city of Belgrade from 2004 for the "metropolitan" zone of Belgrade with the projected population of 1,65 million.

which comprise a variety of topographic, morphological, typological, economic and social characteristics and components. The planned population is 1.4 million, with time projection of the plan until 2021.

On the territory of the City of Belgrade there are about 500 current detailed urban plans. This type of plans is adopted for settlements or parts of settlements and as per the spatial coverage, i. e. per the area, it can be rather diverse, which on the example of Belgrade ranges from 1 ha to 750 ha. The minimum coverage is one city block with appertaining traffic routes. In the total summary, the detailed urban plans cover about 65 % of the urban space intended for construction. Substantially, these plans closely determine the use of space, the routes and corridors of roads and infrastructure, horizontal and vertical regulation, capacities and building codes, rules of parceling out, special conditions associated with the preservation of cultural-historical heritage and environment and the manner of further implementation. In preparing them particular care has been taken of the application of urban standards for public spaces and uses. Legally defined procedure of plan preparation involves also the cooperation with all relevant institutions, organizations and utility services, comprising also obtaining adequate conditions and approvals to the planned solution. Also, except for the expert controls, the plans are presented for the public hearing as well, where citizens can provide their comments to the solutions proposed. Since the existing detailed urban plans date from different periods of their preparation, on several occasions they were re-examined in terms of their compatibility with the new legislation, compliance with the plans of a higher order that are relatively recently dated , the condition in the field i. e. degree of implementation, new requirements and the like.

4 GENERAL CHARACTERISTICS OF URBAN PUBLIC SPACE IN BELGRADE

The emergence and historical development of the public spaces in Belgrade is best to be freely studied in the area of the historical core of the city, i. e. in the part of the central area. The need for reconstruction of oriental Belgrade presented itself after 1862, at the same time when in many European cities (Paris, Barcelona, Berlin, London, Vienna and Rome) comprehensive and radical reconstructions were under preparation or in progress being the consequence of the industrialization process. The complete transformation of Belgrade borough had a different cause, goal and symbolic, however, it was implemented after the European model. The plan of Emilijan Joksimovic was radical, it set the whole new orthogonal traffic network which would permanently determine physiognomy of the central zone of Belgrade, by forming regular urban blocks and defining the public spaces.

Urban public spaces of Belgrade today are fundamentally no different from the same ones in other cities, even for their diversity, location and interaction they have great potential for further development and improvement. According to generally accepted opinion, one of the greatest qualities of Belgrade public spaces is made by their users, the citizens who in different ways, whenever weather conditions permit, visit the open urban spaces, socialize and enjoy in that which they have to offer. Belgrade squares, street cafes gardens, pedestrian zones, parks, urban forests and picnic sites, rivers and coastal zones, the beach of the artificial lake of Ada Ciganlija and biking trails are only some of traditionally visited and gladly used urban spaces. The Belgraders are accustomed to mutually sharing good and bad in the urban spaces environment, to celebrate victories (e. g. welcoming winning athletes), the New Years, running the marathons, roller skating, listening to concerts but also to protest and express their disapproval. In a survey conducted in Belgrade by the Bureau team of the architect Jan Gehl 2008,[5] it was concluded that the city possessed the culture of frequent use of public space, adjusted to the climatic region, and that attention should be paid to their development, so as not to lose the valuable habits and a positive effect of their use and have the vitality of the city redirected over to the enclosed malls and similar places. In Belgrade circumstances, compared to the budgetary resources of other cities, the investment in furnishing and maintenance of the public urban spaces is rather modest. Besides, if retrofitting of public spaces has been proposed in order to increase the level of safety, one should bear in mind the diversified organizational structure, shared responsibilities and a lengthy process of decision making and execution. For this reason it is necessary to consider the minimum level of equipment that will provide optimal results.

[5] GEHL Architects, 2009.

5 RESULTS OF THE STUDIES CONDUCTED ON THE TERITORY OF BELGRADE FROM THE ASPECT OF SAFETY

On the territory of Belgrade until recently there were no specific studies on the subject of safety of the users of urban public space, especially in terms of urban planning and design. For many years, Belgrade has been considered a safe and secure city, with an average crime rate for the capital of one million inhabitants, a successful organizer of the international conferences, open and warm to the tourists. The events during the 1990s, the difficult political and economic situation, life in a war environment and degradation of social norms and standards, have introduced some changes. It was not until the middle of the last decade that studies were conducted on this topic from the viewpoint of sociology and criminology.

The Institute for Sociological Researches of the Faculty of Philosophy in Belgrade[6] prepared a study in the period 2003-2004 on the theme of safety and risk sources in the neighborhood from the perspective of children and their parents. From the spatial aspect, the survey was conducted in three parts of the city; through a survey the results were obtained which testify of a high degree of coinciding perceptions of the children and the parents in identifying the issue of the reduced safety level. The most frequent risk sources are the presence of drug addiction in the spaces planned for the stay and play of children, unilluminated space and disorder in the space, suspicious unknown individuals and bullying. On three occasions, in 2004, 2007 and 2008 the Institute for Political Studies, Center for Security Studies and Terrorism Research studied the attitude of the citizens when it concerned the feeling of safety in the capital. Certain publications of the Institute for Criminological and Sociological Researches can be consulted in terms of understanding the topic and its importance. In addition to the above researches the topic of safety in a broader sense, is dealt with by a number of non-governmental organizations - OSCE Mission to Serbia and UN-HABITAT.[7]

6 ANALYSIS OF THE USERS PERCEPTION OF SPACE BASED ON THE RESULTS OF THE SURVEY AND THE OFFICIAL DATA

Based on the data and information available to the Ministry of Interior of the Republic of Serbia – Secretariat of Belgrade and non-government organizations (SOS telephones, legal aid, trauma center, safe houses, etc.), an impression can be obtained on the cases of violence in urban public spaces. Narrowing down the analysis of the data to one specific society group - women, the image was obtained of vulnerability, according to the traditional understanding as a sensitive and easily vulnerable population groups, which at the same time is rather active and mobile, and in Belgrade makes a significant proportion of the population (according to the census from 2011. about 53 % of the capital population are women).[8] Based on data obtained from the MIA RS – Secretariat of Belgrade, a review of criminal acts against women on the territory of ten city municipalities of Belgrade was created and which were committed exclusively in public areas, in the period from 2000 to 2005, when 2135 cases of robbery of women were recorded and also the declining trend of this type of crime was observed.

The information about the attitude of the citizens of Serbia towards safety is a result of the public opinion poll on police reform in Serbia which was conducted by OSCE and IPSOS Strategic Marketing. The survey was conducted in two phases (in November 2008 and October 2009); on the total of 2990 respondents, aged over 18 and by "face to face" method. The question asked " Which problems do you think present the greatest threat to the security of the citizens in Serbia ?"; resulted with violence in public places as an answer taking the fifth place, with an increase of concerned citizens from 3 % in 2008 to 9 % in 2009. Responses like: drug abuse (in the first place), crime (generally speaking, elsewhere), violence (in the fourth place) and minor offenses (in the sixth) are not negligible either, since they are all in some way associated with the level of safety in public places.

The research conducted in 2007-2008 by the team of Urban Planning Institute of Belgrade involved the analysis of users' perception of space and its safety based on the survey of the citizens. This is a common way of information gathering, and the form, i. e. survey contents and the method of analysis and interpretations of the responses obtained were carried out in accordance with the similar surveys conducted

[6] TOMANOVIĆ S., 2006.

[7] http://www.transconflict.com, http://www.ccmr-bg.org, http://www.bezbednost.org, http://www.osce.org/serbia, http://www.unhabitat.org.rs, http://www.skmbalcani.cooperazione.esteri.it

[8] DANILOVIĆ Hristić N., 2008.

in other European cities. The main aim of survey was determination of the personal feeling of safety of the citizens in public spaces, i. e. consideration of their personal perceptions associated with this issue as well as information gathering about which spaces in Belgrade are deemed less safe by the citizens, i. e. where they feel more vulnerable or exposed to danger. In order to obtain as clear indicators as possible, the survey was anonymous and was distributed to various categories of population, i. e. it was ensured to include the participation of both sexes, various generations, certain threatened and minority groups, as well as foreign citizens currently living and working in Belgrade. Essentially, the survey's parameters were defined after the similar surveys conducted in the cities worldwide, and the questions asked could be classified in three groups:

- questions related to personal information on the respondents as well as their daily habits - sex, age group, part of the city they live in, work and spend their leisure time, whether they belong to some of the specified social groups, what time of the day or night and which way they mostly move around the city.
- questions related to personal perceptions, feelings and experience - whether they do not feel safe enough in certain parts of the city, whether they avoid leaving the place of residence for fear and whether for that or some other reason their mobility has been endangered, whether they feel more secure when they are in company, whether they have personally experienced something unpleasant in public urban spaces, or someone close to them experienced the same and how they react when they witness an incident.
- suggestions about which way safety in public spaces can be improved – level of trust in law-enforcement, selection of some of the proposed measures and space for providing suggestions and proposals.

This way data were obtained that the majority of citizens stay in the public spaces in the afternoon, between 12 and 19, and during the "active" part of the day, from 8-24 hours, there is 88 % of stays outside the place of residence. It is interesting to note that most of the respondents take mobility in the public space to mean stay in the public space and leisure activities, like for instance walking the dog in the early morning, going to market or window-shopping on weekend mornings, stay in the park in the afternoon, walking downtown in the afternoon and evening, meeting with friends, going to an outdoor event (concert or other event), but not going to work or college.

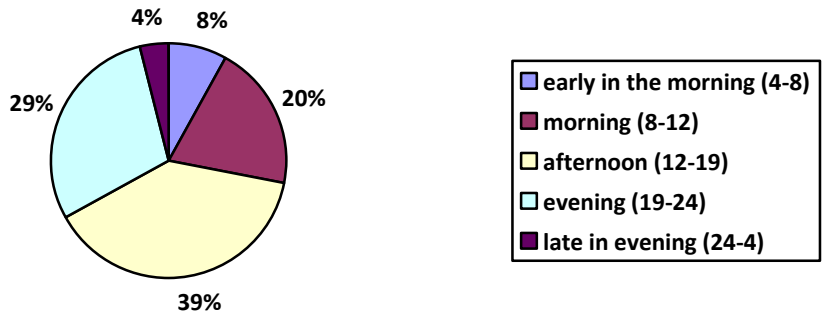

Fig. 1: The most frequent period of mobility in the open public spaces

Most of the respondents move in Belgrade on foot (35 %) or by some sort of public transportation (36 %), whereas about 24 % use their own vehicle or taxi service. The smallest number of respondents ride a bicycle which can be attributed also both to unfavorable morphology of the terrain and the lack of adequate bike trails in greater number.

When answering the question whether the respondents avoided certain parts of the city, some settlements or parts of the space in fear for their own safety, half of the respondents opted for positive reply. In the explanation the parts of the city or type of space were stated. Generally, it primarily concerned vast park spaces in which citizens did not feel comfortable when it got dark, then the areas primarily intended for traffic (highway loops around highways, the area around the railway and bus stations, bridges, underground

passages, public transportation stops etc.) and peripheral settlements that by their typology belong to the open block, and also the areas with a great circulation of pedestrians were mentioned where due to crowds there came to decreased concentrations related to safety which may present mitigating circumstances for minor criminal acts, such as theft. It is quite interesting that approximately the same number of respondents stated spatial and social problems as crucial for avoiding certain parts of the city. The relation between these two aspects is obvious, i. e. dark and unarranged spaces, according to the understanding of the citizens, automatically attract the individuals of deviant behavior (according to the survey's quotes: „homeless persons, alcoholics, junkies, skinses, bullies") and present potential danger for all the rest.

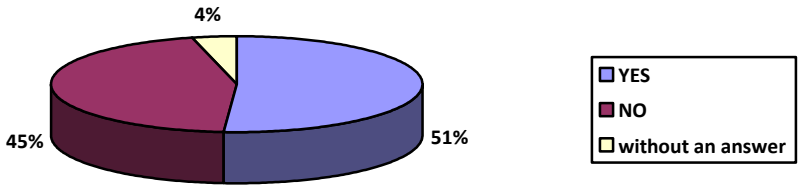

Fig. 2: Answers to the question: "Do you avoid some parts of the city because of fear?"

The mobility of the citizens, i. e. the undisturbed feeling of freedom and security in using urban public spaces is of great importance. To the question whether they avoided leaving the house (being the synonym of safe space) at certain time of the day, most respondents (59 %) answered that they did not, but close to one-half of them said that they avoided going out in the late hours at night. As regards the question what the citizens were afraid of, i. e. what prevented or restrained them to stay in certain urban public spaces during certain period of day and night, mostly quoted answers indicated to the combination of spatial and social problems, such as insufficiently illuminated spaces, desertedness i. e. absence of other users, or presence of persons who one can expect offences and violent attacks from. The feeling of greater security when in group compared to when the individuals find themselves in urban public spaces does not significantly differ, 53 % versus 45 %.

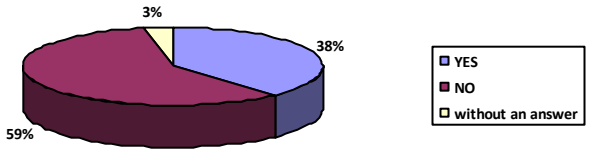

Fig. 3: Answers to a question "Do you avoid going out at certain time of the day?"

Fig. 4: Answer to the question "Do you feel safer in public space as an individual or when in a group?"

The next group of questions related to the personal negative experiences which occurred in urban public spaces, and 69 % of the respondents considered that they personally had had or had the knowledge that somebody close to them had had some sort of an unpleasant experience, from verbal attacks, insults and comments to physical attacks, thefts and other criminal acts. To the question how the citizens reacted when they happened to witness some sort of attack on the other person in the public space, the respondents even provided several variants of answers, having in view different situations they had found themselves in, as

well as hypothetical standpoints on how they would act in those situations. Basically about 50 % of citizens do not react, about 29 % react actively, independently or with the help of the people present, while 21 % of the respondents call police.

The third part of the survey was devoted to the proposals for safety increase, where the overwhelming majority of respondents, 98 % of them, believed it was possible to implement the measures which would lead to better public security in the urban areas. The greatest number of respondents, from 22 to 30 %, marked better lighting and more frequent patrols of law enforcement officials as key measures. A large number opted for a different mode of public transportation, even also for video surveillance (12-13 %), which often is considered an unpopular measure because it is often associated with compromising the intimacy and privacy of the citizens. A smaller percentage, between 7 and 9 % recognized problem in buildings orientation and arrangement of green areas, while the smallest number (3-4 %) chose the response offered related to the space good layout and fencing.

On the basis of the official data obtained, the research and surveys conducted and interviews with the citizens a conclusion may be reached that certain areas of Belgrade, namely the types of space and spatial elements and certain users of the mentioned spaces cause the feelings of fear and worry for personal safety. Based on these data the criteria for identifying potentially dangerous areas and their spotting on the map can be created. Thus marked "black spots" or stretches, as opposed to a network of spaces that have been evaluated as safe, provide the signal at which place it is necessary to implement any of the technical measures of prevention or to reinforce police supervision. The general conclusion is that the residents of Belgrade and the visitors to Belgrade still feel relatively safe in urban public spaces. They feel the safest in the areas that are "alive", frequented and well illuminated at night, or in some manner monitored, and they feel insecure near the areas with a large circulation of people or the presence of "risky groups" or in the spacious park spaces where there is not enough visitors. The feeling of insecurity is equally caused both by spatial elements and by the presence of "unwanted persons", and the majority of citizens believe that there is interdependence, i. e. the spaces that are under-equipped and used to attract offenders or other persons who inspire fear (listed as: homeless, alcoholics, drug addicts, etc), which makes the space dangerous and undesirable, i. e. leads to the fact that it causes fear and people avoid it whenever possible.

At the time of conducting this research the majority of the respondents who participated did not know much about the topic of safety, i. e. they were not informed about the importance of this topic and its impact on the quality of urban life. Also, preventive measures are not known to our citizens and are mostly identified with a greater presence of law enforcement with better night lighting and space surveillance. At the same time almost half of the respondents were not prone to react to the observed criminal act or violence, and nearly half also have no confidence in law enforcement. For this reason it is necessary to work on the education of the citizens on their being informed, active participation in planning and spatial development and building of trust in law enforcement.

7 RECOMMENDATIONS OF URBAN-ARCHITECTUAL ELEMENTS AND GUIDELINES FOR PROVIDING HIGHER LEVEL OF SAFETY IN URBAN PUBLIC SPACES

As already mentioned above, safety is one of the aspects of quality of life in the society, where people, individually or collectively, and to a sufficient degree are spared from criminal acts and associated forms of behavior, and reassured about myths and well-informed about real risks related to criminal and prepared to bear with the consequences. The feeling of the citizens that they are completely safe and carefree in urban public spaces has a positive and beneficial impact on the daily cultural, social and economic life of the city. The crime suppression is considered to be any single action or set of actions that have an impact on reducing the frequency and severity of criminal acts, and it is believed that the best results are achieved by application of measures of prevention, which act directly on the causes. It should be emphasized that prevention measures do not involve great investment and can be implemented already in the planning and design phase. In the next phase, it is important to estimate what the priorities for implementation are, what is viable to be carried out through mutual cooperation between citizens and experts in charge of safety. The practice has been to compare the wishes and perceptions of the citizens to the information at disposal to the authorities, and then, on the basis of that to form a very clear image of which measures, at which locations and in what order should be applied. In order to enable the citizens to have an opportunity to participate and express their perceptions and fears, provide their opinions and ideas, it is recommended to the local government to

conduct surveys or organize public forums. In addition to diagnosing problems in space and make the identification of needs, which has never been easy, the next step that requires special attention is the implementation and monitoring of measures, since following the decision on a set of appropriate measures after their implementation often remains a problem of maintaining the elements of urban design at a satisfactory level and its possible improvements based on shortcomings identified. Therefore, achieving good results requires long-term and ongoing site management and maintenance of physical outcomes of the project. Regular maintenance of vegetation, lawns, paths and grounds, waste removal and graffiti cleaning, replacement of street furniture and lighting, is within the competence of the existing system of public communal services, but it is necessary to coordinate their work and pay more attention to safety aspect which in fact can be easily achieved by regular maintenance of the spaces.

Urban planning can directly contribute to the prevention of crime through the application of tools such as development plans, supplementary planning guidelines, discussions and negotiations prior to their adoption, making decisions that control the development, planning conditions and obligations, working in partnership with the police and non-government organizations.[9] The suggested attributes can contribute to the sustainability of the community in terms of its safety through crime prevention: access and mobility, are associated with areas of well-defined routes, which allow communication, mobility, transit and stay without compromising safety, buildings spatial layout that prevent and minimize conflicts, spontaneous and uninterrupted natural monitoring of publicly accessible spaces, a sense of ownership and possession as well as belonging, togetherness, mutual respect and appreciation and territorial responsibility, physical protection, which in addition to safety features also possesses characteristics of a good design, the level of everyday human activities appropriate to the location, which reduces risk of crime and creates a feeling of safety in all situations and effective spaces management and maintenance. In an environment that is well planned, attractive, clearly defined and well maintained, people will feel proud of their environment, they will mostly feel comfortable and have a sense of shared possession and responsibility. Poorly planned environment provides a sense of alienation and fear, and unlike it, a well-planned environment contributes to the cohesion of the community and meets all planned functions in an efficient and harmoniously coordinated way.

The use of space makes one of the most important aspects which affect the activities in space and therefore the security level as well. As mentioned before, the ideal is a city which is 24 hours alive i. e. which consists of the combination of diverse uses (dwelling, business, commercial, public uses), of moderate density, clearly defined relation between the private and the public, well-planned and projected directions of movement, which provide constant and equal circulation of the inhabitants and reduce the risk of the space being deserted at some point. Also, compactly developed spaces without uninhabited areas and voids, are by far more favorable. It is desirable to orientate the buildings in such way so that the rooms where the most time is spent provide an easy-to-survey street or other public spaces view; fencing the land for better visual survey should be of less height or if high to provide satisfactory level of transparency. In order to be considered a safe space it has to be easily accessible, easy-to-survey, provided with alternate directions for movement and well-marked signalization, well illuminated and surveilled, as needed. In that respect, the starting point is planning and designing, having in mind activities and functions, identifiable benchmarks and views, unique image of settlements or certain buildings, clearly visible and moderately long directions of movement, but also the elements of urban furniture. The quality and well-designed furniture is by itself an obstacle to vandalism. Likable and authentic design makes citizens feel proud and intensify the feeling of identity with their own city while disdain to bad design reflects mostly on the elements themselves (benches, garbage baskets, sculptures or public transportation stops).

In the recent years, Belgrade has ensured to take care of this aspect and in accordance with its financial means to keep up with the trends. The recommendation for the city of Belgrade is certainly to pay more attention to design, placement and maintenance of urban furniture as well as to re-investigate public lighting in some areas i. e. to adjust it to comply with safety terms and conditions. In respect to video surveillance which is associated with controversial standpoints, maybe it would be the most appropriate to restrict it to a necessary minimum i. e. to those spaces where it is not possible to gain desired results with other measures or which present the constant neurological points. If the citizens would feel safer and would be free of fear of the potential unpleasantness and violence, and cameras would not cause in them some other sort of resistance

[9] OFFICE of the Deputy Prime Minister & Home Office, 2004.

to space or feeling of compromised privacy and freedom, then it can be considered a justified measure and positive solution.

The principle of accessibility is based on the same humanistic concepts and legal provisions guaranteeing equal rights for all citizens to freedom and which prohibit discrimination and exclusion on any grounds. The freedom of movement, the feeling of comfort include also the feeling of security and safety, and most of the measures, including also the technical ones, contribute to a different appearance, understanding, acceptance and manner of space usage. The concern about the public spaces, but also the concerns about all members of society, providing equal opportunities to all through the measures of adjustment, sharing space and enjoying life together, communication and a sense of belonging are the basis for creating a secure and safe environment. If the needs of the most vulnerable sections of society have been met (e. g. people with disabilities, the elderly, children or women), then the needs of all those who do not feel vulnerable or endangered will also be met, but they can easily become the same (vulnerable and endangered) if they are exposed to the inconvenience of a neglected and hostile environment.

8 CONCLUSION

The measures of prevention applied in the phase of urban planning could contribute to more comfortable and freer space usage and the fear of urban structure could be reduced to fear of possible risky activities and incidents and the possibility for such events to happen exactly where the environment provides them the opportunity by its nature (e. g. neglected, isolated, badly laid, dark and similar spaces). The measures of prevention could be applied both to already built spaces through their reconstruction and adjustment to the influential factors, and also in the phase of planning new urban spaces, by application of the standards and spatial normative for its arrangement. In this way, with small additional investment, huge benefit can be achieved which registers in the more intensive use of urban public spaces but the surrounding functions as well, and resulting in the pleasure of the users, increased mobility, feeling of a higher level of security and belonging to the society and economic profit. These measures are less "imposing" and by far more agreeable than institutional controls of the space by surveillance of law-enforcements (uniformed officers, video cameras and so like).

An important characteristic of the public spaces is their integration and incorporation in the network system that allows for unrestricted movement and use. If any element of this network is considered by the users to be inadequate, unsafe or undesirable, it would result in its avoidance, i. e. exclusion from the matrix. In line of identification and diagnosis of problems, it is important to identify whether it concerned just a poor spatial organization, neglect and failure to maintain the space, the more profound sociological problem of settlements or a combination of all these problems. Depending on that measures are to be selected which are possible or necessary to implement. Since public spaces should present the priority in the process of urban planning, in terms of protecting the public interest and promotion of the overall quality of life, it is necessary to include more actively the segment relating to measures for safety and security into urban practice.

Analyzing the condition in Belgrade, based on the information gathered, including also the opinions of direct users it have been concluded that Belgrade is still a relatively safe city but also that measures should be taken which would contribute to the feeling of safety to still remain. The recommendations for further actions were certainly creation of the unique data base in GIS technology which could provide process monitoring in space, mapping of events and actions, registering of changes, making comparative analyses and analyzing the results of the application of positive measures of prevention. Education and specialization of experts in these topics is preferable equally as general awareness of the citizens and their elected leaders. Considering that legal framework provides the possibility of application of urban-architectural measures of prevention, it is necessary to work on their standardization and creating by-laws or running professional publications.

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Urban Structure as a Repository of Social Content – the Case Study of the Lodz 'Jewish District'

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1 ABSTRACT

The spatial structure of the city rests at the confluence of the human nature and the artefact of the era. Cultural factors are among important determinants of the shape of structures and of the construction process. Each community has its own distinctive social characteristics. An analysis of the spatial record of community functioning preserved in the physiognomy of a city allows for the comparison of features of different groups of city users. Lodz is said to be the city of four cultures. Its construction is attributed to Poles, Russians, Jews and Germans. The spatial distribution of different nations in the city downtown was not even, although the whole area was inhabited by the mixed population. The downtown part of the current Bałuty district was among the regions where Jewish nationality prevailed. The paper analyses the spatial features of the area, with emphasis on morphological characteristics of buildings and public spaces.

2 INTRODUCTION

2.1 General assumptions

Cities, understood as concentrations of large groups of people in a limited area, are places where civilisation occurs (Xenakis 1965: 336-337). Similar conclusions from empirical investigations, with regard to the large concentration of people in cities, are provided by Florida (2008). It should be noticed here that the city space is the only possible place of contacts for people belonging to various milieus. The lack of spatial relations between the location of different social groups - which Sachs (2006) defines as belonging to different periods of civilisation development: information, industry, agriculture - and the place, which they occupy remains characteristic for contemporary *'urban regions'*[1]. Such situation – usually of positive connotation, as mixing contributes to the equalisation of differences – is the result of many years of evolution and spontaneous transformation of social structure. This is an antithesis to the Chicago school approach[2], which defined the city social structure as a juxtaposition of areas occupied by people belonging to various groups, seeing in the situation of change the transformation period between the following phases of succession. While mixture and variety create fortuity and are a source of richness of the urban environment. Carmona et al. (2009) and Gehl (2009) also underline the need for integration of different groups within an area and point at enabling direct contacts between inhabitants as the primary challenge for today's urban design.

Studies of former cities, which successfully developed as multiethnic communities provide important guidelines, when looking for solutions for problems of contemporary multicultural cities. Thus this case study, which concerns Lodz – a 19th century, textile industry centre, the development of which was a common oeuvre of four cultures: Polish, German, Jewish and Russian. Their activities left durable traces in the city structure in the form of important edifices: factories and palaces of factory owners, and common structures: tenements and social housing, serving for factory workers and other employees. Architectural forms expressed the differences in religious habits: there are catholic and orthodox churches, whereas most of the synagogues were demolished. The analyses of urban structures, including social spaces of squares and markets, streets, passages and nooks provide an important perspective. The patterns differed throughout the city - their overlay with the distribution of communities representing various cultures indicates the correlation. Their concentrations and mixing up provided occasions for both: isolation and mutual relations.

2.2 Thesis

When regarding the development of physical structures in relation to culture, the built form constitutes an important repository of cultural information, an artefact of cultures and societies that created them in a given time (Lawrence, Low 1990, Dubos 1972, Alexander 1977). Studies of the physical form of the city allow to reveal the activities of former citizens. The physical urban structure constitutes part of the material culture,

[1] The term proposed by Zuziak (2008, 28) to describe a city and its surrounding areas.

[2] R. Park et al. after Jałowiecki, Szczepański (2006, 18). An exemplary thesis of Otmar Spengler, used as reference by the creators of Chicago School *„a city is the same for civilised man as a cottage for a peasant"* stops making sense in the description of the contemporary reality.

which, as Mead states, remains a series of *"collapsed acts, the signs of what would happen if the acts were carried to completion"* (cited in Richardson 2009: 75). Material culture becomes an expression of the defined situation (as described by social scientists, e.g. Perinbanayagam (1974)), when an unity is brought about between the situation itself and the material settings. Then the situation may be described as placed as it has achieved its material existence (Richardson 2009: 75).

Hillier and Hanson (2003) underline the relation of patterns of people movements and physical environment introducing the concept of spatial logic of space. Thus, the analyses of existing and former urban structures provide an important tool for the creation of new structures, which not only follow the site's genius loci and local tradition but also stay in compliance with the integral cultural patterns of social groups. More contemporary research on the social production of space seeks to place the understanding of built form in the larger context of the society's institutions and history: Lefebvre (2003), Lawrence, Low (1990) and their followers. Proxemics relates the human environment with behavioural patterns proper for distinguished cultures (Hall 1966, 2009). The above factors remain important, when considering the constant displacement of people in an era of globalisation and the requirement to provide an environment, which suits their needs while at the same time reducing the problems of social adaptation.

The present case study discusses the settings, which were created by Jews, who lived in Lodz in the 19th and 20th centuries, addressing the relation between the level of mixing up and assimilation and presence of features specific for this culture in the city structure.

3 HISTORICAL BACKGROUND

3.1 The definition of the area under consideration

The delimitation of the area may raise some controversy. The common perception of the Jewish district in Lodz refers to the area of the Old Town and the adjacent part of the former Nowe Bałuty settlement, and is enclosed by Pomorska and Legionów Streets, including the former Factory of I.K. Poznański and its closest surroundings. Citizens with higher level of historical consciousness consider the area extending to Zielona and Narutowicza Streets, aware of the presence of more assimilated Jewish population in the direct neighbourhood of the pre-war edifice of the reform synagogue (*Dajcze szil*), which was erected on the corner parcel of Zielona Street and Aleja Kościuszki (former Zachodnia Street). The consistent concentration of Jews was located in the Old Town along with the most urbanised part of the former Nowe Bałuty settlement – this area is referred to in literature as the one of essentially Jewish character. In the South part the area lines up with the extent defined by analyses of statistical data of the beginning of the period between the World Wars (Grabowski 1922), shown in Fig. 1. The spatial extent of the contemporary administrative Bałuty unit differs from the common understanding of the name, and from its historical meaning. The tragic events associated with the functioning of the Litzmanstadt ghetto in Bałuty overlap on this in the public consciousness.

Basing on the Municipal Register of 1918-1920 (Grabowski 1922) the population of Moses' faith occurred in the area limited by Św. Andrzeja and Przejazd Streets (current names: Andrzeja Struga and Tuwima Streets). The greatest number of Jews lived in the Old Town (statistical unit III – 89%), in the neighbourhood of Pomorska Street (unit V – 78%), in the neighbourhood of Zielona Street (unit VII – 62%) and Dzielna Street (current name Narutowicza Street, unit VIII – 68%), in the North-East part of Bałuty (XVIII - 43%) and in the neighbourhood of Konstantynowska Street (unit IV – ca 50%). Certain percentage lived in Górna district, in the neighbourhood of the market place. The extent of the occurrence of Jewish population for units VII, VIII, XVIII and IV did not match the borders of the statistical units, thus the aggregation to bigger units did not allow to show the effective concentrations of this group within the whole unit (Spodenkiewicz 1999).

The analysis of the spatial development of the Old Town in Lodz and of the Bałuty district, thus of the areas, the final spatial shape of which was mostly the artefact of the Jewish community, indicates the presence of a set of morphological features proper for this culture. German authorities of Litzmanstadt extensively redeveloped the area during the World War II, further redevelopment was conducted in the post-war period by Polish authorities. However, even the later alteration, which diluted most of the former character, did not utterly destroy the general character of these places, which remains present and allows for reading of the former citizens' activities and habits.

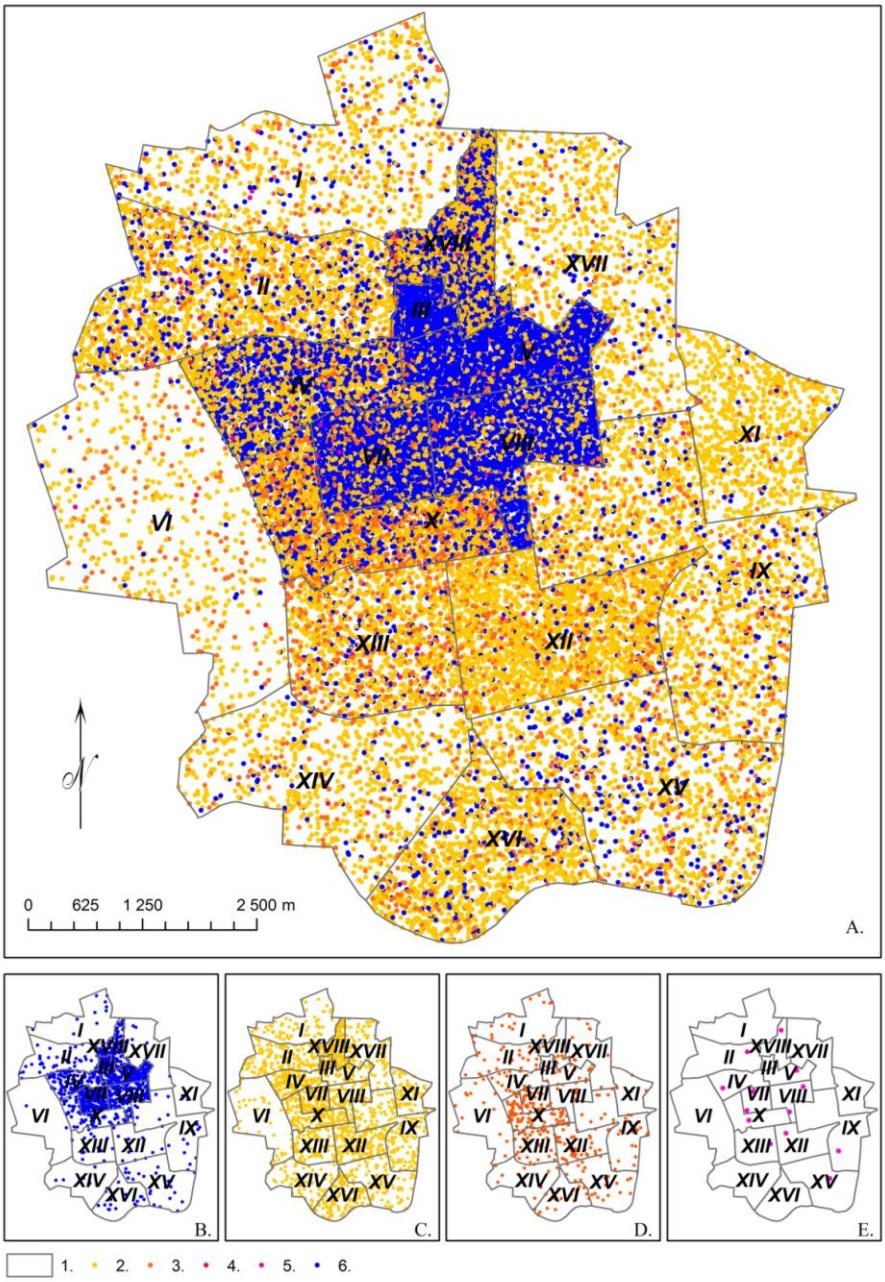

Fig. 1: Sociotopography of Lodz in the beginning of the 20th century, data source: Grabowski (1922).

3.2 History of the Jewish settlement in Lodz

The initial low influx of the Jewish population to Lodz before the end of the 18th century was the effect of the economic stagnation of the city (Puś 2003: 11). The lack of interest continued despite the fact that Lodz, which remained the property of Wroclaw bishops did not have the privilege *"de non tolerandis Judaeis"*, that is there were no legal limitations for Jews' settling (Friedman 1935: 22). The economic development of the city under the initially Prussian (to 1806 r.) and then in the period of the Duchy of Warsaw – Polish government administration, contributed to the considerable growth of the population - in the years 1793-1808 it was above twofold: from 191 to 434 persons. In this time, the number of Jews in Lodz grew up five times: from 11 to 58 persons (Puś 2003: 11). The conclusion about the economic development of city as the main factor inducing the Jewish population to settle in Lodz is important for further considerations (Baranowski 1988: 12).

The regulations of the Constitution of the Duchy of Warsaw, setting up the equality of all citizens *"before the face of law"* did not refer to the Jewish population. Moreover, their law to move freely was limited and the successive policy of the government aiming to transfer Jews living so far in the country (above 30% of the entire Jewish population at the Duchy of Warsaw) to cities was introduced. This was one of the factors,

which fostered the growth of immigration to cities, among others to Lodz. The treatment of the Jewish population did not change in the Kingdom of Poland (in the period between the Congress of Vienna in 1815 and 1862), however it did not reduce Jewish immigration to Lodz. The number of Jewish inhabitants of Lodz grew up from 98 persons in 1809 to 259 in 1820.

The decision of the authorities issued on the 7th May 1822, concerning the establishing of Jewish districts in cities, belonging to the government, was introduced in Lodz on the initiative of the authorities of the Mazovian Province, as part of the regulation on constructions, accompanying the location of the factory settlements (first of Nowe Miasto, and then of Łódka). The decision of the governor of Congress Poland of 27th September 1825 established in Lodz the district for the inhabitants of Moses' faith and obliged all local Jews to move to the appointed zone of the city before the 1st of July 1827. Exception was made for these, who showed high income, spoke Polish and French or German fluently, were sending children to public schools and did not use *"superficial signs, which so far distinguished the Jewish nation from other citizens"*. The privilege to choose the place of residence was also granted to persons of high material status, scientists, artists and wealthy merchants (Rynkowska 1960, Nr 152). Economic development was the factor attracting subsequent immigrants: in the years 1825-1841, the Jewish population grew up four times from 342 to 1359 persons. It resulted in the growth of the inhabitants' density in the zone and, as a consequence, its enlargement. The first informal enlargement, took place in 1841, when the Government Committee annotated the project presented by the Mazovian Governor Franciszek hr. Potocki, stating that the Committee *„confirms that, building intended and already begun by the Jewish population in the part of the city of Lodz proposed for spreading of their district, should not stopped".* The district was then enlarged, including the whole of the Old Town market and the northern part of Podrzeczna and Wolborska Streets as shown on the plan from 1841[3].

Nobody decided to settle outside the zone, despite the regulations allowing for this. It was partly a result of the hostile attitude of artisans, mostly German, who referred to the regulations of Zgierz, where Jewish people were forbidden to settle. The first Jewish investment outside the zone was the yarn store erected by Ludwik Mamroth from Kalisz only in 1833. Until 1848, there were only eight Jewish families living outside the zone. From 1848 to 1860, further 40 families got their permissions, there were also 312 Jews living in Nowe Miasto without permission (Friedman 1935: 82-85). The next enlargement of the zone took place in 1859, confirmed by the Decree of the Administrative Council of the Kingdom of Poland on 12 May 1861. It covered the territories to the East from the Old Market, where four new streets were marked out, as well as parts of the streets: Zgierska, Kościelna and Piotrkowska (currently part of Nowomiejska) and the North side of Północna Street. A year later, on 5 June 1962, tsar Alexander II signed an ukase defining the rights of the Jewish population, which, along with equalising the Jews' rights in access to merchant and artisan corporations, liquidated the Jewish zones and cancelled the former discrimination of Jews in the civil and penal law.

Concurrently, in 1853, merchants from Lodz: Szlomo Icchac Bławat and Icchat Birenzweig signed a lease contract with August Zawisza, the owner of Bałuty estate. The allotment of the New Bałuty settlement began in 1857. According to Orłowski (1984) *"its objective was the foundation of a new, industrial settlement which, neighbouring with the Jewish district, would have in it a constant source of cheap and professional labour force"*. One could argue with the term 'industrial settlement'. Especially that the same author quotes the statement of the then president of Lodz Franciszek Traeger, describing houses, *"the structure, layout and size of which are conceived as convenient places for craftsmen and merchants*" (Rynkowska 1960, Nr 130), thus confirming the commercial character of the new settlement and pointing at the perfection of adopted solutions from the point of view of commerce. In the report for the gubernial government Traeger stressed the satellite character of the new settlement in relation to Lodz, being rather a prolongation of the city than an independent organism, the spontaneity of the new development and its possible competition for Lodz. The Nowe Bałuty settlement was inhabited mainly by poor people, both Jewish and Polish, who earned their living from small trade, home industry and domestic service in Lodz (Puś 2006: 95). The land properties belonged to all three groups (German, Jewish and Polish), though Germans seldom settled in the neighbourhood.

3 *"Plan rozszerzenia rewiru żydowskiego w r. 1841 (ze zbiorów Archiwum Akt Dawnych Miasta Łodzi)"* Map 2 in Friedman (1935)

The Jewish district in Lodz, initially restricted to 'the zone' was enlarged with time covering a big part of Bałuty and the North part of the downtown. Richer and better-assimilated citizens lived rather in Nowe Miasto, poorer groups in Bałuty. The main reason of Jewish immigration was the economic development of the city as textile industry centre (Puś 2006: 47). After 1890 there were about 10 000 Jewish immigrants from Russia, who arrived in Lodz – so called Litvaks (Puś 2006: 47), what fostered the development of commercial contacts with Russia and facilitated export of products to the East. This by turn indirectly influenced the wealth of this ethnical group, its position in the city and allowed to enlarge their properties outside the zone.

3.3 Spatial distribution of nationalities in the pre-war Lodz

The spatial distribution of nationalities in pre-war Lodz was not even and changed in time. In the period just before the beginning of the World War II Jews counted ca 231,000 people - 34,4% of the total population of the city (Baranowski 2009, 85). The Old Town, the central part of Nowe Bałuty and the North part of Nowe Miasto were inhabited mostly by Jewish population, though the social characteristics of this group, mainly its level of assimilation were varied. Most descriptions of the life in Lodz of these times, referring to the areas in question, mention Polish, Jewish or German owners of tenements, Polish janitors and mainly Jewish inhabitants. The spatial distribution of different levels of income was clear: the poorest – proletariat, small artisans, outsource workers lived in Nowe Bałuty, traders and small producers inhabited the Old Town and larger merchants and bankers resided in Nowe Miasto. Obviously, the above-described distribution is very schematic, as the mixing of professions, nations and countries of origin and the differences of the degree of assimilation was huge and not equal.

The spatial distribution of nationalities influenced also the perceived safety. The districts: Widzew, Chojny and the neighbourhoods of the garrison at Konstantynowska Street or of the Hallera Square seemed dangerous for the Jewish citizens. Parks Sienkiewicza or Poniatowskiego – safe on weekdays, could occur dangerous on Sundays or during holidays, especially on Corpus Christi or on 3rd of May – the anniversary of the adoption of the Constitution of 1791.

4 METHODOLOGY OF ANALYSES OF URBAN STRUCTURE

4.1 Conzenian tradition

Polish tradition of analyses of urban morphology, derived initially from the German and Austrian research and enriched by Polish scientists[4] drew further on from the methodology of MGR. Conzen[5]. Works of M.R.G. Conzen (resumed 2004), developed further by, e.g., Whitehand et al. (2000a), Whitehand (2001), concentrated on examination of urban structure in the morphological approach, against the economic and social background, looking for relations between the city, its inhabitants and the dynamics of city construction (Vernaz Moudon A. 1997: 4). Studies on morphology of plans of small towns and villages of medieval provenience, conducted since the early 60s, aimed at proving the Polish roots of the so-called Regained Territories[6]. Similar studies on different morphological units distinguishable in the urban structure of Lodz[7] also based on the Conzenian methodology of parcellation analyses. The above studies belonged to

[4] Koter, Kulesza (2010: 112) refer to the work of Dziewoński K.: Zagadnienie typologii morfologicznej miast w Polsce, Czasopismo Geograficzne 33/ 1962, 441-56

[5] Koter, Kulesza (2010: 113) refer to the works: Golachowski S.: Studia historyczno-geograficzne nad Wrocławiem na przełomie XVIII I XIX In Sprawozdanie Towarzystwa Naukowego Seria A, 12/1957, 3-8; Golachowski S.: Studia nad miastami i wsiami śląskimi, PWN, Instytut Śląski, Opole 1969

[6] This trend is represented by works: Pudełko: (1959, 1962, 1964), and, as refered by Koter, Kulesza (2010: 114): Pudełko J.: Zagadnienie wielkości i proporcji rynków w badaniach nad rozplanowaniem miast średniowiecznych, Zeszyty Naukowe Politechniki Wrocławskiej, Architektura 4 (36) 1960, 25-45; Pudełko J. : Ewolucja średniowiecznego miasta w Polsce, maszynopis w zbiorach Zakładu Historii Kultury Materialnej PAN, Wrocław 1965, Pudełko J.: Zagadnienie wielkości układów średniowiecznych miast Śląska, Prace Komisji Historii Sztuki Wrocławskiego Towarzystwa Naukowego, Wrocław 1967

[7] The most important studies were conducted by M. Koter (1979, 1984), also: Koter M.: Geneza układu przestrzennego Łodzi przemysłowej Prace Geograficzne 79, Instytut Geografii Polskiej Akademii Nauk,Warszawa 1969; Koter M.: Relikty osadnictwa średniowiecznego w planie współczesnej Łodzi', Przegląd Geograficzny, 48/1976, 667-87; Koter M.: Rola wiejskich elementów morfologicznych w procesie kształtowania układu przestrzennego Łodzi, In Koter M.,

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the historical geography. They were based on the analyses of the plans of cities, including their visible elements like street network, layout and characteristics of parcels, etc.

4.2 Other methodologies

Bandini M. (2000, p.133) points at the lack of methodology for analyses of the physical form of the city in the field of humanistic and social sciences and presents the review of the main analytical threats in the field of analysis of the city architecture. A similar review of analytical threats is presented in the work by Panarai, Depaule and Demorgon (2009). The development of modernism as an international style set back the tradition of morphological analyses, which were in opposition to its basic assumptions (Rykwert 2000: 4-6). In the area of the British culture the continuation of the English *Picturesque* style became one of the threads recalling earlier traditions of development of urban structures, indicating the need of paying attention to the features of urban landscape including: diversity, semantics, intimacy and contrast[8]. This tradition is represented by the oeuvre of Cullen (2008, 1961), which assumes analyses of elements such as series of views, the way of experiencing of a site by examination of physical relations between the human body and its environment (proximity, scale in relation to human dimensions, the presence of defined, enclosed spaces). The essential features of urban environment included local colour, textures, scale, character, etc. Lynch (1960, 1994) developed the theory of perception of the urban landscape based on five elementary features: nodes, landmarks, paths, regions, and edges. Further studies on urban form (Lynch 1994, Lynch, Rodwin 1991) concentrated on the development of the notional apparatus allowing for description both of the elements of *"adopted spaces"* as well as of the system of space of *flows* – in other words of the network of open spaces: streets, squares and pedestrian passages. Attempts to conceive the notional apparatus were also made in order to describe relations between objectives and functions fulfilled by specific elements of the system and their physical properties, with the special emphasis on the concept of habit (Kropf 2009).

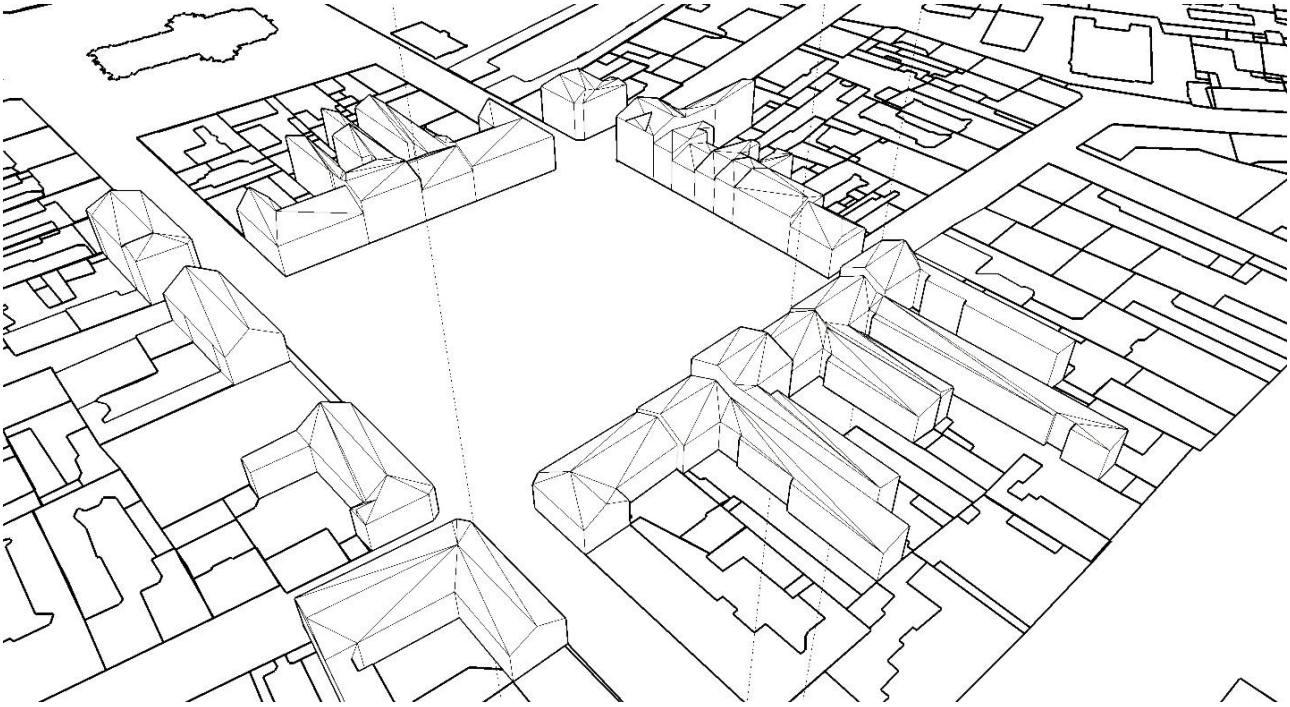

Fig. 2: Hypothetical reconstruction of the model of the Old Marker direct neighbourhood basing on archive photographs and postcards.

Traditional, morphological way of perceiving urban structures, present in the postmodern architecture and urbanism (Rossi 1984) inscribes into the general trend towards the contestation of modernism as an international style. The analyses of former structures, addressing the genius loci and the research to revert to

Tkocz, J. (Eds.) Zagadnienia geografii historycznej osadnictwa w Polsce. Materiały Konferencyjne (Uniwersytet Łódzki i Uniwersytet Mikołaja Kopernika w Toruniu, Toruń Łódź 1994, 63-88

[8] Bandini (2000: 139) refers to the works: Hussey Christopher: The picturesque: studies in a point of view, G.P. Putnam's Sons London 1927 and Watkin David: The English Vision: The Picturesque in Architecture, Landscape and Garden Design, Murray, London 1982

a concretisation of the genius loci are among the key challenges. Typology of public spaces and more architectural considerations, concerning scale and form of constructions, constitute one of the basic areas of interest of the New Urbanism movement (compare Krier 1975). The comprehensive set of features allowing for the characteristics of physical structures, including the culture related features was developed, among others, by Rapoport (1990: 106-107).

5 CHARACTERISTICS OF URBAN STRUCTURE

5.1 The Lodz 'Jewish District' – an example of 'shtetl[9] culture'

The different character of the Jewish settlements in the countries of Western and Eastern Europe was the result of initially larger spatial isolation of the Jewish population in Western Europe, followed by their more essential assimilation than it had place, among others, on the terrain of Poland (Wirth 1962). Here the initial privileges, allowing for the development of Jewish communities not only in large cities, but also in small towns as well as the permission to undertake many occupations, and further isolation and restrictions concerning the available locations for settlement, caused that this ethnic group settled in small towns, villages or districts of similar character (Wirth 1962).

A huge number of historical, demographic and social studies provide an exhaustive picture of Jewish presence both in Poland and in Lodz. Numerous monographs and collective works, popular science works as well as fiction describe in a comprehensive way the habits of the nation and the issues of coexistence between Poles and Jews, in particular problems concerning World War II and Holocaust. The numerous studies concerning the culture of Jewish emigrants from the areas of Eastern Europe deal with the characteristic features of the life in small towns, villages and districts of bigger cities defining them under the same notion 'the shtetl' (Zborowski, Herzog 1962, Ertel 2011).

The proxemics approach, presented by Hall (2009) and his successors, examines the relation of spatial patterns of usage of space in different cultures with the material environment. The differences between morphological structures representing various cultures are particularly apparent in cities, which like Lodz had become a melting pot of many cultures. Hall (2009) identifies direct relationships between interpersonal distances and other characteristics specific to individuals and communities and the way they shape their own physical environment.

In nomadic tribes, the members of which are accustomed to residing in small spaces, social distances are usually smaller than in other groups. Assessment based on the descriptions of the crowd in literature, e.g.: Singer (2010) or photos of the Ashkenazi Jewish population (those of Eastern European descent, e.g. Bonisławski, Keller 2002), which once used to live in Lodz, correspond to that characteristic. Hillier and Hanson (2003: 27) also refer to the usage of space, the patterns of behaviour appropriate for different communities as the determinants of the final shape of urban structures: *"Throughout the social grouping, a similar family of characteristic spatial themes is reproduced and through its repetition we recognise ethnicity in space. (...) Different types of social formation, it would appear, require a characteristic spatial order, just as different types of spatial order require a particular social formation to sustain them."*

Much has been written about the Jewish architectural heritage in Lodz (Wesołowski 2009, Walicki 2000, Stefański, Szrajber 2009), but there is probably no description referring to the urban structure of the areas inhabited by Jewish citizens. These settings were commonly described as possessing a special 'Jewish' character, e.g. in Bonisławski (1998), though referring this attribution to urban structure only would be, in this case, an oversimplification. The descriptions, frequent in the literature, indicate at the presence of narrow, "circulating" back- streets of the downtown part of Bałuty district and of the Old City as at an example of spontaneous development, realised without any previous conception: *"The still curved and tight back-streets... are sad witnesses of the unusual history of origins of Bałuty"*(Friedman 1935: 94).

An attempt has been made to define a certain set of features proper to the area, describing its morphological structure, which is repeated in most Polish towns and neighbourhoods populated by Jews (Dylewski 2003, Hanzl 2011, 2011a, Hanzl *in press*). The characteristics of the physical form was significantly altered during their stay in Lodz. In this context, it seems clear that the considerations about the relation between the presence of this nation and the appearance of the area are justified.

[9] Yiddish: שטעטל

The characteristic of urban spaces presented below refers mainly to the areas of the Old Town and of the central part of Nowe Bałuty. The Nowe Miasto settlement, established in 1821-1823 by Rajmund Rembieliński, with the main octagonal square and rectangular, regular network of large blocks (average 230m by 190m in the proximity of Wolności Square) belongs to a different era of urban development than the areas described. Some features proper for Jewish concentration in the discussed districts concerned also the area of Nowe Miasto, which is indicated below – though the level of assimilation processes of the society living there, the mixing of different groups and the character of spaces represented different stages of urbanisation processes (Wirth 1938).

5.2 The ubiquity of commerce

The basic character of the area of concern may be defined as the ubiquity of commerce. In 1913 there were 4050 shops and trade companies in Lodz. Basing on the singular registry data in the *"Czas"* calendar of 1913, completed with the list of enterprises in the publication *"Przemysł i handel Królestwa Polskiego"*, the Jews owned ca 80% of transport and freight companies, including branch offices engaged in businesses in Russia, which in 74% belonged to Jewish entrepreneurs. In other branches Jews owned about 60% of shops and warehouses with textiles and 50% of warehouses with stationary and technical products (Puś 2006: 58). In the description of the Old Market, which used to fulfil the functions of a marketplace, one reads: *"The small, poky space was heaped high with piles of merchandise... the intensive movement, most of all on fair days, both residents of the city of several thousand, local peasants and merchants from other cities were huddling together, buying and selling."*(Friedman 2006: 57-58) The space of commerce was not restricted to the main square or main squares only. This function of public space was present everywhere: in nooks, alleys, in the smaller squares and in the streets neighbouring the main square. The assortment of goods was very rich; one could buy or sell nearly everything.

5.2.1 The presence of edifices proper to the Jewish culture

Most of the studies on the Jewish cultural heritage (Rykała, Kulesza 2009: 209-210, Wesołowski 2009, Bergman 1991, 2009) point at the presence of characteristic edifices belonging to this culture, including synagogues, prayer houses, mikves and religious cemeteries. The proximity of religious buildings was indispensable, as on the Sabbath day they had to be accessible within a walking distance. The concentration of orthodox Jews around religious edifices remains a characteristic feature of this religion, though it is not as imperative as it used to be before (Diamond 2008). The specific form of these buildings was defined by religious regulations.

Among secular buildings, which are listed as traces of the presence of Jews, there are schools and buildings of educational societies, premises of different public institutions, manufacturers' residences, and factories. Tenements seldom attract attention, though the basic city structure consisted mainly of this type of buildings. The general layout of medieval streets as well as the former allotment was preserved to a big extent but the structures were replaced, following the 19th century modes of construction. Many buildings erected in this period are still preserved, comprising a general character of this part of the city, significantly different from other areas. *"Directly next to the synagogue, on the left, there was a gate and entrance to the bes medresz płac – a vast interior yard of the synagogue, which extended until Żydowska Street; there was another entrance there. Next to this square there was bes medresz (hebr. beth midrasz) - "the house of science" sponsored by the community. The large, close yards with different buildings were quite typical for Jewish districts in Poland. The most famous one was Szulhof in Vilnius"* (Spodenkiewicz 1999: 30)

Fig. 3: Nonexistent appearance of the central part of the old Jewish district: 1. frontages, 2. distant landmarks, 3. landmarks, 4. special places, 5. buildings in 1939, 6. parcellation in 1939

5.3 Parcellation and street network

5.3.1 Parcellation

The parcellation in the Old Town was of medieval provenience and dated from the period when the charter was granted to the city by the King Władysław Jagiełło (Koter 1984). Main streets, their directions and tracing were on one hand an effect of the pursuit to connect in one straight line the main settlement units characteristic for the Kingdom of Poland and on the other - the response to their inscribing into the preceding structure of settlements, property divisions and former terrain configuration. Koter (1984) writes about using of the passage on the Łódka river and of the formerly existing bridge on the Jasień river, when laying out the road to Piotrków and about taking into consideration the central part of the former village with the market and the church (Koter 1984: 55). At the occasion of the second enlargement of 'the zone', further streets were traced: Aleksandryjska, Św. Jakuba, Jerozolimska and Franciszkańska (Rynkowska 1960, Nr154).

Describing the allotment of grounds of Nowe Bałuty undertaken by Bławat and Birenzweyg the then president of Lodz Traeger stated *"they laid* out *the squares and markets preserving the directions and shape of former ones, according to the character of the city"* (Rynkowska 1960, Nr154). The assumption may be done that laying out the main streets in the central part around the Bałucki Market and Bazarowy Square, and also the initial scheme of the parcellation was the work of the two merchants. The streets in the remaining grounds and further parcellation in the central part of the settlement were spontaneous, devoid of any control. An example of this is Ciesielska Street traced by its owners for servicing the properties, which were located along (Sygulski 2006).

5.3.2 Street network

The physical structures, in the Jewish period, due to the breaks in the lines of frontages surrounding most of the blocks, allowed for enriching of the initial network of streets with numerous passages, small squares, hooks, completing the official sociometric layout with the possibility of informal circulation in the area. The actual network of passages was thus richer than the layout of streets, laid out as part of the initial parcellation. Hillier and Hanson (2003: 53-66) indicate at the relation between the characteristic of a given society and the sociometric layout, which is created by the group.

The dense network of curvy streets, alleys, nooks, passages and pedestrian ways, including informal passages through private properties is a characteristic feature for the whole of the discussed area – also in the part of Nowe Miasto inhabited by Jews the quantity of such junctions is higher than elsewhere. The density of the street network is a feature, which Jacobs (1992) qualifies as facilitating the development of all kinds of

services, especially commerce in the ground floor of buildings, as it stimulates pedestrian movement. Most of the connections remained mostly pedestrian, which fostered the presentation of goods and making deals.

5.4 Public spaces

The essential features of the outdoor space, characteristic for the given area refer to the issues of scale and dimensions. The narrowness of streets and presence of numerous slight turns and directional differentiation, providing the notion of concavity, thus closing the views' perspective and assuring perceived and felt closure, are factors favouring direct physical interaction. The irregularity of enclosures of streets, their broken line, the apparent lack of precise form, which enlarged the amount of border space, where people stop more willingly than in the centre of an open space, facilitates transactions, presentations of goods, etc. The abundance of such spaces enabled the location of numerous outdoor, commercial furniture: stalls, kiosks, stands and presentations encouraging buying. Furthermore, purchase was encouraged by the merchants' activity; by the way, not all methods were upright[10]. The aforementioned behaviours are also the most successful in narrow and intimate places; compare the narrowness of pavements in the street cross-section, even in the comparably wide streets such as Zgierska or Łagiewnicka. The analysis of old photographs shows that their shape remained unaltered, except for the former open gutters, which were removed.

Whyte (2009) defines the set of features of outdoor space favouring contacts and fostering relations pointing at the location inside of the human flow. Gehl (2009) indicates at small dimensions of spaces as favourable for establishing relations. In his further considerations he underlines the role of the corrugation of the edge of space (through the presence of elements of urban equipment and the shape of walls themselves) as a feature important for enhancing communal life (Gehl 2009: 150). In the case of the discussed area the tightness of some places, the complication of wall shapes, the apparent chaos could hinder concentration and easiness of perception by persons from outside, which could by turn facilitate transactions profitable for sellers (not necessarily for buyers). Attracting passersby, their stopping was fostered by the presence of numerous small size elements in the outdoor space, providing even sham shelter – Cullen (2008: 103-105) describes this phenomena using the example of a street „cross", the main function of which was to stop pedestrians. Here such role, less formal, was fulfilled by outhouses and stalls. Whyte (2009) confirms the observation concerning attractiveness of elements freely distributed in the outdoor space.

6 CONCLUSIONS

Recent research (Ladányi 2001) proves that concentration of ethnically distinguished groups favours social exclusion. As Wirth (1938) stated *"the larger, the more densely populated, and the more heterogeneous a community, the more accentuated the characteristics associated with urbanism will be."* The lack of an intermediate, socially mixed zone fosters separation, thus belonging to the 'folk society', following Redfield's terms (1947), rather than introducing urban, more heterogeneous culture. Ethnic and cultural groups distribution had been subject of many studies since the research by Park, as described by Gottdiener and Hutchison (2006: 155-180). The latest research on allocation of distinguished social groups in cities (Rankin 2010, 2011) confirms Wirth's (1938) and Redfield's (1947) theses, concerning the presence of heterogeneous, urban specific transition zones between ethnic groups, instead of distinct borders as proper for urban communities of high level of stability. The case study of Jewish presence in Lodz confirms all of the above observations: the core part covering the *shtetl*-like development of the Old Town and central part of Nowe Bałuty settlement presented features of distinct, socially isolated population of folk features. The social equilibrium and more accentuated city-like characteristics of development were achieved thanks to the presence of an intermediate, socially heterogeneous community, which as far as Jews were concerned was apparent along with the increased level of assimilation and the dilution of traditional religious orthodox practices and habits resulting from it.

Contemporary studies on segregation and integration processes in the globalising world confirm the presence of different social patterns and the ethnical heterogeneity as the feature proper to a contemporary, urban society (Schnell, Benjamini 2005). Spatial distribution of ethnic groups in Lodz in the beginning of the 20th century tended towards this model. The co-presence is understood in categories of social situations as Goffman (1963) defines it. The community of *shtetl*, with its specific and closed character and defined

[10] The interview with Don Goren in Spodenkiewicz (1999: 33).

culture along with the transition zone of assimilation provided the environment, which remained balanced and did not generated conflicts for long period of time, which may still serve as an example to follow in cases of co-presence of many different cultural groups.

Lévi-Strauss describes the city as "*the most complex of human inventions, (…) at the confluence of nature and artefact"*[11]. The recognition of an area as belonging to a specific culture is an issue addressed by anthropologists, cultural geographers[12] and urban morphologists – starting from Geddes (1904). The subject of investigations are the tangible results of social and economic forces, the outcomes of ideas and intentions expressed in actions, which are themselves governed by cultural traditions (Vernez-Moudon 1997: 3). Experiencing of culture may be effectuated via examination of its influence on the physical form of the city: spaces of flows and built-up places. A number of features confirm the influence of the presence of the Jewish community over the physical form of spatial structure. Referring the methodological remarks presented in the paper to the attempt to analyse the spatial structure of the part of Lodz, inhabited by Jews and in its important part erected by them in the second half of the 19th century and in the beginning of the 20th century (Hanzl 2011, 2011a), the following features may be distinguished:

1. Adjustment of public space to the needs of commerce: various scale of public spaces, important quantity and density of passages, nooks, alleys, also within private properties, irregularity of border line of public spaces and thus lengthening of the edge – increased comfort of stay in public spaces,

2. Variety of building forms, diversity of styles, materials, lack of homogeneity – as an answer to the requirements of current needs only – a feature considered characteristic for Jewish communities as representative of Diaspora lifestyle (Zborowski, Herzog 1962),

3. Adjustment of the plan of medieval village to the needs of 19th century reality without significant changes in the former state, only through replacement of buildings,

4. The presence of edifices, both public and private, belonging to Jewish culture.

5. The core location of Jews constitutes the most densely populated part of the city.

Panerai et al (2009) propose a concept of habitus, which seams significant for the present considerations, and which assumes that urban structure, as reflecting the repetitions of social practices of everyday life, becomes the form of record of these practices. With time the recorded layout may become the contribution to the further continuation of the former way of use of space. Such situation happens also in Lodz, where in spite of important changes resulting from the new usage of the Old Town Market, despite the widening of some streets, demolitions and destructions of war and post-war periods, and the intensive car transit through the former Jewish district, the use of social spaces still remains to a large extent commercial, thus compliant with the one produced once by the presence of their former inhabitants.

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[11] Claud Lévi-Strauss (1954: 137-8), translation after Vernez Moudon (1997: 3)

[12] Compare recent studies referring to the post-socialism cultural settings of Polish landscape by Czepczyński (2008) or the studies of the American landscapes by Holdsworth (1997) or Lowenthal (1997).

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🏆 *reviewed paper*

Urban Time and Energy (UTE) – Time-Space-Energy Scenarios in Urban Areas

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1 ABSTRACT

The temporal map of a city – its fast and slow speeds, working and opening hours, the location of its businesses and its mobility infrastructure – is of major importance for the quality of life in a city. Several policy measures such as changing public transport intervals, transition to flexible working times, changing opening hours of public services, and spatial planning have changed and will change urban patterns of time use and have an effect on both the economic performance (synergies, production and consumption patterns, income, etc.) and the natural environment (energy flows). Time-use structure of household members (phenomena such as "time squeeze" and synchronization of activities of different persons), the energy demand of households and the spatial organisation of cities entail each other. In the 1970s first concepts appeared to integrate time aspects in regional sciences (Hägerstrand 1970). The demand for equal opportunities for men and women and for a better work-life balance marks the beginning of time policy in the 1980s, a young interdisciplinary field aiming to integrate time aspects in urban development planning and decision-making processes. Spatial planning plays a significant role in the design of time structures. The currently starting project UTE (urban time and energy) aims to gain a better insight into the drivers of time-use patterns and energy use by focusing on time-policy measures that consequently impact on energy and material consuming activities of urban households and on the necessary urban infrastructure. The project will base its assumptions on the case study of Vienna. An integrated socioecological simulation model will be developed to study the inter-linkages between time-use patterns in differently structured areas of the city of Vienna. Time-space-energy scenarios will highlight the potential of time-use structures for energy-use reduction.

2 INTRODUCTION

Several policy measures such as changing public transport intervals, transition to flexible working times, changing opening hours of public services and spatial planning have changed and will change urban patterns of time use and have an effect on both the economic performance (synergies, production and consumption patterns, income, etc.) and the natural environment (energy flows). Time-use structure of household members (phenomena such as "time squeeze" and synchronization of activities of different persons), the energy demand of households and the spatial organisation of cities entail each other. Reaching the goal of an activity faster requires more energy for the same achievement. Similarly, larger distances between locations of activities require either more time or more energy or both. "Time sovereignty", which is some freedom of choice over one's time use, is considered a key feature of quality of life. Available time – as much as available money – governs everyday decision making of household members concerning living space, consumption patterns and means of transportation. All of these activities are energy consuming (transport energy, heating/cooling energy, etc.). Consequently, lack of time often translates into spending more money and more energy, severely constraining individual and household choices.

The UTE project aims to gain a better insight into the drivers of time-use patterns and energy use by focusing on time-policy measures that consequently impact on energy and material consuming activities of urban households and on the necessary urban infrastructure. An integrated socio¬ecological simulation model will

be developed to study the inter-linkages between time-use patterns in differently structured areas of the city of Vienna and urban energy consumption by addressing the following questions:

- Is there a link between time-use patterns in a city and urban energy flows?

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- How can time-policy measures in a city change quality of life, i. e. work-life balance, time-affluence, time-pressure, family life, educational situation, recreational situation and how do they affect energy consumption?
- Could an awareness of these interrelations help to improve spatial settings and infrastructures in cities, as a win-win connection between quality of life and energy savings?
- How can a socio-ecological model further our understanding of the interplay of socioeconomic and natural drivers (time-use patterns) influencing urban energy use?
- What is the potential of the developed simulation model to serve as decision support tool for municipalities, urban planners and traffic management?

Time-space-energy scenarios will highlight the potential of time-use structures for energy-use reduction. Model results concerning emission reduction potential will be critically challenged in order to take rebound effects into account. The project will elaborate basic principles for integrated systematic solutions in practice. This entails the following innovative conceptual as well as methodological development:

- Furthering our understanding of time-use patterns as drivers for energy use of urban households.
- Developing an integrated causal toy model capable of simulating changes in household energy use based on different time-use scenarios.
- Testing the applicability of the integrated model for one case study region in Vienna as a decision support tool time, space and energy.

3 TIME, SPACE AND ENERGY

3.1 Time-policy and Time-use research

Time policy and its research is a young interdisciplinary field aiming to integrate time aspects in urban development planning and decision-making processes. Beginning in the 1980s in Italy largely as a result of linking gender issues to urban planning and transport (Bonfiglioli, 2005; Bonfiglioli et al., 2000; Stadtgemeinde Bozen, 2006; Mairhuber, 2001), it also has a tradition in Germany (Henckel , 2000; Deutsche Gesellschaft für Zeitpolitik, 2003; Eberling and Henckel, 2001) and France (Boulin and Mückenberger, 2000). These studies address the question of how major changes in western industrialized societies over the past 50 years – i. e. the increase in female employment, the shift to a knowledge society and changes in production and consumption patterns (Post-Fordism, precarious work, internationalisation of labour) – lead to new patterns of time use, and how arising issues of time pressure and time conflicts can be addressed in terms of political measures concerning the times of a city (Läpple et al., 2010). A city's time map – its fast and slow speeds, working and opening hours, the locations of its businesses and its mobility infrastructure, which together set the pace for how its inhabitants move about in it – is of major importance for the temporal quality of city life and work (Mückenberger and Boulin, 2005; Kramer, 2005).

The project will draw on the international preliminary work and experiences gained from time-policy projects in Italy, Germany, France and the Netherlands. Vienna has recently launched an assessment of the potentials of communal time policy in a feasibility study (Mairhuber and Atzmüller, 2008). Similar to other international model projects, this study aimed at optimizing time issues in order to improve citizens' quality of life and their "time affluence". The relevance of such communal time policy for energy and resource consumption has not yet been researched.

In sustainability sciences, it is important to find indicators to assess quality of life and changes therein. Time-use is an integrative aspect of many facets of quality of life and is seen as helpful in its monitoring (Carlstein, 1981; Fischer-Kowalski and Schaffartzik, 2008; Mückenberger and Boulin, 2005; Moe, 1998; Garhammer, 2001; Garhammer, 2008; Mischau and Oechsle (eds.), 2005; Schaffer, 2007). The terms 'time scarcity' and 'time affluence' (Rinderspacher, 2002; Heitkötter, 2007; Kränzl Nagel and Beham, 2007; Schor, 2010a) are used to link economic and social factors and to find alternatives to a solely economic notion of growth and development (Sanne, 2002; Kasser and Sheldon, 2010; Graaf, 2003). Eurofound, the European Foundation for the Improvement of Living and Working Conditions, examines in its European Quality of Life Survey a range of issues, such as employment, income, education, housing, family, health, work-life balance, life satisfaction and perceived quality of society. "Having sufficient time to fulfil both professional and personal

goals – raising children, caring for older relatives, maintaining social and family contacts – is a crucial element in determining a good quality of life. However, findings from the European Quality of Life Survey 2007 indicate that work–life balance remains an elusive goal for many working Europeans." (Eurofound, 2010, p. 3, see also Boulin, 2003).

A number of European nations conduct time-use surveys on a regular basis. These data are widely used to analyse changes in gender relations (Eurostat, 2003; Statistisches Bundesamt, 2004; Döge, 2006; Sellach et al., 2005; Bundesministerin für Frauen, 2010) and socioeconomic changes like family and household structures, working hours, recreational behaviour and consumption patterns (Schor, 2010b; Hartard et al., 2006; Stahmer and Schaffer, 2004; Gershuny, 2000). Statistics Austria finalized a new time-use survey for Austria in 2009 (Statistik Austria, 2009).

Linking sustainability research with time-use research is attaining some importance in socio-economic national accounting, in non-monetary input-output approaches (Stahmer et al., 2003; Schaffer, 2006; Minx and Baiocchi, 2010) and in other new attempts to strengthen socioeconomic features within sustainability discourse (Chiou, 2009; Vinz, 2005; Jalas, 2002; Jalas, 2008; Hayden and Shandra, 2009).

3.2 Time Structures and Urban Planning

First approaches to integrate time aspects in regional and geographical studies already appeared at the beginning of the 1970's. A central model was the space-time aquarium of Hägerstrand (1970). The movement of humans is demonstrated in a three-dimensional model, whereby the area is represented as two-dimensional map and the temporal dimension in the vertical Z-axis is supplemented. Range of movement and speed depend on outside factors and are subject to certain restrictions. Hägerstrand divides these restrictions in three categories: capability constraints, coupling constraints and authority constraints (Hägerstrand 1970, 12).

Contemporary models of urban architecture and spatial planning aim to align themselves again with the historical city. Knoflacher (2007) states a "space-time dimension on the human scale" in the historical city whereas the "new city" is oriented along a "space-time dimension for machines". Concepts of the "compact city" or the "city of short distances" are favoured in contrast to the inflexible, divided and homogenous use of spaces. In opposition to these efforts to counter large-scale expansion in area terms, land-use is constantly growing. A study by the University of Natural Resources and Life Sciences, Vienna, shows that in Austria 15 hectares of land are swallowed daily by construction and transport development (Weber, 2008). Along with the loss of land as an important future CO2 sink and source of energy and raw materials, the high ensuing costs (infrastructure costs for construction, maintenance, repair and renewal) and all further climate-related consequences of urbanisation (increase in individual motorised transport, expansion of additional traffic routes, great use of fossil energy sources, etc) are alarming.

3.3 Urban Energy Use

Departing from energy metabolism as crucial concept in assessing society-nature interaction and sustainable development (Haberl, 2001a; Haberl, 2001b) we focus on energy use. Urban energy use can best be understood from a demand perspective, not just for final energy forms, such as electricity or transportation

fuels, but for energy services (Lovins, 1976; Jochem et al., 2000). Each household and economic activity in urban areas can be interpreted as a demand for energy services, such as mobility (physical access to certain destinations and certain goods), ambient temperature (hotter or colder than the local climate), or working appliances (for home, office and industry, communications, etc). These urban energy services are common to most urban areas, but the energy consumed to provide them varies greatly. Household demand for energy services changes depending on several factors, which can be categorized as economic, demographic and behavioural.

The positive correlation of income and energy use has been long established in the traditional energy literature, especially in national level analyses. Energy use correlation with income has been measured for households in the Netherlands (Vringer and Blok, 1995), India (Pachauri and Spreng, 2002), Brazilian cities (Cohen et al., 2005), Denmark (Wier et al., 2001) and Japan (Lenzen et al., 2006), with similar results for GHG emissions in Australia (Dey et al., 2007) and CO2 emissions in the USA (Weber and Matthews, 2008). Urban dwellers consume energy directly, in their homes and vehicles, and indirectly, through the goods and

services they purchase. Since urban incomes are often higher than the national average, by this metric alone, urban populations can be expected to consume more energy than non-urban populations.

Demographic factors such as population growth, household size, average household age and migration influence urban energy usage. Household size plays an important role in energy use: above 2 persons per household, economies of scale can reduce the energy consumed per capita. Urban populations may have significantly smaller household sizes than rural populations, due to smaller family sizes and a larger generation gap as well as smaller dwellings, and are thus less likely to shelter extended families or many generations under the same roof. The evidence for the influence of age is mixed. In Sydney, increasing age was correlated with higher residential energy consumption but lower transportation use (Lenzen et al., 2004). The most important effect of age may be through resulting changes in household sizes.

Behavioural or cultural factors clearly influence energy use: e. g. using a car, especially a big car or SUV, as a social status symbol, compared to using the bus or a bicycle. Individual behaviour and household decisions on dietary patterns, eating habits, preferred ways to spend leisure time and many others are surveyed in research on sustainable consumption and possible rebound effects (Kletzan et al., 2006; Duchin, 2005; Hertwich, 2005; Jackson, 2005; Bruckner, 2008; Binswanger, 2002; Sorrell and Dimitropoulos, 2008). Recent research on energy consumption and gender aspects (Räty and Carlsson-Kanyama, 2010; Carlsson-Kanyama and Linden, 2007), on household behaviour according to energy use (Linden et al., 2006; Duchin, 2003) and studies on individual mobility types (INFAS, 2002) and sustainable lifestyles (Graham et al., 2009; Sutcliffe et al., 2008) will supply valuable guidance for potential time-use and energy scenarios.

3.4 Urban Time and Energy Scenarios

UTE aims to explore the options for future development which depend on internal choices (of households) as well as on changes in the framework conditions, such as time-policy measures. Using the "magic triangle of sustainability" (Fischer-Kowalski et al., 1997) as the model concept and guide for this innovative approach, we try to link concepts and knowledge from different scientific disciplines and data from different accounting systems. The model analyses the decision-finding process of households according to their energy use (mostly transport and heating energy) using a 'sustainability triangle' (see Figure 1) in which each corner represents one of the core sustainability dimensions (social / ecological / economic dimension).

To apply this so-called 'magic triangle of sustainability' to households, the three dimensions are:

- Household energy consumption (ecological dimension)
- Income of household members and working situation (economic dimension)
- Household time-use pattern (social dimension)

Figure 1 shows these dimensions in their interdependencies on household level (Smetschka et al., 2009).

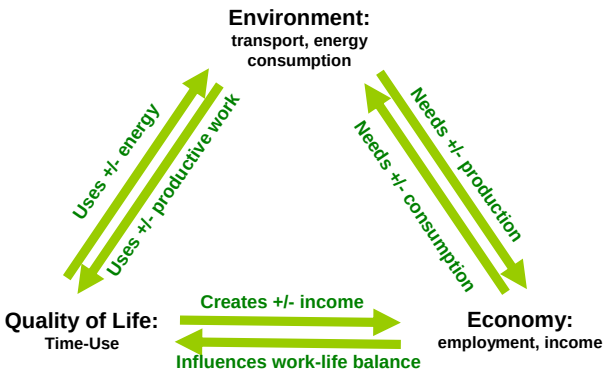

Fig. 1: Zooming in on the models' "Magic triangle of sustainability"

In analysing changes in the use of energy in the city it is important to take into account that these changes are based on human decision making, occurring at a very local scale on a day-to-day basis. Recent developments in computational science allow for the application of numerical models for the systematic analysis and

simulation of human decision making and its direct and indirect effects. Modelling such as agent-based modelling can be applied as a means for testing hypotheses about interrelations in complex human-environment systems (van der Leeuw, 2004, Lawrence et al., 2007, Liu et al., 2007) in cases where approaches limited to the analysis of social or biophysical parameters alone are insufficient. Moreover, model development provides a transdisciplinary platform for stakeholders and experts to communicate on an equal footing throughout the research process. Participation of this kind is described as key to enabling social actors or social systems to learn from, or be stimulated by, a research process (e. g., Hare and Pahl-Wostl, 2002, Pahl-Wostl, 2002), and represents a core methodology of sustainability science (Kates et al., 2001).

4 UTE APPROACH

4.1 Linking Time-use and Energy-use

UTE aims at studying the full cycle of time-use patterns in selected urban areas in the city of Vienna and energy use of households by focusing on decision-making processes of households in relation to their time-use strategies. The interlinkages between time use and energy use will be modelled for different household types (distinguished by socio-demographic and employment status) according to the actual data of the urban model area.

Existing scientific models mostly reflect theories and concepts developed within single disciplines and usually focus on ecological, social or economic aspects. Thus, to analyse socioecological systems and impacts of external drivers on these systems, the approaches of different disciplines are needed. Integrated modelling in terms of integrating different modelling approaches (agent-based, stock-flow, etc.) makes it possible to integrate social-science based approaches with concepts from the natural sciences (van der Leeuw 2004). The model presented here belongs to this new model type that can deal with local situations and aim to integrate biophysical issues (e. g., built infrastructure, energy supply) with socioeconomic factors (e. g., Time-use patterns, energy consumption).

4.2 Case Studies

Participatory modelling

An initial goal of UTE is to design an accompanying process throughout the whole project duration with iterative methodological elements such as qualitative partially structured interviews, workshops, explorative focus groups and national & international co-operations on the one hand. By using qualitative interviews with representatives of important stakeholder groups, UTE aims to generate first assumptions about time-use patterns and energy use. On the other hand, the collected qualitative information will be implemented in a simulation model. Consequently, those interviewed will gain systematic understanding of the time-policy relevant questions in their respective area of competence and work in correlation with energy use.

The study brings together insights from a range of diverse subjects, combining them to develop an interdisciplinary approach to analysing links between time-space and energy use such as:

- Local times and infrastructure (opening hours of municipal offices, public/private services and shops, hours of school and childcare facilities, etc.)
- Urban planning and development, urban renewal (distancedependent times, i. e. mixing of residential areas with social infrastructure, etc.)
- Transport and mobility (working hours, time schedules of public transportation, etc.)
- Buildings (energy services, household preferences)

It is in the interplay of these areas that the study will investigate in how far time-policy measures can result in added energy efficiency and altered energy consumption.

The developed model will build upon the first version of a residential location decision model developed for Vienna in the FP 7 project SUME (Sustainable Urban Metabolism in European cities, http://www.sume.at/). This model focuses on households and their residential location decisions in relation to their economic and demographic situation. Based on assumptions according to their internal structure (more or less family members, age, income situation) and external urban planning decisions changing infrastructure access in different areas in Vienna, households need or want to move to another place of residence. This provides an

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excellent starting point for our proposed model, as it already delivers a spatially explicit distribution of households in Vienna according to their socioeconomic situation. UTE will use this spatial model of Vienna and extend it with assumptions about time-use requirements of households and time-affecting services in urban areas. In order to structure and implement the decision-making process of each single household, the magic sustainability triangle will be applied (see Figure 2).

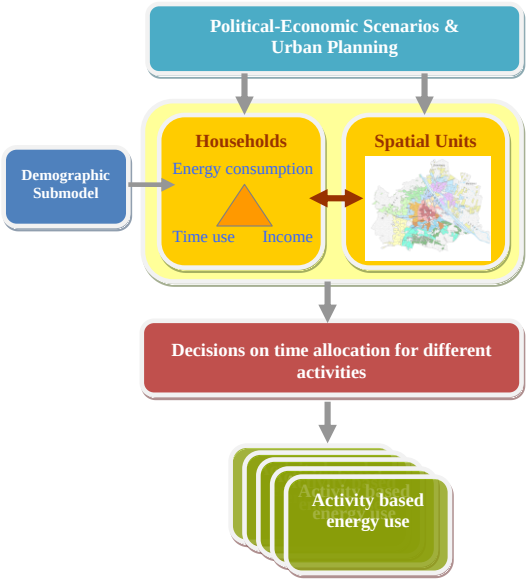

Fig. 2: Overview of the model concept

Implementation in different types of urban areas

An overall model concept will be adapted to different types of urban areas, such as urban renewal area, new urban residential area and urban development area (see Table 1).

	Urban renewal areas	New urban residential areas	Urban development areas
Urban Development structure	densely built-up area, traditional block perimeter development with narrow courtyards	five to seven-storey buildings, ribbon or block perimeter development	moderate building density, mixed structural types
Age of the buildings	up to 50 % built before 1918 (promoterism), numerous buildings from the inter- or post-war period	up to 60 % built after 1990	future planning
Location	inner city, centrally located, directly adjacent or close to the historic centre	periphery, suburban location	suburb
Land use types	small scale residential and commercial use	uniformly residential area	residential buildings, offices, commercial and educational institutions
Transport and mobility infrastructure	good public transport accessibility, restricted accessibility for private vehicles (narrow traffic lanes, restricted parking areas, congestions)	restricted access to public transport (limited number, intervals and directions), good accessibility for private vehicles	high-level public transport system, good accessibility for private vehicles but with restricted areas (pedestrian zones)
Social infrastructure and services	well-established infrastructure, short distances (walking distance)	limited social infrastructure and services (choice, long distances)	good infrastructure for everyday necessities (shops, restaurants, libraries...), moderate offer of educational and public institutions
Green and open space structure	barely parks and open spaces	parks or wide-open green spaces and wilderness areas in the immediate surroundings	parks or wide-open green spaces and wilderness areas in the immediate surroundings

Table 1: Description of the typical characteristics of the three urban areas for the toy models

After implementing the model and using the model results, future scenarios and policy measures developed in our case study, we will design a transfer process enabling us to learn more about the model. This will primarily enhance cooperation with stakeholders and people interested in applying the model.

5 RESULTS

The principal outcome of the project is a model-based integrated understanding of the interrelation between time use and energy use in a city. Time-space-energy scenarios will highlight the potential of time-use structures for energy-use reduction. The project's potential for successful application is to develop a decision support tool which can be used by stakeholders of communal administration, urban development and planning bodies in politics and civil society. This tool can trigger and guide time-policy measures of the city's administration and planning processes which integrate time policy, participatory processes and energy saving. One feature of the planned agent-based model is that it can easily be handled by users not belonging to the scientific community through an user-friendly interface. Given a participatory process, its graphic design will show the most interesting influencing factors for these actors as interactively changeable sliders. The realization of a commercially or politically useable model should be envisaged with industrial partners in a subsequent project.

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Urban Types and Transformation of the City

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1 ABSTRACT

This research deals with the subject of Urban Types, for what it represents, as an element dealing with the conscious and the unconscious, in the process of thinking of the city future, in order to build a continuous civilization. The urban types were established historical cities in the middle age in the Christian civilization in Europe land, and in the middle age of Islamic civilization in Arabic land. To determine important urban design intervention, which take part in development plans of cities, and make there to conserve the basic types which established on its.

The continuity process is the main concern of the research, and it will not be achieved without taking the Urban Transformation, as well as studying their effects on the historical city centers, where the interest in the process of continuity will come to its peak.

Therefore the research aim is to mention the transformation meaning of the Type and Typology concepts; and clarify specific definitions for each of them; which considered challenge due to the conception transformation for them and their wide uses in the other fields. So, the research aims to examine type and typology importance in architecture and urban design of the city.

The research procedure has dealing with the past & present experiments of historical cities in the fields of architecture & urban planning, represented by the historical city center through the age. So it takes many study case of cities like (Rome, Paris, Baghdad, Damascus) to study their architecture and urban types, before and after urban development plans to determine useful or affect factors, with four different city types there are some types are more useful from others in the developing design of the city. These developing designs are decided by theory of type or by providing new types to meet the needs of the community. focusing on the important conclusion about continuity types or urban transformation happened on it, to determine which types could have the ability to be adapted with these changing and transformation, and which one haven't this ability. So the research choose these historical cities with different types from different places in the continuous civilizations.

The research explain how cities transform by introducing the idea of urban morphology through an examination of more than a century of transformations in downtown of experimental cities including (vitality, alienation livability, and un belonging). Considered the main aim of the research to reach the conclusions of city future, so we can have a clear vision of the coming future, what is the future of the historical center of the cities, in terms of its policies, and the development projects?

Furthermore, the research is looking for the transformation of urban types, and which one can be adapted of twenty one century requirements. To make the process of the continuation of civilization sail strong, safe and sound, through urban academy and practical institute.

2 INTRODUCTION – WE SHAPE OUR BUILDINGS AND THAN OUR BUILDINGS SHAPE US (CHURCHILL)

Urban environment reflect in architecture and urban design for the way in which buildings are formed by the elements and gather with neighbors. This indicates a problem in the urban environment today by losing much of its characters and their basic components that maintain the cohesion and harmony bound thereby to further disintegration, ruptures and fragmentation, these components include (human, spatial dimensions, timing dimensions), which generally represent the basis for establishing and achieving the concept of belonging of the urban environment, and research on the concept of the built environment and the factors affecting them and their basic components with an indication of what we are suffering from the problem of erasure, removal and insertion, and others that carry implicit notions of separation of spatial and temporal for the general context of the total, this separation in the built environment today marks the beginning of the disintegration of the urban fabric in, and go to separate the building solo on the overall context of the existing in, and thus the embodiment of the phenomenon of alienation of civilization and cultural heritage, which represents the most prominent manifestations of fragmentation in configurations major decay of urban spaces, and the

appearance of duplication between the (old and new, heritage and modernity, past and future, natural and artificial), which was reflected in the duplication of personal humanity. Therefore, the environment can be divided into two parts (Hillier, 1996, p.89):

2.1 Natural environment

Represent data that surround the human being and has no income in its presence, which vary from region to region depending on the data component.

2.2 Man-made environment

The physical material products made by human being in order to adapt laws to serve the purposes of natural rights and the achievement of its objectives, and work to achieve the protection and safety and the establishment of social relations in the modern sophisticated societies.

Any ruptures or discontinuity between the human and the natural environment will lead to create of urban environment does not meet the requirements of the psychological, social and even health, and the emergence of a number of problems like incoherence, the lack of identity and personal characteristics of the built environment. The confusion of psychological disturbance and alienation because of lack specific solutions to the development of environment construction.

Urban design of the city is a prior thought behind design process; which could got from Forms; sketches or images and even verbally; and all summarizes through the concepts of Type and Typology in Architecture by its time transformations. So how do cities transform over time? And why do some cities change for the better while others deteriorate? In articulating new ways of viewing urban areas and how they develop over time?

3 THE CITY SHOULD BE A LIVABLE PLACES

A city is the characteristic physical and social unit of civilization, with it possesses size, density, grain, outline and pattern. The people who live in it shape these properties and are shaped by them. The old cities usually were roughly circular or rectangular in outline, with a sharp boundary commonly marked by a wall. Such is the medieval cities in Europe and Arab land.

Every city has its intimate inner pattern: the streets, squares and other openings that make buildings accessible and livable. In ancient cities and those of traditional European cities and in the Arab land today the pattern is highly irregular (organic fabric). Buildings or high-walled private gardens are dominant: the public way is simply the land left over. This complex composed mass may be perforated occasionally by design larger open spaces for gatherings, exchange or ceremonials.

The city is the most explicit index of power relationships. Walls, squares and streets are not only meant to support the functioning of the city, but they also form an extensive governmental instrument. Without proposing a cause-and-effect relationship between form and politics, the intention here is to trace the political origin of quintessential city projects within the history of the modern city. The aim is to test the political instrumentality of architectural types and reflective forms. For this reason, instead of focusing on the city at large, the focus will be on paradigmatic architectural archetypes. The category of archetype that will be advocated here will not be the way Carl G Jung defined it, as a universal content less form, nor as innate pattern of behavior. The category of archetype is advanced here as an alternative to the idea of type. If type traditionally indicates the idea that regulates the development of a group of forms (and for this reason is irreducible to any particular form), and contribute to make the city as livable place. Archetype offers the possibility of addressing a found singular form as a definition for a possible group of forms. In architecture, an archetype is thus a paradigmatic form through which it is possible to illuminate a particular critical passage in the development of the city. (Aureli, 2011)

4 TRADITIONAL CITIES AND MODERN CITIES

Christopher Alexander put in his studies compare the structure of the city of traditional and modern cities through the concept (structure inclusive), as shows the urban fabric of cities, the traditional integrated holistic result of cumulative growth and gradual compared to modern cities, and confirmed (Alexander) in a book (The Nature of Order-2001) the importance of the positive space in the structure of the urban fabric through the continuity of urban space and the surfaces of buildings constant that defines the space, he define positive space: that the space gets defined surfaces surrounding it and its association with direct building and

confirmed the ability of the city to rebuild and repair itself, detect city (urban pattern) has a dynamic of its own, and the goal of urban designer in the search for the city in the mechanical support and develop itself constantly (Salingaros, 2002, p4). And so a city had several models:

4.1 Natural Models

Since cities were founded in these things, it is hardly surprising that cities ever since have been permeated by them or their equivalents. As for their physical design, (Broadbent, 1990, p5), cities and part of cities, have grown in tow types:

- Many towns owe their foundation and underlying plan to specific event, a 'big-bang' origin. Such towns were the result of a self-conscious design decision and existed as concepts before materializing in fact.
- Type of beginning has no such precise definition. For such towns, it is no more profitable to pin down the moment of birth than to define that of the culture to which they belong. These 'steady-state' settlements seem to have grown organically with that culture and even where we can be fairly clear about the period of their beginnings. (Gosling, 1984, p25). As with the many medieval towns of Europe and traditional Arabic-Islamic cities which sprang up during the population expansion of the twelfth and thirteenth centuries.

The first is described by Alexander (1964) as a natural way in which people simply start buildings, as they still do in the shanty towns of the emerging world. There is the artificial way in which a master plan is prepared; streets laid out, squares and urban blocks on to which buildings are then placed according to some planners' sense of order.

This contrast will recur many times in the book. So wills another contrast: between formality and informality. The "natural" city tends towards informality, not mention an apparent disorder whilst the planners will want their conscious decisions to show. Most planners aim for regularities of a kind which shoe that human minds have been at work; but some aim for a self-conscious irregularity of the kind we call Picturesque (Broadbent, 1990, p5). Natural Cities express the needs of the same set of design decisions over an extended period of time, and take in its message multiple variables, and a special system in the format might suggest chaos, but it carries the spirit of the system (Gosling, 1984, p27).

4.2 Utopian Ideal Models

In this, it contrast sharply with another powerful tradition -the utopian or ideal- in which town design is closely allied to the design of society itself. And whereas the organic town can exist only in fact, as the physical result of a multitude of small forces and actions, the ideal town can exist only in theory, as one designer's formulation of possible complete solution to the design problem 'town', Such as utopian ideas of Bacon, Fourier, Le Corbusier, Wright and Howard. (Gosling, 1984, p32)

So the research see that idealists architects - including (Aldo Rossi) – searching for permanent fixed formal types by trying to re-study and research in the concept of Typology and Ideals with the same sense, inspired by the early idealists, such as Plato, Descartes and others.

4.3 Models Derived from Arts & Sciences

This model given the complexity and intractability of urban problems, it is not surprising that designers have found it helpful to borrow ides from other fields in order to gain fresh insight. These references have taken two forms; analogy and translation, which together have constituted an important further source of urban design theory. These theories derived from (walking city in archigram's projects, mathematical theory of Alexander, psychological studies in Gestalt theory, psychoanalyses studies of Piaget, anthropological studies like Defensible space of Oscar Newman and Territorial Behavior of Jane Jacobs). (Gosling, 1984, p40)

Alexander discussed the structure of the urban fabric of the city through the analysis of urban structure of cities through a wide range of studies. And discussed in his article (A City Is Not A Tree) the difference between the natural cities and modern cities which are designed according to the ideas of specific criteria, did not grow naturally, point the importance of not analyze the cities according to their forms as far as research on the basic principles in the organization and the importance of testing those abstract relationships also.

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Having thus defined his terms, Alexander goes on to analyze a number of city plans in tree' semi-lattice terms, including Abercrombie's Greater London, Tange's Tokyo, Soleri's Mesa City, Le Corbusier's Chandigarh, Costa's Brazilia, and so on taking as the most extreme example of a tree- like plan that described by Hilbersheimer in the Nature of Cities (1964). And in the second part of his paper, Alexander goes on to show that whenever a city thought out by planners it is bound to have a tree- like structure. National cities grow over time but they are the most appropriate containers for the complex, semi-lattice forms of our complex social relationships. (Broadbent, 1990, p145)

With this concept Alexander submit (A city is not a tree), where he distinguished between the different structures of the cities into two groups:

- Semi-lattice forms: includes traditional areas of organic-oriented design and grow over time. Seems that the physical fabric of urban in any traditional Arabic city or any other traditionally European city came like a spontaneous planning a network of winding streets and roads graduated from expanding to the narrower end of the col-de-sac roads, and the entry of other factors in the production of the city like (social, cultural, religious and economic).
- Lattice forms: which is mostly newly designed cities. (Broadbent, 1990, p.143) that modern cities affected by the modern growth of new types and functions, and by searching for positive space and confirm the centrality of urban growth through the five essential components in the structure of the urban fabric; (buildings, the axes of pedestrians movement, open spaces "parks" , the streets of movement, parking) by dealing with the basic elements in the structure of the urban fabric of the city as a dynamic overlapping stages, and its emphasis on physical factors and neutralize other factors.

Alexander in the definition of the structure of the urban fabric by defining axes of infantry, as the axes of pedestrian links to know the urban fabric, while the adoption of the principle modern cities with career progression in zoning and in the relations between the parts of the city and the isolation of the various events led to the fragmentation of the fabric of the city. The research also stressed the idea of the urban center that overlap the events for the gradient space as shown in the holistic integration of traditional city centers (the adoption of the principle of deduction), while the modern city built according to topical parts shall be the sum of all parts of the local entity and has no special distinctive (adopting the principle of induction) (Alexander, 1987, p93).

In this system, the news rack, the traffic light and sidewalk are all fixed parts of the system; product, as it were, of design, whilst the people, their money, the newspaper and the impulses which drive the traffic light are all things over which the designer has much less control. So to start with two categories; the fixed parts of his system and the changing parts, each part can be numbered. So clearly a city which is zoned, into working, residential and service areas forms a tree in Alexander's sense whilst a mélange of houses, shops and so on of the kind which Jane Jacobs describes is, in his terms a semi-lattice. (Broadbent, 1990, p144)

5 THE ORIGIN OF EVERY THINGS WITH DYNAMIC NOT WITH CONSTANT

All the strength of the Stability and changing are essential for the sustainability of any society, the decline in the power of the Stability may lead to a decline of culture, but the lack of change or decline may lead to death or the end of that society.

Since the Stability and change the status of all living systems, including the system of the city, so we find that many of the thinkers adapted constant for many centuries ago, while dynamic anomaly and a rare exception, and even the mid-eighteenth century emerge the idea of dynamic - especially living ones - take place gradually to the stable constant, especially after the detection James Watt to use steam power, then the Einstein theory of relativity, put forward the idea of relative movement and constancy.

Heraclitus adapted Changing and says: "Without change there is nothing" because in his opinion the stability is death and lack of, and he belief, this change must happen by a certain act. If things were static and fixed on one case does not change, the human couldn't originated the idea of causality, because this idea is the result of what occurs to change things. What ever-one thing we do know with our senses, changing is immediately transformed after the event?

So Emerged theories put forward (Genius Loci of Space) as spirit of the place, the Romanian idea with existence of the spirit of all the assets of independent and serve as a spirit Guardian and specify the nature of

these things, and what it wanted to be, in essence fixed things (Schulz, 1980, p6), If this essence constant, how can discrimination "spirit of place" in the cities of Britain in place of the difference between ancient and modern cities, or Genius Loci of Rome (Fig.4). And highlights the important question is: If the change is inevitable, how can we find the balance that preserves the survival of the system?

6 URBAN TYPES REPRESENT CONSTANT IN THE CITY DISCIPLINE

As Vitruvius, the type is trying to standardize the changing, and may be done by quantitative approximation. The type is mentality attempt; try to find a common objective vision of the objects or the relations among them, to get the kind of understanding, control and prediction.

"Aldo Rossi" Said: "The fixed type arises from necessary, is linked to the mind and feelings and values of a social iconic, and linked to the community and human innate." Chomsky called this mental ability the term Competence and defined as: "a set of mental rules, one can by the results make an unspecified number of sentences." With this ability we can produce results for the specific language. While "Carl Jung" defined by that represents the "mental forms cannot explain its presence, which seems to form a primitive, innate, or a tendency instinctive, as generated by the human is always the tendency towards the formation of these representations." It is a "factors governing the elements of a mental or psychological specific developments are described as types, but know the effect produced by such as the concept of religion, guess and likely to constitute the dominant structure of the same in general, and perhaps compare the crystals are not visible in the liquid as prior factors" (Jung, 1981, pp. 86-100).

Therefore Type represents constant in thought, it is preceding forms. And the image of this type is conceptual thought, which is termed (Archetype), shows "the internal structure of the form, which is the principle has the potential to generate infinity different forms." From this sense, we find the conceptual Archetype network or neutrons, through its ability to (willingness, tendency, respectively), which starts from the moment given the evolution of the human mind. "Type does not present so much an image of something to be copied or imitated exactly as the idea of an element which should itself serve as a rule for the model…" (De Quincy, 1998, P. 618(.

6.1 Autonomy of the City

The City is case of (Institution Form), this would be through the formation of any selection of the appropriate Shape, and this does not mean that, the chosen form is linked to the images, forms reflect Types in the first, and second images. In other words, the image is brought through the selection of an appropriate type, this type on the level of conscious, not at the level of physical verification. Type does not require re-use the old within the particular level attributes, but it helps in understanding the Old, with this perspective the type had the possible interaction and generate forms which had the prospects appear.

Rossi was interested in how research is produced architecture, how it works and then gradually building to create the city. The establishment of the city means rational foundations for the birth of a city over time, so look for analysis of the concept of style (or the intellectual ideals), as Plato and Quatremere. Any timeless elements that give the city the archaeological dimensions and urban types are the physical objects that make up the city through time. So type had a range of intellectual relations that remain fixed behind a set of physical models (Broadbent, 1990, pp.181-187). After these steps are detected on the laws that produce these types, then the lines in recent research on the laws that combine these types to form the baseline to the image of the city and the urban sectors.

6.2 Type in the urban design of the Neo Rationalism

Rationalists work on the new abstract geometric architecture since the eighteenth century in France such as: Laugier, Ledoux, and Boullee (Fig.3). Most of the neo-rationalists they belong to the group (Tendenza) affected by the ideas of Marx. Continuation of the develop rules and principles addressed in the architecture, Are treated with it at the level of relations, as abstract that are connected by these elements, on the level of (Types), which count their existence previously to the presence of architecture or any other historical period, and these types interact with the functions and tasks that arise in the building at any stage to form the overall system, but keep the relationship between type and any model is a random relationship depends on the designer intuition. There are some of the proposals of the most prominent theorists' current new rationality about the relationship between architecture and types: (Broadbent, 1990, p157)

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Manfredo Tafuri (Ideology and Utopia) - 1976

For Tafuri, the very existence of multi-nationals makes socially responsible planning impossible. And whilst in previous centuries, architects and other visionaries had imagined Utopias; Capitalism has destroyed the very concept. If they cannot even conceive of Utopias, They have no hope of achieving anything like them. Nor will them ever again whilst Capitalism retains its grip on human affairs. (Broadbent, 1990, p158)

Aldo Rossi (The architecture of the city) - 1966

Focused in its arguments to deal with the facts as urban facts objects list is working on the composition of the city over time. It highlights the facts on the products of the city, buildings and urban spaces. So he focused on the Types as descriptive elements that make up the city and grow it over time, defined them like constant of relational despite changes in specific examples of buildings of heading to read the facts within the architectural methods reveal implicit infrastructure within buildings (Broadbent, 1990, p.325).

The Krier Brothers (Architecture and Urbanism) - 1977

Rob Krier located his studies in urban design to look at the types of the urban spaces, which has represented the intellectual relations which make Essential form, and join its. Essential Pure forms in the formation of interference types create for the design of the building at the beginning of the formal types of presence within the Urban Context and autonomic architecture, and components of the architectural details. Naturally enough whilst most internal space is rectangular, he finds examples which match his three major Urban Types: square, circular and triangular with equivalent combining and distortions. (Broadbent, 1990, p328)

Either Leo Krier believes that the basis on which the lesson can be inspired from the basic types of the archetypes lies in the understanding and analysis of urban components which are streets, squares and different configurations. A good city is made of streets and squares and squares provide natural settings for people to meet. But the square also provides the "choice location of all things public". It is, in other words, the proper location for monumental buildings. (Broadbent, 1990, p333)

Antonio Vidler (The Third Typology) - 2000

Vidler Submit a group of urban design, which calls for a return to the morphology of the traditional city's development, deduction types of space and processors in the traditional urban structure. The Third Typology of the city consider as the main source of proposals for urban design, The first Typology depend on function, and The second Typology depend on machine, the third came to return to the morphology of the city and the promise of types that are derived from design trends in the work of neo rationalist of the earliest models to morphological design (Vidler, 2000, p292).

"Columns, houses, and urban spaces, while linked in an unbreakable chain of continuity, refer only to their own nature as architectural elements, and their geometries are neither naturalistic nor technical but essentially architectural" (Vidler, 2000, P291). The third revolve in Architecture led to emerge the importance of the Type and Typology Concepts in practice; for discussing great cases in architecture like first architecture origin.

Although the bid difference between the rationalism and empiricism; they agreed that the type is the origin in first architecture; and it's extrude all the architectural splendor of luxury. The Type Theory used in understands and analysis all architectural and urban design projects.

6.3 Urban types and the form of the city

Type and Typology are effective tools in the process of analysis form of the city, as well as a tool classification and tabulation of history and understood by the gradient historical, and make it in the form of successive types, draw accurately the characteristics and features of the times its own; it is also the classification and tabulation types of city planning, which can't be counted as a result the emergence of new types in every age since the analysis the city and the extent of its success depending on the typical practice, and upon them if they are drawing the attribute and the general character to its; to solve all problems in the city planning. The planning of the city is located within several types depending on the shape of space and formal composition such as:

Centralized Type

A central organization is stable, concentrated composition that consists of a number of secondary spaces grouped around a large, dominant, central space. Such as the circular type in Baghdad rounded city (Fig.1).

Linear Type

A liner organization consists essentially of a series of spaces. These spaces can either be directly related to one another or be linked through a separate and distinct linear space. (Ching, 1996, p198) An example of this type proposed by Soria de Mata (linear city), and Leon Krier (Stuttgart-Leinfelden). (Krier, 1979, P.166)

Radial Type

A radial organization of space combines elements of both centralized and linear organizations. It consists of a dominant central space from which a number of linear organizations extend in a radial manner. Whereas a centralized is an introverted scheme that focuses inward on its central space, a radial organization is an extroverted plan that reaches out to its context (Ching, 1996, p208). The Re-planning of Paris by Haussmann (Fig.3), and re-planning of Damascus by Ecoshar (Fig.2), examples of this type.

Clustered Type

A clustered organization relies on physical proximity to relate its spaces to one another. It often consists of repetitive, cellular spaces that have similar functions and share a common visual trait such as shape orientation. A clustered organization can also accept within its composition spaces that are dissimilar in size, form, and function, but related to one another by proximity or visual ordering device such as symmetry or an axis. Because its pattern dose not originates from a grid geometrical concept, the form of a clustered organization is flexible and can accept growth and changing readily without affecting its character (Ching, 1996, p214). This type is evident in the traditional environment in the old city of Baghdad (Fig.1), Damascus and other traditional Arabic cities (Fig.2), as well as the city of ancient Rome (Fig.4), Paris and other traditional European cities (Fig.3), which is known as the traditional fabric.

Grid Type

A grid organization consists of forms and spaces whose positions in space and relationships with one another are regulated by three-dimensional grid pattern or field (Ching, 1996, p220). For example, New York City, new districts of greater Baghdad plans (Fig.1).

In order to analysis the form of city, the research need to analysis of the following open space types, usually associated with city development:

- Forecort: an open space between the public sidewalk and the main entrance of the building.
- Walkway: an exterior public pedestrian way at street level, usually providing connection through the block.
- Urban garden: a landscaped open space, usually of intimate scale, located and oriented to provide maximum sunlight during midday.
- Plaza: an animated gathering place with landscape features flanking a public street.
- Courtyard: a landscaped open space, located in the centre of a single or consolidated block with no direct street frontage.
- Street: path or axis for vehicles, cars, bicycles, pedestrians, etc.

The archetype of the closed monumental courtyard clearly separated from the city but fully accessible by the community of workers that inhabited each superblock introduced a type of space that is neither public nor private (Aureli, 2011). The urban archetype of the isolated block can be interpreted as the product of an urban ethos in which the growth of the city requires a certain openness of the city space.

7 TRANSFORMATION REPRESENTS CHANGING IN THE CITY DISCIPLINE

The process of urban transformation in the context of cities changes in the modern economy and society, and it's deriving from the post industrialization of the urban economy and from the modifications deriving from the processes of the knowledge, information and new technology society, as well as from the new social

forms of consumption and social relationship make the transformations of European cities a topical issue. Urban transformation is a habitual process in the evolution of cities. It is based on a constant tension in the relations between the cities' physical and social elements.The changes in social and economic processes always involve an almost permanent urban need to update or modernize or simply to transform cities. (Maria, 2007)

We live today in a conflicted time of both accelerated change and business-as-usual, a time of both transformation and stagnation. Those who want to change the conceptual direction of architecture and forge a larger cultural change. Of course it would be silly, after so much twentieth-century evidence to the contrary, to think that architects could change society. They are relatively powerless compared to politicians, developers, journalists, and businessmen. They can only tinker with ecological and population problems set by others. They do, however, have one power that no other profession enjoys: they have some control of the architectural language and the messages sent. A single building can celebrate a better world or signify a change in direction. It has the power to engage the imagination and symbolize the basic truths of the universe. Man is not the measure of all things - the emergent cosmos is. We are beginning to know some of her predispositions, but the question is: can we build a shared culture on them (Jencks, 1997, p21).

Transformation is a positive option in the face of changes in urban and regional structures. Transformation processes are essential to the city's existence and comprise part of urbanism itself. The physical, architecture and urban planning dimensions, and social, economic and cultural dimensions, are always connected in a transversal way. And we should point out that this is more of a process than a structure. Therefore the situation of going from one initial position to another - which is the outcome of a transformation process - generates a certain transitory position. This characteristic is essential at the conceptual level of the more theoretical reflections on the subject. But it does not modify either the characteristic of the requirement, of the processes of urban transformation in study case cities, or the almost deliberate or conscious sense of modifying the urban environment to introduce factors of a new urban vitality. (Maria, 2007)

Nevertheless the issue of urban policies should not be reduced to the most dramatic aspects of urban issues. It is necessary to return to the reflection that the conditions of the urban environment are a key to the competitiveness of the cities themselves. And this brings us to recall the planning aspects which constitute basic factors in the attractiveness of cities. This dimension is a key to cities in particular - since they depend, to a greater degree than large cities, on their own characteristics, conditions and elements of potential transformation. (Maria, 2007)

8 NEW URBAN TYPES AND CHARACTERISTICS OF THE CITIES IN THE TWENTY ONE CENTURY

Le Corbusier write: "If we eliminate from our hearts and mind all dead concepts in regard to house and look at the question from a critical and objective point of view, we shall arrive at the 'House Machine', the mass production house, healthy (and morally so too) and beautiful in the same way that the working tools and instruments which accompany our existence are beautiful." (Frampton, 1980, P. 153 (

These new ideas were emerged in the end of twentieth century was attempt a short and brief outline of a political history of the modern city, and the way its ethos, made of urban management on the one hand and conflict on the other, was embodied and represented by the use of certain architectural forms.

While the changes of the city in the twenty one century can be thought of as the evolution of urban types, its realization can only happen within a political 'state of exceptions', in which the exemplarity of specific and singular forms plays a leading role in resetting the urban condition.

So new types emerge in the contemporary city: like Entering mega structure and taller buildings to small contexts of historical fabric, Emerge new disciplines with information revolution of twenty one century like (digital city, cybernetic, cyborg, etc). As a result of significant changes which began to appear in some of the literature different expressions and new words such as: (Networked territories, Electronic Spaces, Post modern hyper – Space, Cyberspace, Virtual space, Virtual Communities, New social Space, Electronic agora, Net world). These terms show how the relationship between Information & Communication Technology (ICT) and their effects in space, city and the community.

With Cyberspace we built non-geographic land in electronic - information networks without distance limitations, and time plays a central role here instead of the distance which can influence the world in Real

Time. But the gap here is the explanation for the mechanism of behavioral change of the city parts within a type of network, and then to influence of city system and regional system. This helped the emergence of new concepts for future cities affected by the massive developments in modern science.

8.1 Intelligent City

"All this plastic machinery is realized in marble with the rigor that we have learnt to apply in the machine. The impression is of naked, polished steel" (Frampton, 1980, P. 153 (. The idea of the Intelligent City depend on identify the idea of housing and smart buildings in the type, which calls to mind the relationship of telecommunication systems and computerized urban network management, but under the guise of a more comprehensive perspective of thinking. It looks smart cities and closely related to the emergence of new relationships based on the flow of physical and metaphysical exchanges condensate for telecommunication systems in resolving the central problems of access to the best means to improve the urban environment.

The telecommunication rule depend on dissolution of the need for physicist rapprochement between people, services, and this makes it easier to imagine the beginning of the dissolution of cities and the formation of a new life status of the house. But other anti rule of telecommunication networks that increase the central urban centers control flow of information and thereby increase the dominance of global cities not as largest cities, but as the Smartest. It is clear that intelligent cities be node within the telecommunication network which fellow multinational companies and provide a new political tool for urban management and strengthen the urban face of cities and support the economic interdependence between local and global levels (Graham & Marvin, 1996, P 383). The application of these ideas emerge in Silicon Valley in America, and the European Union countries, and Southeast Asia countries.

8.2 Globalization instead of local culture

The cultural sector as a factor in the development conditions for the transformation of society. Today the world are witnessing the phase of historical changing, described in a aspects of the emergence of the information revolution that will take physical place in the maintained frame by the existing cities. There is no doubt that the power to influence the ancient urban types would be great effect and leave their signals on the urban morphological system of the city.

These urban policy models and criteria to improve the factors of cities' attractiveness are a base or framework for the processes of urban transformation, which can be detailed; so the research going to do this in the following points, based on the local and global conditions of cities, and based on their reflections online.

We couldn't understand the city parts and their behavioral changes in full partial contexts unless the city is considering node within the integrated network. This network contain several cities together constitute the Global City Region. The characteristics of global cities and territories different from the characteristics of individual cities in (economic, social, cultural and political) without being beyond the concepts of behavioral changes in terms of public order as a part of the city or sub-system of a larger system (salingaros, 2008).

The idea of the Global Village puts cities in the relationship joint between local and global levels, where the information disturbed boundaries between it and became the look of both the two together (Both / And) interpreted the entities are not monolithic in seeing what is universal and what is local and this so-called interaction scale. In order to treated with the global cities system in the interpretation of their behavior within the levels of economic, social, cultural and political relations with the type of the information network to gain access to understanding the behavioral changes to these parts in the level of space / time, and its effects on urban structure, in particular the experience of cities that were raised the idea of world city.

In this new type the Factors and dimensions in the transformation of cities are (Maria, 2007):

- The changes in the modern economy and in the social model linked to it, as well as the regional system, which places the urban centers in a new network tension, are at the base of the process which the processes of urban transformation originate.
- Cultural and social transformations resulting from the impact across society of the so-called "weightless" economy arising from the internationalization or globalization process. Technological transformations, of systems of production and distribution and the knowledge economies. As well as the new uses and techniques of communication.

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Social transformations and in economic relations deriving from the changes in role of every individual and of social groups and networks, resulting from the impact of the new financial flows of globalization (On markets, on industries) but above all on the relationship between global and local, Including the basic aspect in all this of democracy and liberties.

8.3 New metropolitan cities

Global cities known today as a base of integrated infrastructure that is assist transformation toward high density urban networks which contain group of hubs, Spokes and Tunnel Effects which connect urban economies together in real time and reshape the production of border space / time, including and between (Graham & Marvin, 1996, p384).

As result of the economic and social developments in the era of information revolution is the reorganization of cities, so that they are both integrated by grouping the units that operate as nodes in global networks. Dematteis focuses on the emergence of Planetary Metropolitan System, cities does not show equal within these broad changes. Batten was named these cities as Network City. The complex interactions between these cities as places of constant and intensive transition between networks (telecommunications, Multinational Corporation's network, the flow of the center, etc.) form of urban life and urban development (Graham & Marvin, 1996, P.71).

9 FOUR DIFFERENT TYPES OF CITIES

The political form of the modern city will be defined by addressing four archetypes (Rome, Paris, Baghdad, and Damascus). The sequence of these four archetypes attempts to synthetically describe the emergence of modern urban types that embodied specific power relationships within the ancient types of the historical city, especially those related to entering new urban types such as Information & Communication Technology, social relationships, the rise of economic accumulation and management as a response to particular conflicts in the city.

The research counters the current millstone of evolutionary and empirical development projects on the city that portrays urban space as an evolutionary and self-organizing organism. Against this idea, the city emerges as a locus of a permanent political conflict of which architectural types are one of the most extreme and radical manifestations (like genius loci of Rome) (Fig.4).

	City form types					Open space types				
	Clustered Type	Grid Type	Circular Type	Linear Type	Radial Type	forecourt	walkway	urban garden	plaza	Courtyard
Baghdad	*	*				*				*
Damascus	*				*		*	*		
Paris			*		*		*	*		*
Rome	*				*		*		*	*

Table 1: Table of comparative between four cities including types and transformation of the city (Author, 2012).

Transformations of cities' urban systems, the work arising from the study and types the description summarized in the specific case studies. Where the issues which are considered key to the transformation process are:

- The emerge stage which established Urban types.
- The growth stage when types conserve with its characters.
- Changes in the nuclear character of cities by another broad or diffuse dimension.
- New social and demographic systems transform the use of the urban space.
- Less rigid cities in less hierarchical societies.
- Technological innovations which are key to the type changes in forms of productivity.

- Urban transformation, from this period of "renewal" to urban regeneration.
- Transformations in diversification and restructuring of urban forms.

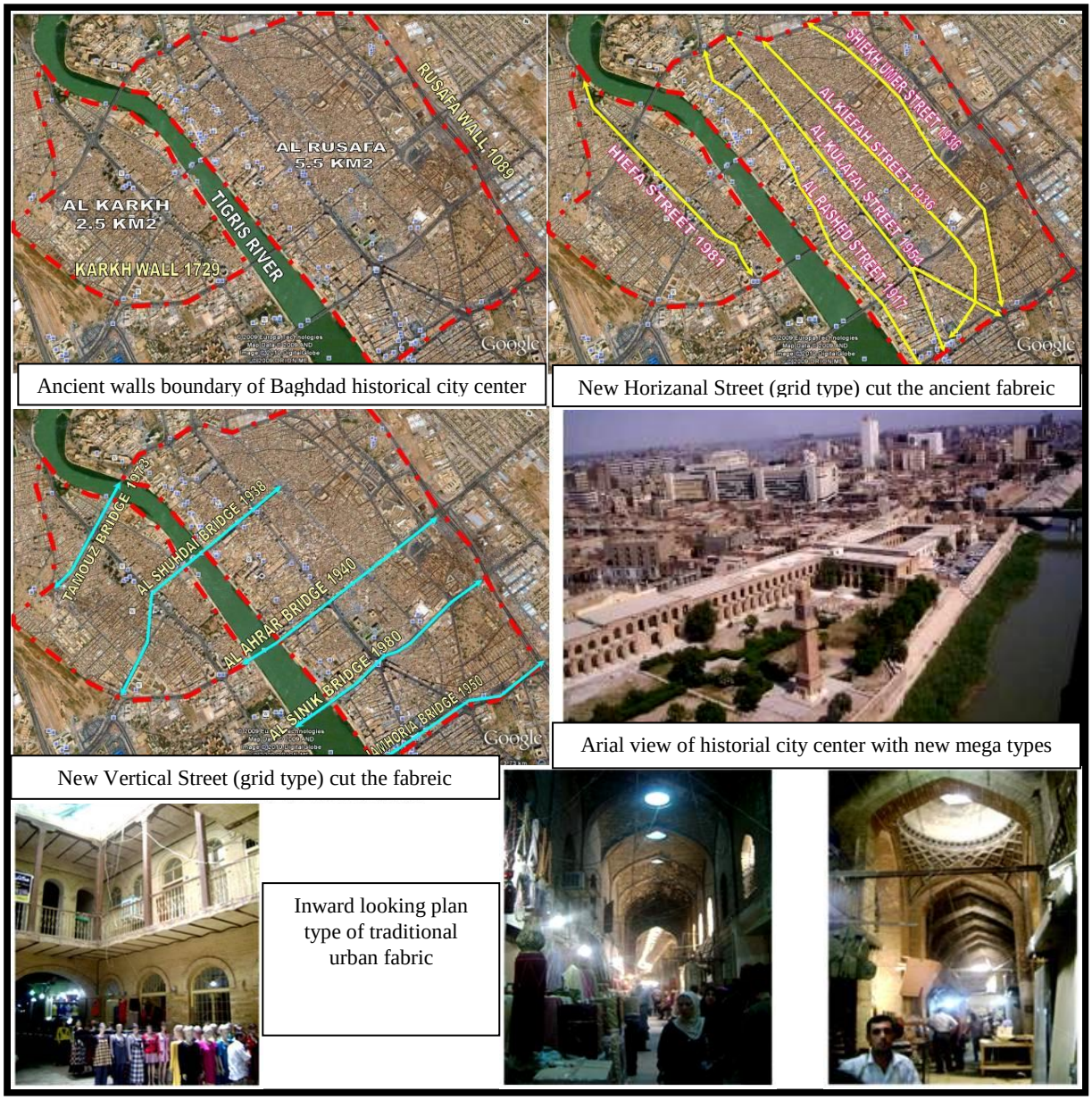

Fig. 1: Transformation of Baghdad city center (Author, 2010)

10 CONCLUSION AND URBAN SOLUTIONS TO SOLVE THE TRANSFORMATION OF THE CITY

- The types of Utopian city Failed to submit solutions that assumed the future of cities, because it was based on expectations of real-time variables which not proved on the reality, not based on what can be considered as constants of the natural system.
- Stay away from human nature (Right Innate) as a result of modern technology creates totally alien environment to the sense of human culture, while the traditional city has maintained to achieve the humanitarian and technical requirements but without the crushing human rights.
- Transformation of residential urban fabric: Regeneration of areas and neighborhoods which are in crisis or depressed; Activities in social or public housing as an instrument of integration and urban cohesion; Integrated neighborhood plans in all their social, economic and town planning aspects, with citizens' participation; and the historic centers, with policies of rehabilitation that are complementary to these plans. All of these are needed to adopte in the city in Twenty one century.

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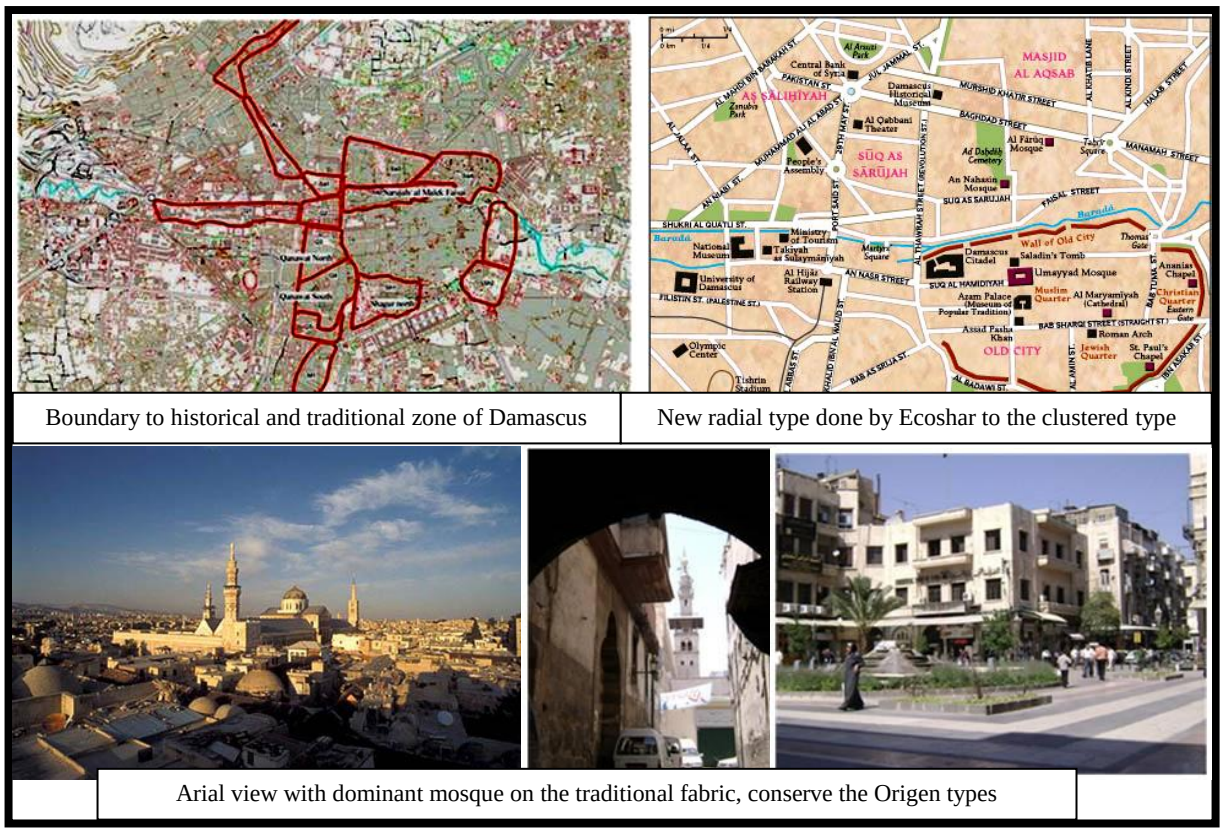

Fig. 2: Transformation of Damascus city center (Inernet, 2012) (Author, 2008)

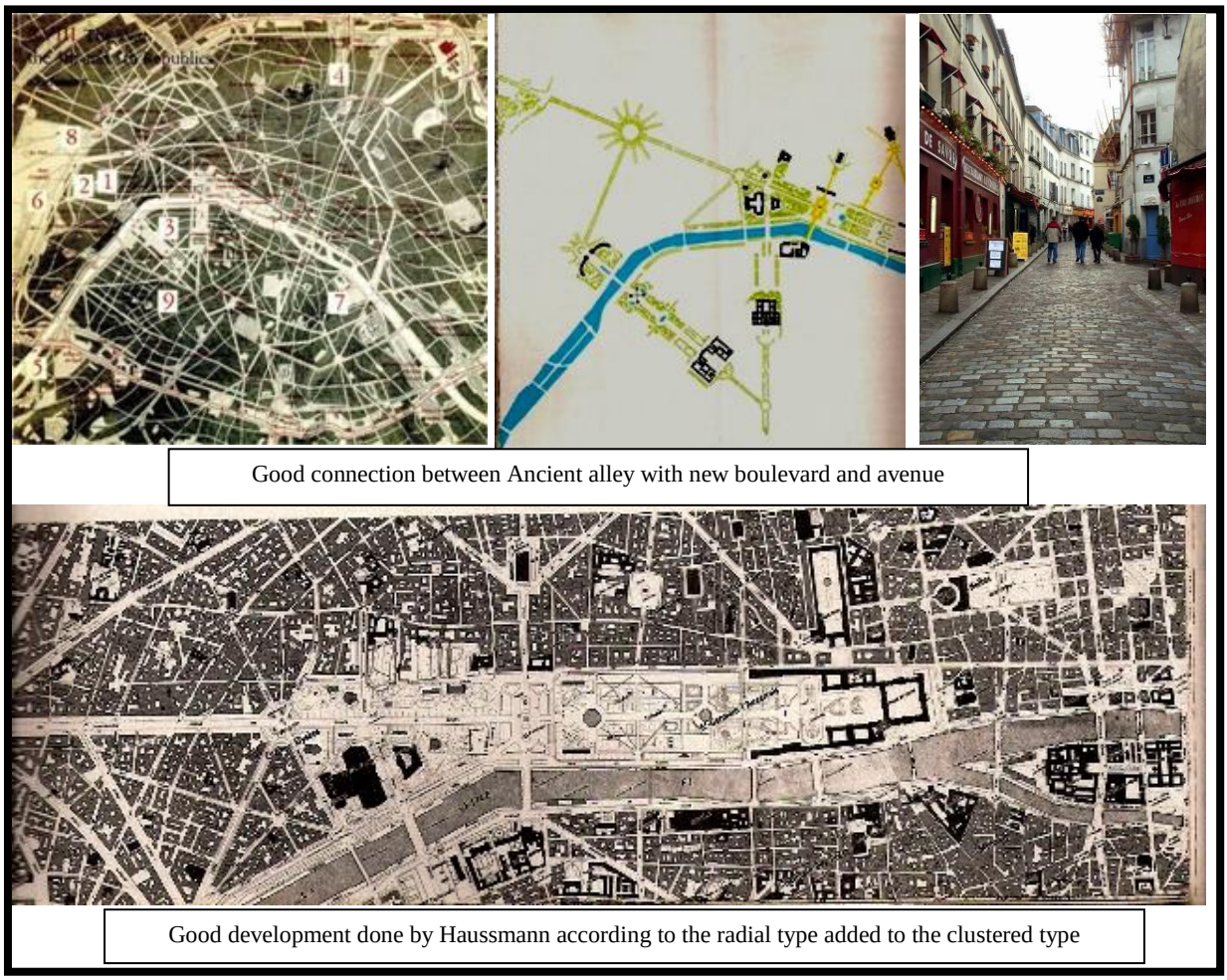

Fig. 3: Transformation of Paris citry center (Bacon, 1978, pp.192-193) (Author, 2010)

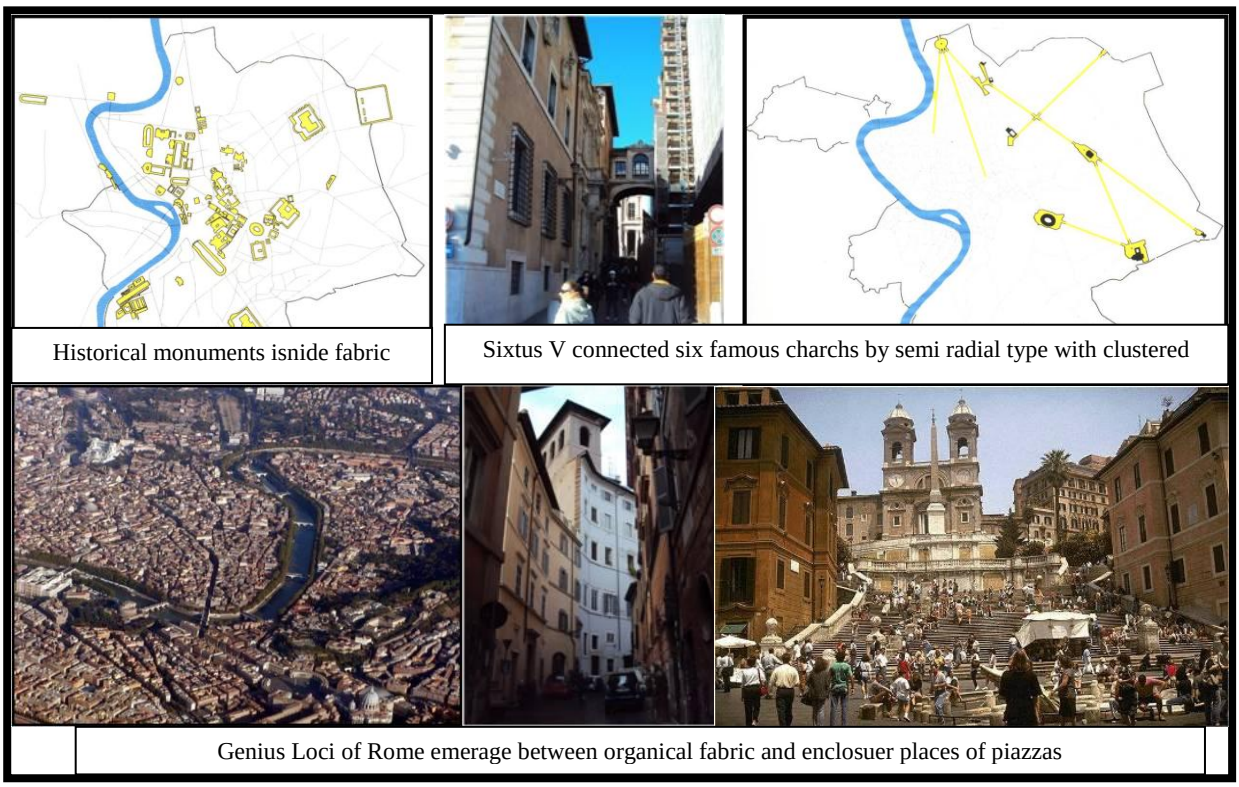

Fig. 4: Transformation of Rome city center (Bacon, 1978, pp.86-87) (Author, 2010)

- The traditional Islamic city works in the general framework as a single unit connected with the status of one center returning to the main roads, but it is also divided into smaller groups "neighborhood unit" and this division to achieve (humanitarian purposes, security, practical) this confirm the reference to the flexibility of this system in adapting the future transformation of the city, which reflected in the proposals of Christopher Alexander - A city is not a tree, Oscar Newman - Defensible space, and Jane Jacobs - Behavior territory.
- Urban renovation processes combine with expansion new types and requirements for, urban spaces. It is characterized by the overall transformation of wide spaces, not just in specific activities, of an urban area. Generally, this relates to activities in old cities. Renovation, like urban improvement, is linked to the culture of the 19th-century urban types, and they are different in the scale and scope of the transformation project.
- Human is the scale of the city in the ancient architectural movements and intellectual trends, turned out to be (vehicles, sciences, atom and thus the universe) are the scale of the city in the new direction of the twenty one-century. This led to many problems at different types of the city level, and therefore the man who lives there. So the research determines respect the human scale and human relations in building the future cities.
- The changing and transformation is the characteristic of the livable city systems evolutionary, so city need to adapt Transformation of the urban structure; waterfronts and different types of urban ports; Road accesses and axes of regional connection; Renewable energies; Large scale urban public spaces; Green zones and urban parks, the elements of sustainable urban mobility, and especially new forms of urban transport.
- The transformation of the traditional street and alleys from cluster type to the radial type (like Paris historical city center developing master plan) more useful than grid iron type (like Baghdad historical city center developing master plan).
- Put forward the concept of zoning of the contemporary city, as one of the most prominent reasons which have led to increased social isolation and an imbalance in the performances of urban space, contrary to what is known by the traditional city.

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- Nature presence to give the modern man, human technology, the rapid changes and variables emergency, take specific moments to possess his tired breath of the life problems and complexities of social life associated with the types of automation progress, industrial and racing technology, which led to the disruption of balance in order to make integration between matter and spirit.
- The urban fabric of the traditional city which was built according types with main components appear in unison as a single indivisible parts, where the building linking the two actions in the architecture, the first represents the building itself and the second is to make the building part of each context. As contrast with types of contemporary urban experience of the (fragmentation, disintegration, disharmony) phenomenon caused by the slogan of modernity and modernization, and thus no longer architecture reflects the collective project through which the expression of collective cooperation and rationality in the urban design development, but to rely on the (relative, partial, individual, competition).
- The necessary perspective for transformation of cities to adapt the new demands for uses and activities, the process of post-industrialization and of new tertiary activities. Key processes for the current new economy deriving from competitivenes typess, while the traditional city shown as cooporativeness types, but also from the internal demands of its urban systems.

Finally, we find out how to interpret essential aspects of "life and place" by evaluating the transformation of types in these cities. The research has a unique understanding of cities and how they work. So it offers clear vision to the future of inventive new solutions to familiar urban problems.

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Urbane Sicherheit – eine Gemeinschaftsaufgabe vieler Akteure

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1 ABSTRACT

Sicherheit und Ordnung in Städten und Gemeinden werden – meist bezogen auf aktuelle Anlässe – in der Öffentlichkeit kontrovers diskutiert. Reale Sicherheitslage und öffentliche Wahrnehmung unterscheiden sich oftmals. Das Gefühl von (Un-)Sicherheit in den Städten verändert sich, ebenso die Arbeitsteilung der Sicherheitsakteure. Urbane Sicherheit ist eine Gemeinschaftsaufgabe, die nicht nur von der Polizei wahrgenommen wird, sondern an der eine Vielzahl von Akteuren direkt und indirekt beteiligt ist.

Das Deutsche Institut für Urbanistik, die Forschungs-, Fortbildungs- und Informationseinrichtung für Städte, Gemeinden, Landkreise, Kommunalverbände und Planungsgemeinschaften, hat im Rahmen des Forschungsprojektes „DynASS – Dynamische Arrangements städtischer Sicherheitskultur“ im Jahr 2011 zwei Kommunalumfragen in den deutschen Städten mit 50.000 und mehr Einwohnern zum Thema „Sicherheit in deutschen Städten“ durchgeführt. Die Befragungen sollen einen systematischen Überblick über das Verständnis von städtischer Sicherheit, über Akteure, kommunale Aktivitäten im Bereich Sicherheit sowie Einschätzungen zu „sicheren“ und „unsicheren“ Orten in der Stadt ermöglichen. Befragt wurden die Leiterinnen/Leiter des Ordnungsamtes bzw. des Fachbereichs Sicherheit und Ordnung sowie des Amtes/Fachbereiches Stadtplanung/Stadtentwicklung/Stadterneuerung.

Das Projekt DynASS wird als interdisziplinäres Verbundprojekt durch das deutsche Bundesministerium für Bildung und Forschung (BMBF) im Rahmen des Programms der deutschen Bundesregierung „Forschung für die zivile Sicherheit“ gefördert.

Der Beitrag verdeutlicht, wie urbane Sicherheit als Gemeinschaftsaufgabe in deutschen Kommunen wahrgenommen wird und geht besonders auf die Akteure urbaner Sicherheit, sichere und unsichere Orte in der Stadt sowie Konzepte und Maßnahmen zur Verbesserung der Sicherheit im öffentlichen Raum ein.

2 URBANE SICHERHEIT

Alkoholisierte Jugendliche, Party im öffentlichen Raum, Gewalt in der U-Bahn, Graffiti an den Wänden oder Hundekot auf der Straße: Sicherheit und Ordnung in den Städten haben viele Facetten. Auch wenn reale Sicherheitslage und öffentliche Wahrnehmung sich dabei zum Teil erheblich unterscheiden: Die vermeintlich Ungeordnetheit und Unübersichtlichkeit großer Städte wurde schon immer im Kontext von Sicherheit und Unsicherheit diskutiert. Mit den beispielhaft oben genannten aktuelleren Entwicklungen sind sichere Städte noch stärker zu einem Thema öffentlicher Diskussion geworden. Für Bürgerinnen und Bürger sind sie Teil der eigenen Lebensqualität. Das zwingt Kommunen zum Handeln.

Sicherheit und Ordnung in der Stadt sind kontrovers diskutierte Themen. Wie Sicherheit und Ordnung bewertet werden und welche Handlungsoptionen bestehen wird häufig ideologisch geprägt diskutiert: Setzt man eher auf das solidarische Verhalten der Bürgerinnen und Bürger, gegenseitige Rücksichtnahme, die Gewährung von Spielräumen und Aushandlungsprozesse im Umgang miteinander oder auf das Schaffen und Durchsetzen von Regeln, verstärkte Kontrolle und Ahndung von Regelübertretungen? Favorisiert man eher Top-down- oder Bottom-up-Ansätze? In welchem Maß hält man Prävention für notwendig und das Zusammenwirken von Prävention und Repression für sinnvoll? Wie bewertet man Störungsfreiheit und Lebendigkeit in einer Stadt? Alle diese Fragen entscheiden darüber, wie man sich persönlich zu Fragen der Sicherheit und Ordnung in den Städten stellt. Die Art ihrer Beantwortung prägt die lokalen Sicherheitskulturen. Als Sicherheitskulturen bezeichnen wir im Rahmen des hier vorgestellten Forschungsprojekts die Gesamtheit der Überzeugungen, Werte und Praktiken von Individuen und Organisationen, die darüber entscheiden, was als eine Gefahr anzusehen ist und mit welchen Mitteln ihr begegnet werden soll.

Im Zuge eines sich verstärkenden Diskurses über die urbane Sicherheit gewinnen Fragen der sicheren Gestaltung von Städten auch im stadtentwicklungspolitischen Kontext eine größere Bedeutung. Tatsächliche und vermeintliche Bedrohungen gehen dabei nicht nur von einzelnen Großschadensereignissen aus, betroffen sind auch nicht nur die Megametropolen und Weltstädte, sondern gerade alltägliche Kriminalität und

alltägliche Gefahren in städtischen Räumen stehen im Blickpunkt. Die subjektive Wahrnehmung der Sicherheit bestimmter Orte in der Stadt durch die Bürgerinnen und Bürger wird nicht nur geprägt durch die tatsächliche oder vermeintliche Kriminalität am jeweiligen Ort, sondern auch durch Störungen der Ordnung zum Teil weit unterhalb der Schwelle strafbaren Verhaltens und der vermeintlichen oder tatsächlichen Unübersichtlichkeit der städtebaulichen Gestaltung sowie der Sauberkeit und Ordnung an bestimmten Orten. Gerade urbane Transformationsprozesse mit ihren Strukturbrüchen und gravierenden sozioökonomischen Veränderungsprozessen bilden den Hintergrund für die Befürchtung, Stadträume seien unsicher oder könnten unsicher werden. Die kommunale Ebene nimmt diese Bedürfnisse wahr: „Von den Bürgerinnen und Bürgern wird … durchgängig die saubere und sichere Stadt ohne sog. Angsträume als prioritäres Ziel eingefordert“ (DST 2011: 5). Städte werden in der medialen Berichterstattung und öffentlichen Diskussion oft als Brennpunkte der Kriminalität dargestellt. Eine tatsächliche oder behauptete zunehmende Kriminalitätsfurcht bestimmt die Argumentation oft in stärkerem Maß als die tatsächliche Kriminalitätsentwicklung. Die Sicherheitslage in den deutschen Verdichtungsräumen ist aber „weit weniger kritisch als in den meisten Städten Europas und der Welt“ (DST 2011: 5). Allerdings gibt es gerade im Bereich der Metropolregionen „klare Signale dafür, dass unser Sicherheitssystem weiterentwickelt und ausgebaut werden muss“ (DST 2011: 5), um neuen Sicherheitsanforderungen gerecht zu werden. Zu den neuen Problemlagen werden beispielsweise gezählt:

- Gefahr von Segregation, „anstatt objektiv und subjektiv sicherheitsfördernder Integration“ (DST 2011: 5),
- organisierte Kriminalität und Korruption (DST 2004, DST 2011),
- Gefahren der Innenstadtentwicklung: „etwa durch einseitige Entwicklungen, wie die Ansiedlung von Spielhallen und ähnlichen Betrieben“ (DST 2011: 5),
- neue Sicherheitsprobleme in Gebieten mit negativer demographischer Entwicklung: „Wohnungsleerstände ebenso wie hohe Arbeitslosigkeit führen zu bedenklichen Schwächen sozialer Nahräume“ (DST 2011: 5),
- eine gewachsene Erwartungshaltung der Bürgerinnen und Bürger im Bereich der öffentlichen Ordnung und der allgemeinen Gefahrenabwehr (DST 2004: 1).

Obwohl Risiken und Bedrohungen sich natürlich lokal auswirken und Unsicherheitsgefühle vor allem lokal wahrgenommen werden („Kriminalitätsschwerpunkte“, „kritische Infrastrukturen“, „No-Go-Areas“ sind nur drei Begriffe, die die örtliche Verankerung von Sicherheitsfragen deutlich machen), gibt es bisher keine umfassende kommunale Sicherheitspolitik. Dennoch entwickeln sich aus dem pragmatischen Handeln neue urbane Sicherheitsregimes basierend auf spezifischen lokalen Sicherheitskulturen (vgl. Floeting 2006).

3 DIE BEFRAGUNGEN

Im Folgenden werden ausgewählte Ergebnisse zweier Kommunalumfragen vorgestellt, die das Deutsche Institut für Urbanistik im Jahr 2011 im Rahmen des Forschungsprojektes „DynASS – Dynamische Arrangements städtischer Sicherheitskultur“[1] zum Thema „Sicherheit in deutschen Städten“ durchgeführt hat. Ziel der Befragungen war es, einen systematischen Überblick über das Verständnis von städtischer Sicherheit, über Akteure, kommunale Aktivitäten im Bereich Sicherheit sowie Einschätzungen zu „sicheren“ und „unsicheren“ Orten in der Stadt zu erlangen (Floeting, Seidel-Schulze 2012).

Die Erhebungsgrundgesamtheit umfasste alle 188 deutsche Städte und Gemeinden mit mehr als 50.000 Einwohnern, sowie die 12 bzw. 7 Bezirke der Stadtstaaten Berlin und Hamburg (Stand 2010). Zum Thema „Sicherheit in deutschen Städten“ wurden die Amtsleiter/-innen bzw. Fachbereichsleiter/-innen von Ordnungsämternb und Stadtplanungs/Stadtentwicklungsämtern[2] befragt. Die schriftlichen Befragungen der Ordnungsämter und Stadtplanungsämter wurden nacheinander in einem jeweils fünfwöchigen Zeitraum

[1] Ausführliche Informationen zum Forschungsprojekt „DynASS – Dynamische Arrangements städtischer Sicherheitskultur“ finden sich in: http://www.dynass-projekt.de/.

[2] Die Fachbereiche Sicherheit und Ordnung bzw. Ordnungsämter werden im Folgenden synonym als Ordnungsämter bezeichnet. Analog werden die Fachbereiche bzw. Ämter für Stadtplanung und/oder Stadterneuerung und/oder Stadtentwicklung als Stadtplanungsämter bezeichnet.

zwischen Februar und Juni 2011 durchgeführt. Der Fragebogen für Ordnungsämter bzw. Stadtplaner umfasste geschlossene und offene Fragen zu folgenden Themenkomplexen:

- Allgemeine Angaben und Verständnis von kommunaler Sicherheit darunter Größe des Amtes und Zahl der Mitarbeiter,
- Informationsgrundlagen zur Einschätzung städtischer Sicherheit,
- Akteure, Gremien und Kooperationspartner bei der Wahrnehmung der Aufgaben im Rahmen der städtischen Sicherheit,
- Maßnahmen, Konzepte und Projekte zur Verbesserung der Sicherheit im öffentlichen Raum,
- „sichere" und „unsichere" Orte in der Stadt.

Die Rücklaufquoten der Ordnungsämter und Stadtplanungsämter lagen bei 49 bzw. 44 Prozent. Leichte Unterschiede im Antwortverhalten gab es je nach Stadtgröße. Bei den Ordnungsämtern haben überproportional viele Mittelstädte mit 50.000 bis 100.000 Einwohnern teilgenommen. Ihre Beteiligung lag bei über 50 Prozent. Bei den Stadtplanern hingegen war das Antwortverhalten besonders in den großen Städten mit mehr als 200.000 Einwohnern sehr gut.

4 AKTEURE URBANER SICHERHEIT

4.1 Ordnungsämter

In den Ordnungsämtern ist eine Vielzahl unterschiedlicher Aufgaben angesiedelt. Kernaufgabe der Ordnungsämter ist die Wahrung der öffentlichen Ordnung. Dabei sind die Zuständigkeiten in den einzelnen deutschen Kommunen aber sehr unterschiedlich verteilt. Die Aufgabenbereiche der Ordnungsämter haben sich in den letzten Jahren erweitert. Dies ist auch teilweise damit begründet, dass immer mehr ehemals polizeiliche Aufgaben von den kommunalen Ordnungsämtern wahrgenommen werden müssen (vgl. DST 2011). Wenngleich weit über 90 Prozent der Ordnungsämter angeben, dass die Zusammenarbeit mit der Polizei grundsätzlich gut funktioniert, wird gleichzeitig von rund drei Vierteln der Ordnungsämter beklagt, dass die Polizei immer mehr Aufgaben an das Ordnungsamt abgibt. Besonders Kommunen mit eigenen kommunalen Ordnungsdiensten sind davon betroffen: Einen kommunalen Ordnungsdienst oder eine Stadtpolizei, die Aufgaben über die Verkehrsüberwachung hinaus wahrnimmt, gibt es in rund drei Viertel der Städte. Mit zunehmender Stadtgröße steigt auch der Anteil der Kommunen mit Ordnungsdiensten.

4.2 Stadtplanungsämter

Obwohl eine Vielzahl von Planungsentscheidungen die Lebensqualität und damit auch das Sicherheitsgefühl in der Stadt beeinflussen, leistet nur ein kleiner Teil der Aufgaben – und dies im Vergleich zu den Ordnungsämtern auch eher indirekt als direkt – im engeren Sinne einen Beitrag zur Sicherheit in der Stadt. Nach Einschätzung der befragten Stadtplaner sind dies vor allem (in der Reihenfolge nach absteigender Häufigkeit) Gestaltungskonzepte für konkrete öffentliche Räume, die Erarbeitung von Innenstadtplanungen, die Durchführung von Maßnahmen der „Sozialen Stadt" und die Erarbeitung städtebaulicher Entwürfe. Mehr als 70 Prozent der Stadtplaner halten diese Aufgaben für „sicherheitsrelevant".Wenngleich eine gewisse Bedeutung für die Sicherheit in der Kommune fast allen planerischen Dokumenten zugemessen wird, werden Aussagen zur Sicherheit in der Stadt aber vor allem in den Integrierten Stadtentwicklungskonzepten niedergelegt. Politisch gefordert wird die Berücksichtigung des Themas „Sicherheit in der Stadt" in der Stadtplanung in nur knapp einem Viertel der Städte. Ebenso sind spezielle Konzepte oder Maßnahmen zum Umgang mit dem Thema „Sicherheit in der Stadt" (z.B. zur städtebaulichen Kriminalprävention) nur in einem Fünftel der Städte verbreitet. In 36 Prozent der Städte haben sich Stadtplaner noch nicht mit dem Thema "Sicherheit in der Stadt" beschäftigt.

4.3 Weitere Akteure mit Aufgaben für die urbane Sicherheit

Vergleicht man die am häufigsten von Ordnungsämtern und Stadtplanungsämtern genannten Kooperationspartner (vgl. Abbildung 1), so ähneln sich die Kooperationsstrukturen im Themenfeld „Sicherheit" deutlich: Neben dem jeweils anderen Amt werden von den Befragten (gemessen an der Häufigkeit der Nennungen) auf vorderen Plätzen Polizei und Feuerwehr, Jugendamt, Sozialamt und Schulamt, einzelne Bürger und Vertreter der Kommunalpolitik genannt. Auffällig ist die geringe Häufigkeit

der Nennungen von Sportvereinen und anderen Vereinen als Kooperationspartner durch beide Ämter, die in der öffentlichen Diskussion häufig als wichtige Akteure organisierten zivilgesellschaftlichen Engagements in den Städten genannt werden: Weniger als ein Viertel der Stadtplanungsämter und weniger als ein Fünftel der Ordnungsämter nennen diese Kooperationspartner. Sehr unterschiedlich häufig wird die Wohnungswirtschaft als Kooperationspartner im Themenfeld „Sicherheit“ genannt: von mehr als der Hälfte der Stadtplanungsämter, aber von weniger als einem Fünftel der Ordnungsämter. Hier wirkt sich offensichtlich die Nähe der Professionen untereinander und die Ähnlichkeit der Aufgaben (Raumbezug, baulicher und planerischer Zugang statt „ordnendem“ Zugang) auf die Kooperationsstrukturen im Themenfeld städtische Sicherheit aus (vgl. Abt/Meier 2012).

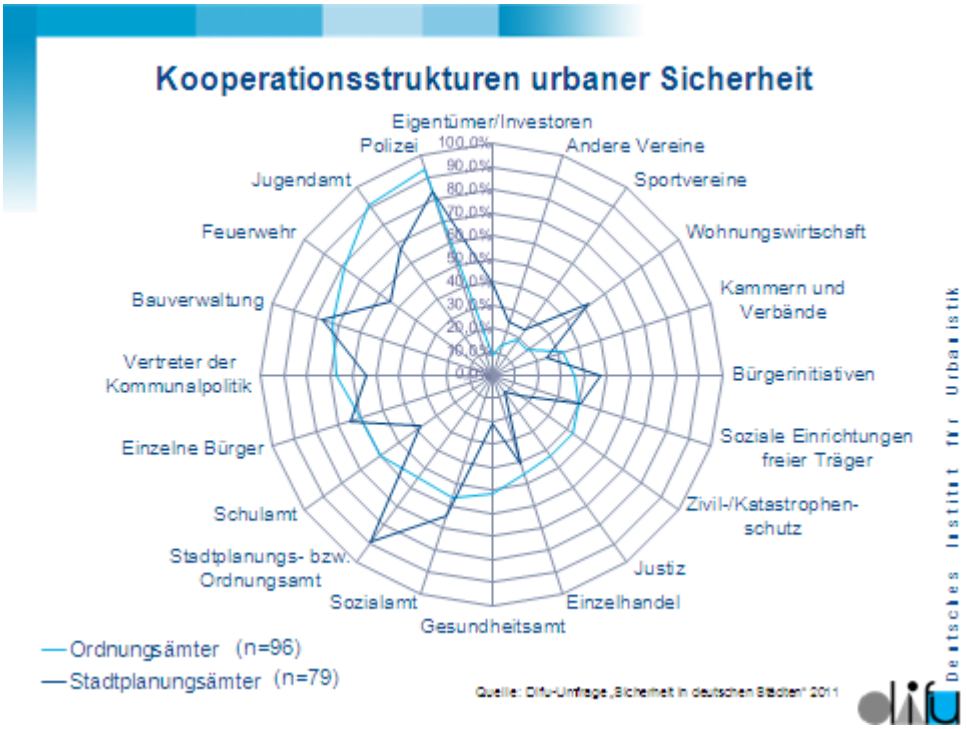

Abb. 1: Kooperationsstrukturen urbaner Sicherheit

5 SICHERE UND UNSICHERE ORTE IN DER STADT

In jeder Stadt gibt es Orte, die in der öffentlichen Wahrnehmung als eher „sicher“ oder eher „unsicher“ gelten. Das können Bahnhöfe, öffentliche Plätze, Grünanlagen, Einkaufsviertel, Wohngebiete sein. Die Gründe, warum Orte von allen oder von einzelnen Bevölkerungsgruppen als „sicher“ oder „unsicher“ wahrgenommen werden, sind seit langem Gegenstand der kriminologischen Forschung zum subjektiven und objektiven Sicherheitsgefühl (Bott/Coester/Kerner 2007, Glasauer/Kasper 2001). Eine zentrale Erkenntnis dieser Forschung ist, dass empirische Daten der (polizeilichen) Kriminalitätsstatistik die Kriminalitätsfurcht der Einwohner oft nicht erklären. So kann die Kriminalitätsfurcht an einem Ort hoch sein, obwohl die objektive Sicherheitslage dies nicht rechtfertigt. Kriminalitätsfurcht ist eine emotionale Reaktion gegenüber Kriminalitätsereignissen, die – wenngleich selten auftretend – als persönliche Bedrohung empfunden werden (Dittmann, 2005). Die subjektive Komponente der Einschätzung der Sicherheitslage und ihre Abweichung von objektiven Gegebenheiten bilden sich auch in Bürgerumfragen ab. Wenn dort nach dem Sicherheitsgefühl in der Nachbarschaft sowie der Gesamtstadt gefragt wird. wird die Sicherheit in der eigenen Nachbarschaft höher eingeschätzt als die der Gesamtstadt. Dies trifft sowohl für europäische als auch für deutsche Städte zu (Schoeb 2008, Waespi-Oeß 2008). Man spricht vom so genannten Distanzeffekt (Bott/Coester/Kerner 2007). In Nachbarschaften ist der Grad der Fremdheit eher gering. Man kennt sich, grüßt sich, in der Gesamtstadt ist das Element des Fremden groß oder wird zumindest eher vermutet. Moderne Städte produzieren aus sich heraus eine Vielzahl von Milieus, die einander fremd sind (Häußermann 1995, Häußermann/Siebel 2004). Ein Ziel der hier vorgestellten Kommunalumfragen war es, die Orte der Unsicherheit und Sicherheit und deren Veränderungspotenzial genauer zu untersuchen, denn Aufenthaltsqualität und das Image von Orten in der Stadt unterliegen Veränderungen. So können ehemals

unsichere Orte sicherer werden, ehemals sichere Orte unsicherer werden. In der vorliegenden Untersuchung wurde nach diesen Orten und ihrer Dynamik gesucht.

Grundsätzlich wurden von den Befragten mehr Angaben zu den sicherer gewordenen als zu den unsicherer gewordenen Orten gemacht. Angaben zu den sicherer gewordenen Orten wurden meist maßnahmenbezogen (Umgestaltung von Stadträumen, Aufbau eines Stadtraummanagements, Verkürzung der Reinigungsintervalle an bestimmten Orten, verstärkte Präsenz von Ordnungskräften, Kooperation von Sicherheitsakteuren usw.), zu den unsicherer gewordenen Orten meist delikt‐ oder störungsbezogen (Steigerung der Kriminalitätsrate, Zunahme der Problematik illegaler Drogen, neuer Standort für Alkoholiker usw.) erläutert. Die Beschreibung der konkreten Orte weist bei Ordnungs- bzw. Stadtplanungsämtern Übereinstimmungen aber auch deutliche Unterschiede auf. So werden von beiden Gruppen zwar alle Ordungsprobleme angesprochen, allerdings in unterschiedlicher Gewichtung (vgl. Abbildung 2). Während Stadtplanungsämter bei den unsicherer gewordenen Orten stärker nachteilige städtebauliche Eigenschaften sowie Leerstand nennen, sind für Ordnungsämter vor allem Orte im Blick, die ordnungsrechtliche Probleme aufweisen (z.B. Trinkerszene, Partymeile usw.).

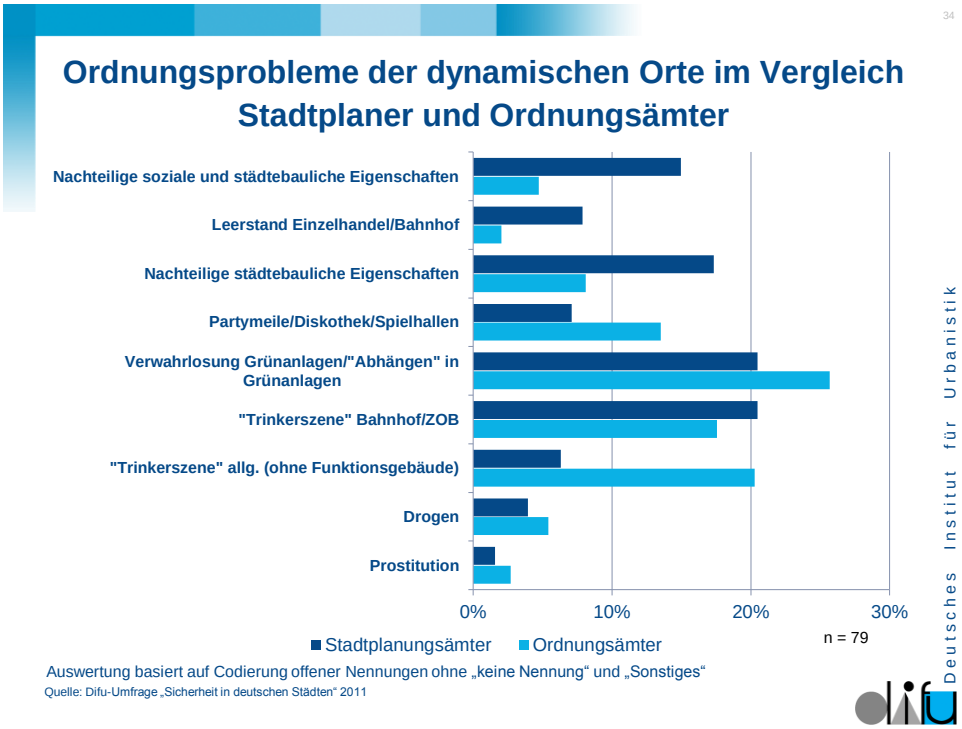

Abb. 2: Ordnungsprobleme der dynamischen Orte im Vergleich Stadtplaner und Ordnungsämter

Eine einheitliche Entwicklungsdynamik bestimmter Orte gibt es nicht. Gleiche oder ähnliche funktionale Orte in der Stadt werden in der einen Stadt als sicherer geworden, in der anderen Stadt als unsicherer geworden dargestellt. Trotz der bei Stadtplanungs- und Ordnungsämtern zum Teil abweichenden Nennung der Ordnungsprobleme stimmen die genannten Orte, wie Bahnhöfe, Zentrale Omnibusbahnhöfe, öffentliche Plätze, Grünflächen/Parks, Einkaufsstraßen/-viertel überein. Zwei Drittel aller genannten Orte verteilen sich auf diese Räume. Vor allem werden innerstädtische Orte genannt. In der Wahrnehmung der Akteure ist städtische Sicherheit also meist innerstädtische Sicherheit. Nur heben die Akteure, je nach Profession, die zumeist kumulativ auftretenden Ordnungsprobleme in unterschiedlicher Weise hervor.

6 KONZEPTE UND MAßNAHMEN ZUR VERBESSERUNG DER SICHERHEIT IM ÖFFENTLICHEN RAUM

In den Städten wird eine breite Palette von Maßnahmen und Konzepten zur Verbesserung der Sicherheit im öffentlichen Raum eingesetzt. Sie umfasst

- ordnungsrechtliche Maßnahmen wie beispielsweise rechtliche Vorschriften (z.B. zum Umgang mit Alkohol) und die Ahndung von Ordnungswidrigkeiten,

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- personelle Maßnahmen wie die Präsenz vor Ort, den Einsatz ehrenamtlicher Sicherheitskräfte oder den Einsatz privater Sicherheitsdienste,
- technische Maßnahmen wie Investitionen in Beleuchtung oder Videoüberwachung/CCTV,
- baulich-gestalterische Maßnahmen wie die Verbesserung der Einsehbarkeit von Räumen, die Pflege und Instandhaltung des öffentlichen Raumes oder die Berücksichtigung von Mindestanforderungen für Sicherheitsaspekte in der Bauleitplanung bzw. beim Einsatz von Instrumenten des Baurechts,
- sozialräumliche Maßnahmen wie gezielte Investitionen in die soziale Infrastruktur, die Förderung der sozialen Mischung der Bewohnerschaft im Quartier, die Belebung des Raums durch Förderung von Aktivitäten, die Förderung von Partizipation, Aktivierung, Empowerment der Bürgerinnen/Bürger, Quartiersmanagement, Jugendarbeit und sozialpädagogische Angebote sowie Angebote sozialer Dienstleistungen (z.B. Schuldnerberatung),
- Kommunikation mit den Bürgern und die Information der Öffentlichkeit in Form der Veröffentlichung von Informationsbroschüren, der Durchführung von Informationsveranstaltungen, der Bereitstellung von Ordnungstelefonen oder Hotlines für Bürgermeldungen, Internetangeboten für Bürgermeldungen oder der Präsentation von Aktivitäten des Amtes in Fernsehen und Presse.

Die befragten Ordnungsämter sehen Schwerpunkte bei den ordnungsrechtlichen und den sozialräumlichen Maßnahmen und Konzepten sowie im Bereich Kommunikation und Information der Öffentlichkeit. Bei den personellen Maßnahmen werden besonders häufig die Präsenz vor Ort, bei den baulich-gestalterischen Maßnahmen die Pflege und Instandhaltung des öffentlichen Raumes genannt. Nach Angaben der Ordnungsämter wird eine Vielzahl von sozialräumlichen Maßnahmen zur Verbesserung der Sicherheit im öffentlichen Raum eingesetzt.

Von den Stadtplanungsämtern werden vor allem baulich-gestalterische und sozialräumliche Maßnahmen und Konzepte zur Verbesserung der Sicherheit im öffentlichen Raum angeführt. Als baulich-gestalterische Maßnahmen wurden vor allem die Neugestaltung des öffentlichen Raumes, der Beleuchtung und der Möblierung, die Verbesserung der Einsehbarkeit und die Pflege und Instandhaltung des öffentlichen Raumes, die Verwendung vandalismussicherer Materialien, die Markierung von Grenzen und die Beschränkung von Gebäudehöhen genannt. Auch unterschiedliche sozialräumliche Maßnahmen werden eingesetzt, die aus Sicht der Stadtplanungsämter der Sicherheit im öffentlichen Raum dienen.

Integrierte städtische Sicherheitspolitik muss Aussagen zu einer breiten Palette von Maßnahmen und Konzepten treffen, um die unterschiedlichen Adressaten in ihren Handlungsbereichen anzusprechen. Mehr als die Hälfte der Ordnungsämter geben an, dass sie in ihrer Stadt über integrierte Sicherheitskonzepte verfügen, währenddessen weniger als ein Fünftel der Stadtplanungsämter dies angeben. Dies lässt sich zum Teil aus Rücklaufunterschieden erklären: Es haben sich nur in einigen Städten beide Ämter an der Umfrage beteiligt. Auch wird der Begriff „integrierte Konzepte“, wie die Arbeit mit Fokusgruppen der Befragten zeigt, unterschiedlich verstanden. In der Stadtplanung werden integrierte Stadtentwicklungskonzepte genannt, die auch Aussagen zum Thema Sicherheit und Ordnung enthalten. Das ist eher seltener der Fall. Ordnungsämter fassen darunter sehr unterschiedliche Konzepte im Aufgabenfeld urbane Sicherheit zusammen, so z.B.:

- Konzepte, die viele Akteure einbeziehen,
- Konzepte als Leitlinie des Handelns im Bereich Sicherheit und Ordnung,
- Konzepte, die ein Thema oder eine spezifische Problemlage aus unterschiedlichen fachlichen Zusammenhängen beleuchten (z.B. zu Fragen der Sicherheit und Ordnung im Zuge der Zuwanderung aus Südosteuropa), die stadtweit gelten und vom Gemeinderat beschlossen werden,
- quartiersbezogene, kleinräumliche Konzepte,
- operative Handlungskonzepte (z.B. integrierte Sicherheitskonzepte für Großveranstaltungen, im Umgang mit „Drogen im Bereich von Schulhöfen, Parkplätzen“),
- Konzepte in Zusammenarbeit mit anderen Kommunen.

7 FAZIT

In den Ordnungsämtern deutscher Kommunen ist eine Vielzahl unterschiedlicher Aufgaben angesiedelt. Dabei sind die Zuständigkeiten in den einzelnen Kommunen aber sehr unterschiedlich verteilt. Die unterschiedliche Aufgabenverteilung bestimmt den Rahmen für die Wahrnehmung von Sicherheit und Ordnung. Die Aufgabenbereiche der Ordnungsämter haben sich in den letzten Jahren erweitert. Dies ist auch teilweise damit begründet, dass immer mehr ehemals polizeiliche Aufgaben von den kommunalen Ordnungsämtern wahrgenommen werden müssen. Zu dieser Erweiterung zählt auch die Schaffung kommunaler Ordnungsdienste.

Anders als die Ordnungsämter greifen die Stadtplanungsämter nur indirekt in die Sicherheitsproduktion ein. Spezielle Konzepte oder Maßnahmen zum Umgang mit dem Thema „Sicherheit in der Stadt“ (z.B. zur städtebaulichen Kriminalprävention) sind nur in wenigen deutschen Städten verbreitet. Viele Stadtplanungsämter haben sich noch nicht mit dem Thema "Sicherheit in der Stadt" beschäftigt. Obwohl eine Vielzahl von Planungsentscheidungen die Lebensqualität und damit auch das Sicherheitsgefühl in der Stadt beeinflussen, leistet aus Sicht der Ämter nur ein kleiner Teil der Aufgaben eher indirekt einen Beitrag zur Sicherheit in der Stadt. Wenngleich eine gewisse Bedeutung für die Sicherheit in der Kommune fast allen planerischen Aktivitäten zugemessen wird, werden ausdrückliche Aussagen zur Sicherheit in der Stadt aber vor allem in den Integrierten Stadtentwicklungskonzepten niedergelegt. Für Stadtplanungsämter sind anders als für Ordnungsämter Maßnahmen, die zur Sicherheit und Ordnung in der Stadt beitragen, nur eine von vielen Aufgaben. Die engsten Bezüge haben Stadtplaner im Rahmen der städtebaulichen Kriminalprävention und integrierter quartiersbezogener Ansätze stadtplanerischer Intervention.

Das Ordnungsamt agiert eher reaktiv, der Aufgabenschwerpunkt liegt auf der Beseitigung oder Verhinderung von Missständen. Das Stadtplanungsamt kann eher präventiv durch die Schaffung baulich-räumlicher oder sozialräumlicher Angebote mit Fragen von Sicherheit und Ordnung in der Stadt umgehen. Die Vorgehensweisen nehmen hinsichtlich der Verbesserung der urbanen Sicherheit nur teilweise Bezug aufeinander.

Ordnungsämter und Stadtplanungsämter nehmen urbane Sicherheit unterschiedlich wahr. Daraus ergeben sich z.T. unterschiedliche Sicherheitsbilder bzw. unterschiedliche Einschätzungen zu Problemkulissen. Dies bestätigte sich in der Umfrage bei den Angaben zu den unsichererer bzw. sicherer gewordenen Orten. Neben vielen übereinstimmend genannten Orten gibt es auch solche, die entweder nur von den Ordnungsämtern bzw. Stadtplanern genannt wurden. Hotspots für unsicherer als auch sicherer gewordene Orte waren öffentliche Plätze, Bahnhöfe, Grünflächen/Parks, Einkaufsstraßen/-viertel.

Von den Befragten wurde häufig angegeben, dass die jeweilige Stadt über integrierte Ansätze zum Umgang mit dem Thema urbane Sicherheit verfügt. Tatsächlich wird darunter eine Vielzahl unterschiedlicher Ansätze verstanden. Umfassend integrierte Ansätze, die sowohl die Integration unterschiedlicher Akteure, die Integration unterschiedlicher Handlungsebenen (strategisch, operativ) und die räumliche Integration (gesamtstädtisch, quartiersbezogen) umfassen, gibt es bisher kaum.

Städte und ihre Bürger werden sich in Zukunft in stärkerem Maß mit Sicherheitsfragen auseinandersetzen. Es entwickeln sich − eher als Reaktion auf konkrete Anlässe und ad hoc formulierte Sicherheitsansprüche als auf Basis integrierender konzeptioneller Überlegungen sowie durch persönliche Kontakte urbane Sicherheitsregimes. Für sichere Städte zu sorgen, bleibt dabei eine Aufgabe, an der viele Akteure beteiligt sind. Doch viele Akteure sind sich ihrer Wirkung auf Sicherheitsfragen in der Stadt kaum bewusst. Daher ist es zunächst einmal notwendig, das Bewusstsein für Fragen der Sicherheit und Ordnung bei den unterschiedlichen Akteuren zu wecken, nicht nur kooperative Strukturen aufzubauen, sondern auch praktisch kooperativ zu handeln und urbane Sicherheit – die einen wesentlichen Teil der Lebensqualität für die Bürger der Städte ausmacht – nicht nur als Handlungsfeld für „ad hoc Interventionen“, sondern als kontinuierliche Aufgabe und ein gemeinschaftliches Ziel der Stadtgesellschaft zu begreifen. Die Beschäftigung mit Sicherheit und Ordnung als Phänomenen, die sich in unterschiedlicher Auspägung in den verschiedenen städtischen Räumen zeigen, sollte nicht zu der verkürzten Schlussfolgerung führen, dass Probleme mit Sicherheit und Ordnung in der Stadt primär über stadträumliche Interventionen gelöst werden können. Zu vielschichtig sind die sozioökonomischen Problemlagen, die als Ursache von Fehlentwicklungen gelten können und die letztendlich als Erscheinungsformen von Unsicherheit in den Städten wahrgenommen

werden. Für den Erhalt sicherer Städte müssen räumliche Entwicklungen berücksichtigt werden, ohne Fragen von Sicherheit und Ordnung simplifiziert zu verräumlichen.

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🏆 *reviewed paper*

Using Current Condition of Cities to Change them to Dynamic Cities – Case Study of Rasht, Guilan, Iran

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1 ABSTRACT

Today, due to increasing importance of preserving energy resources and using alternative energies, employing potentialities of cities to change them to dynamic cities is one of the major challenges in the modern world. Finding these potentialities and suitable usage of them helps us not only in preserving more non-renewable energies but also lets us have more clean air and meet our public needs by using clean energies. Rasht is one of the cities in north of Iran, surrounded by mountain and sea, has a moderate climate and fertile farm-lands.

This article examines the possibility of changing Rasht in to a dynamic city considering its current condition and geographical location.The overall aim of the research is to offer a model for a dynamic city which includes major characteristics such as supplying its heat, electricity, and even food with the least damage to natural environment and preserving its non-renewable energies.

2 INTRODUCTION

Cities in traditional societies especially in Iran were built according to sustainable and dynamic patterns. Variety of cities' structures show the complete adaptability to their surrounding environment. The main core of traditional cities was built around traditional markets. Beside such traditional markets, there were some other places called districts which were the place people used for social interactions and economic transactions , so districts played a major role in cities vitality and freshness. Due to several changes in cities throughout ages and as people-oriented cities replaced by machine-oriented cities, life-style underwent some changes as well. Constructing streets which had been adapted to different sizes of vehicles and new definitions of modern life from political, social, economic and cultural aspects resulted in dramatic changes in cities. However, unfortunately, what was ignored in constructing new cities was the importance of natural environment: huge constructions, big communication networks, mechanization, and environmental pollutions brought severe damages to the world during the last century. Irreversible fuels consumption and ecosystem demolition made city planners offer new patterns to rescue cities.

Sustainable theory is one of the most universally acknowledged theories today. World Natural Environment and Development Committee definition is as such:

"Meeting the current needs of people without jeopardizing the abilities of future generations for satisfying their demands." (Jin kim and Rigdon, 1998)

This article aims at analysing the concept of a dynamic city. Indeed, it should be noted that dynamism is more than sustainability. In other words, apart from sustainability, dynamism includes climate condition and ecosystem. The inhabitants of a dynamic city have continuous social and economic activities and employ the whole city potential to develop such vitality and dynamism. The concept of dynamism can be recognised when food production and citizens' participation would be considered from all aspects.

One of the metropolitan cities in north of Iran is Rasht. Due to its climate condition and geographical location, Rasht has extraordinary potentials. So, the major attempt in this article is to focus on Rasht potentials in order to change it into a dynamic city, and then, a suitable plan will be offered to save its natural environment, to satisfy its habitants and to meet their daily needs.

3 DYNAMIC CITY

Population explosion, climate changes, excessive consumption of irreversible fuel recourses and environmental pollution are one of the biggest and most challenging problems in metropolitan cities in the world.

According to one estimation , 90% of the world population growth is in cities (Denig, 2010). Also, it is said that 75% of world energies is consumed in the cities of which 40% is used in buildings (Stampfl, 2010). Despite the fact that cities occupy less than 1% of the earth, they are the major reason for climate changes and water consumption (60%) (Denig, 2010). Nevertheless, the overall policies of a city should be in line with its improvement or even change to bring social and economic welfare to a society.

3.1 Charactristic of a dynamic city

A dynamic city is a kind of city which employs the most un-destructive of its minimum potentials. In other words, a dynamic city provides its habitants with best social services such as social welfare, supports their financial interests, and consumes the minimum amount of its energy resources by co-operation between its people and government and improving its infrastructure. One of the main features of a dynamic city is its productivity. For example, supplying food is one of the most important goals in cities. These products are transported from villages or countryside. For example, in highly populated countries like China and India, which enjoy urban life, the demand for food increases constantly. Then, unsurprisingly, a city is dynamic when it would be independent in its food industry and sustainable in its food chain. Habitants of a dynamic city are the producers of their own food, produce the minimum amount of waste, and the minimum waste of energy. Besides, the future development of a dynamic city should be efficient and in accordance with its dynamism plans in a way that its habitants ought to be able to adapt to the unexpected conditions. All districts are equipped with intelligent building systems in a dynamic city which are controlled by municipality.

Indeed, such coordinated system can manage all the district and regional crisis, such as traffic, in emergency situation. According to the given definition, a dynamic city is build based on the pattern of districts of traditional cities employing modern information and communication technology. One of the advantages of such a city is the interaction between its inhabitants and policy makers.

In fact, such intelligent systems can satisfy all basic needs of districts, and manage traffics and emergency situations.

Overall, the major goals of a dynamic city are:

(1) Preserving and developing green nature in a city (i.e. in parks, districts, green buildings, etc.).

(2) Optimizing energy consumption (a minimum consumption of irreversible energies, a maximum consumption of reversible energies).

(3) Consuming water in a sustainable cycle and its recycling

(4) Minimizing industrial and household waste

(5) Managing transport system in a suitable way especially according to reversible energies.

(6) Preserving natural environment and reducing destructive effects.

(7) Producing food in cities and using fertile farm lands.

(8) Employing intelligent information and communication technologies for optimum functioning of cities.

3.2 Samples of sustainable cities which can be changed to dynamic cities

Some countries have taken some measures to change their cities to sustainable cities. As mentioned above, some of the characteristics of a dynamic city are its productivity, adaptability to nature, capability for optimum improvement and development which if they will be applied to a sustainable city it can be changed into a dynamic city.

For example, Australia has taken some measures in order to build some cities based on a green environment and to meet its social and economic needs (URL 1). Similarly, Germany, Sweden and Holland have taken some approaches towards their future cities such as suitable consumption of energy resources, clean transport system, healthy productions, reducing green-house emissions, some national TV and radio programmes to make people save energy and preserve their natural environment and developing open air spaces (Peric and Furundzic, 2010), also the Caofeidian city in Tangshan in China, Luadian town in Shanghai, and Hammarby sjostad in Sweden are Eco cities which are supposed to be built based on suitable natural environment and sustainable development patterns (URL 2).

3.3 Which cities can be changed to dynamic cities?

Historically speaking, a good city is built according to its vernacular, cultural and historical features. Furthermore, those cities which have suitable structures make a balance between traditional characteristics and environmental goals. These ever-lasting cities are typically protected (Mahmoudi and Fanaei, 2009).

As a matter of fact, even if all necessary potentials such as climate condition, suitable natural environment, and energy resources are not available, high social interactions and cultural levels of habitants in accordance with determined policies will enhance the dynamism of a city. In a sense, finding some ways to adapt with surrounding environment is part and parcel of a dynamic city. So, if the aforementioned features are available in a city, it will have more efficiency. Generally speaking, it is possible that each city to be changed into a dynamic city. To do so, recognizing its potentialities and infrastructure planning are essential. Such various conditions are possible in many cities in Iran.

Rasht, the capital city of Guilan province in north of Iran, has the potentiality to be changed into a dynamic city thanks to its suitable climate condition, and natural environment. Obviously, if such potentials will be recognized based on sophisticated studies and policies, the city can fulfill the objectives of a dynamic city.

4 RASHT LOCATION

Rasht is the capital city of Guilan province in north of Iran. Rasht is located in 49° and 36' by east, 37° and 16' by north GMT near to Caspian Sea. (Fig.1)

Fig. 1: Rasht location

Rasht lies on a steady slope from south to north and is surrounded by two rivers called Siahrud and Goharrud both of which flow down into to Anzali lagoon. Because Rasht is located along Alborz Mountains from south, Caspian Sea from north, prairies on the east and west, has special climate condition. To be more precise, because of Rasht's Mediterranean changing temperature, and humidity the difference between night and day temperatures is insignificant. Also, the amount of precipitation is 2000mm in Rasht (Taheri, 1996).

5 RASHT: PROCESS OF BUILDING

It is said that Rasht was a big village surrounded by a jungle. While visiting Rasht in King Safavid time(1637),Adam Olearius[1] describes that the houses are hidden behind trees in a way that when one steps in the village it is as if s/he enters a jungle. Jacque Demorgan[2] says that city is lost amidst its branches and leaves (Taheri, 1996).

The first residential areas were randomly located in gardens and farmlands and mostly built around religious places in Rasht. Later with the city economic and market development the districts which were separated by

[1] A German scholar, mathematician, geographer and librarian.
[2] A French mining engineer, geologist and archaeologist.

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small rivers disappeared and replaced by residential areas. Generally, the city has a main core shaped like spider web where all road networks lead to the main core.

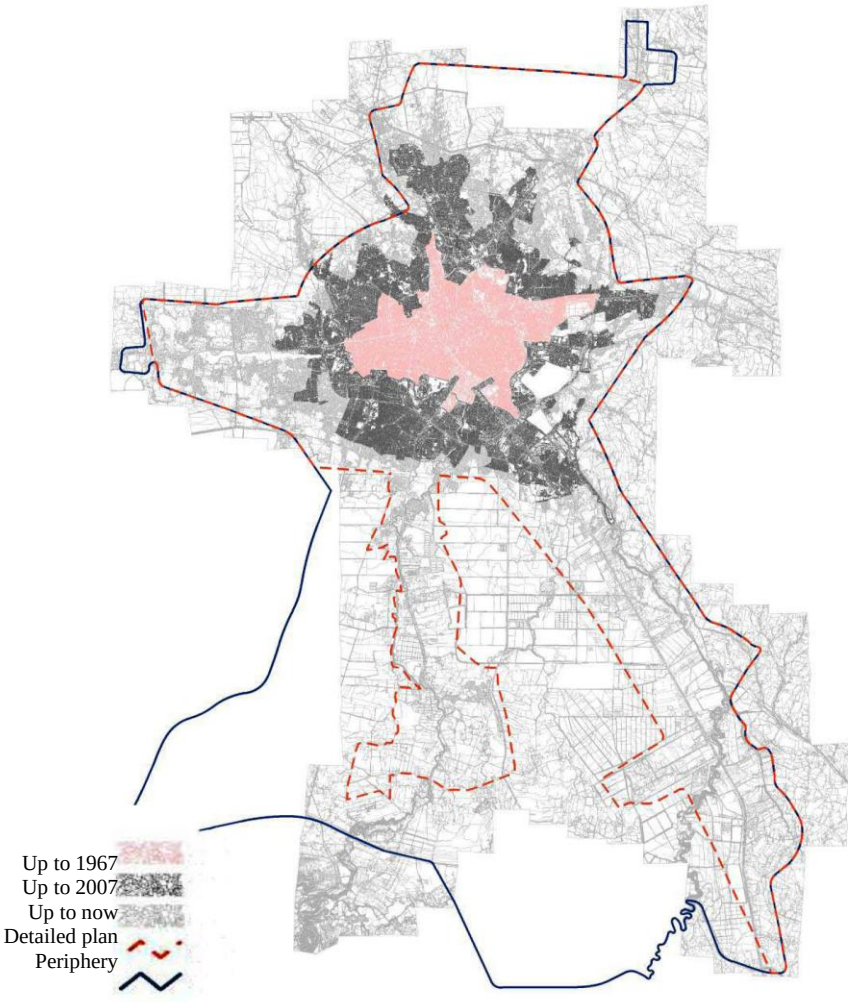

Fig. 2: The process of Rasht development (Rasht master plan, 2008)

Rasht municipality building was built in 1863 and it was considered as the city centre since all main streets led to it. One of the city's first greenery was City Park with 144000 km2 beside Guharrud River and Sabze Meidan (Green Square) park with 15000 km2 which were nearly located at city centre.

6 CURRENT SITUATION OF RASHT

According to Statistical Centre of Iran the number of population in the city in 2006 was 633940. In comparison to its total land area, Rasht has high population density due to its suitable climate condition and consequently organising the population led to spreading of the city(URL4). The growing population has destructive effects on natural environment such as farmlands and gardens and they are replaced by consuming buildings. In the same way, the current green environments do not play any major role in its urban space. Figure 3 shows the current green nature condition in Rasht.

It is needless to say that overall development of Rasht during recent years led to constructing many streets and avenues, which due to lack of suitable infrastructure for public transport system, result in using private vehicles, heavy traffic congestion and pollution. As it was mentioned earlier Rasht was located between two rivers which had clean and fresh water. However, because of urban development two rivers flow through the city now and since there are no suitable sewerage systems all waste are charged in these rivers and as a result they are highly contaminated.

Overall, the most important problems of the city are:

(1) Natural environment pollution especially of surface water and ground water pollution.

(2) Wide-spread urbanization, immigration, and marginalization.

(3) High rate of unemployment.

(4) Lack of public transport infrastructure.

(5) Ineffective traffic rules.

(6) Old public transport systems.

(7) Uneven distribution of water for agricultural, industrial and domestic consumption.

(8) Lack of implementation of urban sewerage and waste recycling.

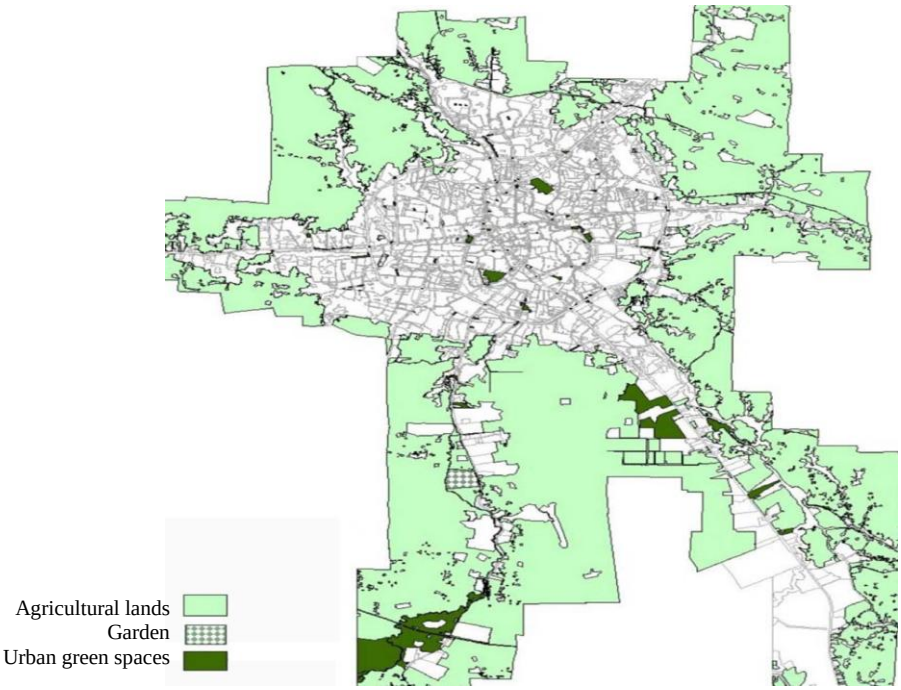

Fig.3: Current urban green nature condition in Rasht (Rasht master plan, 2008)

7 ANALYSING RASHT POTENTIALITIES IN ACCORDANCE WITH ITS DYNAMISM

Rasht enjoys a suitable climate condition and geographical location such as fair weather, fresh water, and rich soil. For instance, if there will be a barren land because of regular seasonal raining some plants grow naturally. As a result, with efficient planning, these lands can be used effectively in order to provide the inhabitants with new jobs. Economy of the city is based on agriculture and since Rasht is the capital city of Guilan province, offering services play an effective role on its economy. However, the sole reliance on agriculture makes organizing agriculture industry necessary (Nikouye,2008). Being located next to sea, variety of animal and plant species are part of those suitable features which apt Rasht to reach objectives of a dynamic city. It is clear that rivers are important factors in a city. If they would be cleaned and used effectively they can play a major role in food production (aqua-culture). Similarly, rivers can be the best spot for tourist attraction which can bring prosperity to the city from economic point of view.

During recent years separation of urban sewerage from surface water, gathered from rainfall precipitation, has been finalized. If such plans would be fully implemented it should be said that some primary measures have been taken for improvement of current situation. One of the strong points which improves the current situation of the city and changes it into a dynamic city is the co-operation of all inhabitants. Fortunately, the historical, cultural, social, and scientific backgrounds of its inhabitants show that they welcome such plans. In comparison to other cities, people from Guilan are well known for their social and cultural activities and people interactions have continuously improved in different issues.

8 SUGGESTIONS AND SOLUTIONS TO CHANGE RASHT INTO A DYNAMIC CITY

As far as Rasht has the most potentialities for dynamism, a sophisticated investigation, proper aims, basic planning, and applicable efforts can be considered as features which can change the city into a dynamic city with clean air and natural environment. For so doing, some suggestions can be made:

(1) Trying to preserve the green environment of the city: green nature apart from its growth and dynamism can trigger the sense of vitality and freshness in a society. Consequently, preserving and developing urban green environment is the first step for building a dynamic city.

(2) Monitoring different districts by using information technology: providing social security to all inhabitants with suitable quality and updating necessary information.

(3) Using green buildings in the city which gives a significant outlook to the city and its dynamism:

Green roofs and terraces can be good places for neighbours' interactions. They also can be suitable places for planting vegetables and fruits. Green walls can function as a heat and noise insulator, so they can reduce energy consumption, add to urban space beauty, and help to dynamic and live context of the city.

(4) Cultural programmes to encourage inhabitants to preserve fruit trees and vegetables.

(5) The minimum use of irreversible energies (using light absorbing windows and supplying building energy by photo-voltaic system, and etc.).

(6) Using recyclable materials and reducing poisonous materials in different industries.

(7) Equipping buildings with collecting rain water system and using it for watering green nature: regarding annual rainfall in Rasht, it is a main resource for life. Collecting and keeping rain water and re-using it in agriculture industry and flash tanks are necessary.

(8) Separating, packaging, and recycling urban waste: to do so, the separation process should be started in houses and special places should be considered in each district.

(9) Managing water consumption, water purification, and recycling for urban consumption (irrigation, and etc.).

(10) Developing public transport system using reversible energy resources in order to reduce using private vehicles, air pollution, and traffic congestion.

(11) Cleaning rivers in Rasht and enhancing aquaculture. Building parks next to rivers so such ecosystem can establish a peaceful relationship between inhabitants and different kinds of animal species: apart from beauty, such plans can encourage healthy activities and exercises. Moreover, the polluted rivers can be for the economic purposes. . Cleaning river plan is carried out by two organisations, Municipality Organisation and Department of Environment. Avoiding sewage to flow to rivers, cleaning rivers, and landscaping plan along rivers will help preservation of ecosystem.

9 CONCLUSION

Inhabitants of metropolitan cities spend most of their time in closed official or residential spaces. While passing the streets pedestrians just see high-rise buildings or even have no time to take a glance at all. Inhabitants are not satisfied with such life style. Consequently, despite scientific progress and technology, such cities are not dynamic. This is why decision makers, policy makers and politicians are seeking new ways to overcome those problems especially in big cities. Indeed, the major applicable items discussed in this article can play a major role in healthy life of human being. The experience of traditional cities is best examples of peaceful relationship between human being and nature in all over the world. So, combinations of traditional patterns with new technologies are of great help. In this regard, paying attention to cultural aspects is of highest importance. Moreover, taking suitable cultural measures and spreading the culture of building dynamic cities make the public participation possible in order to achieve goals.

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Visibility Analysis of the Capital District in the 2030 Master Plan of Abu Dhabi

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1 ABSTRACT

The 2030 master plan of Abu Dhabi describes the new zones of urban development in Abu Dhabi city: The Central Business District (CBD), The Capital District, the Grand Mosque District and the LULU Island District. It highlights the new vision of the UAE via its political capital: Abu Dhabi.

In this paper, the author is interested in the Capital District as the core of the city that has a variety of land use from low to high rise residential buildings, to institutional and commercial buildings to offices/retails, Governmental buildings, etc., besides the landmarks and great open spaces planned in order to highlight the image of Abu Dhabi city as the Capital of UAE.

A newly introduced mean of public transportation: the metro is expected to increase the pedestrian flow from and to these buildings. In order to optimize mobility and to raise the pedestrian movement growth to open public spaces in particular and to provide a lively, easy and pleasant walkways with high visibility and good accessibility to landmarks, natural settings, national symbols, monuments, neighborhood facilities, open spaces, etc. In this paper the author using the visibility analysis, mainly axial lines and segments maps. The urban structure framework, the land use, streets hierarchy, cycling and walking maps proposed in the Abu Dhabi 2030 master plan will be taken in account. Climatic factor and environmental Leadership will be the aim of a further study.

The methodology we followed consists of applying space syntax and GIS to analyze both the visibility and accessibility of open spaces (gardens, plaza, etc), pedestrian pathways, landmarks, facilities and important buildings.

The outcomes of this research will be combined with the study of the climate comfort in further research to translate the sustainable directions to specific recommendations and designs and try to refine the vision and themes represented in the 2030 plan ,which is subjected to detailed evaluation and confirmation in further planning and design.

2 INTRODUCTION

This paper presents a small part of a research that tries to cross three factors: 1) visibility of important buildings, open spaces, roads of the capital district, 2) buildings forms and arrangement and 3) the micro-climate, in order to propose kind of guidelines or orientations for land use, transportation planning, urban forms, etc which provides: 1) livable and pleasing walk paths in an optimum time to the city functions, 2) climatic comfort for pedestrian's walk, mainly shaded and ventilated streets and open spaces and 3) high visibility to landmarks, natural settings, national symbols and monuments, etc.

In this research the author has chosen Abu Dhabi 2030 master plan as a study case, in particular the capital district for its importance. Though it is a proposed plan and a practical research on site cannot be conducted, the author finds this interesting since finding of the research may help in orienting/ guiding future development and design based on simulation and analysis in a small areas, that the master plan did not cover because of the scope.

The author used Depthmap and axial line as many research have been recently made about walkability and accessibility by using axial lines and segment map analysis, together with the using of Geographical Information System (GIS). We found the this computer programs are suitable for this research as by the capabilities of these tools in representation and analysis demonstrated in many papers.

This paper presents first the study case then the methodology and ends with a conclusion that summarizes the findings and presents the limitations of the this research, which will be developed in further work.

3 PRESENTATION OF THE STUDY CASE

3.1 Abu Dhabi city

The united Arab Emirates (UAE) is a country situated in the southeast of the Arabian Peninsula in Western Asia on the Persian Gulf, bordering Oman, and Saudi Arabia, and sharing sea borders with Iraq, Kuwait, Bahrain, Qatar, and Iran (according to Wikipedia) (Figure 1).

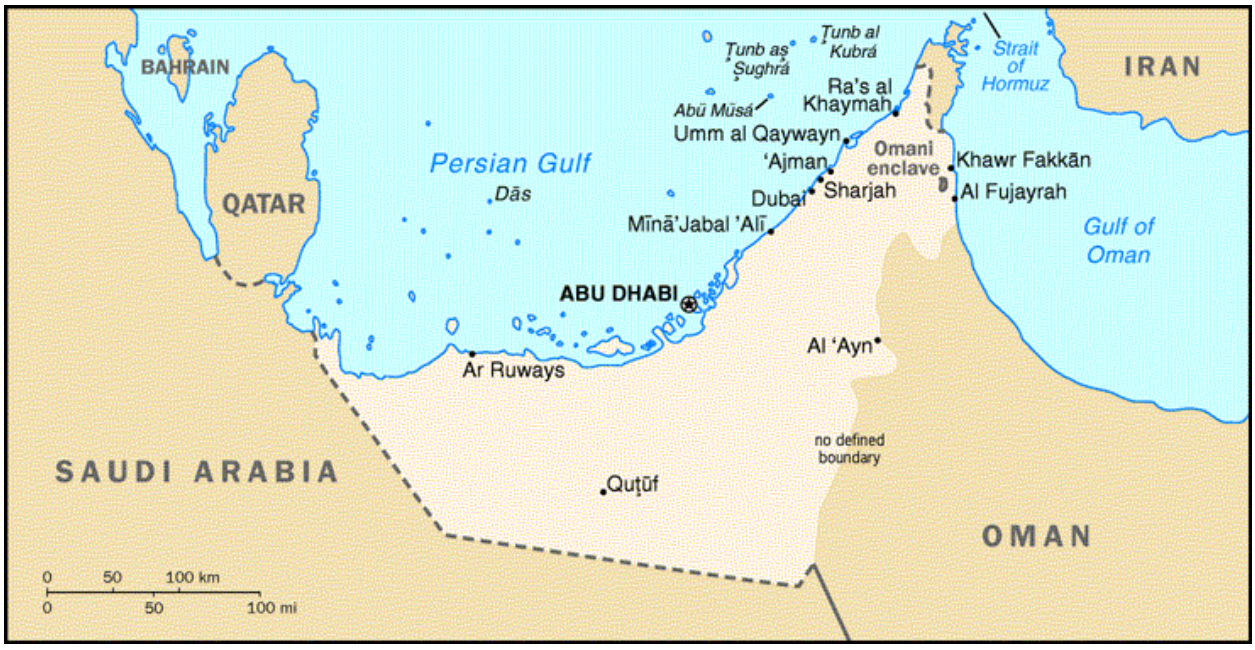

Figure 1: Geographical location of the United Arab Emirates. Source: http://geography.about.com/library/cia/blcuae.htm

The city of Abu Dhabi, which is currently the capital city of UAE with less than one million people, was established in the middle of the 18th century based on hunting and pearling activities. It has grown economically in the middle of 20th century with the discovery of oil and later politically to become the capital city of the United Arab Emirates after the Union of the 7 Emirates: Abu Dhabi, Dubai, Fujairah, Ras al-Khaimah, Sharjah, and Umm al-Quwain in 1971 to form one country (1).

3.2 Abu Dhabi 2030 Master plan

Abu Dhabi 2030 master plan was designed and implemented in 2007 in order to plan, manage and describe the future growth of the city. The continued expansion of the economy, the rapid population growth, the liberalized real estate law, the significant foreign investment and the construction projects of unprecedented influenced the birth of this master plan. The challenges that the master plan 2030 faces are: the creation of a sustainable livable urban environment and guarantee a balance between the mixed cultures existing in the cities with the preservation of the cultural character and traditions of Abu Dhabi as an Emirati and Arab city (1).

Hence, the urban structure framework plan was produced to make Abu Dhabi match its current financial and social capital to become the "Urban capital" with an expected population of 2 million residents and 4.9 million annual tourist in 2020 and 3.1 million residents with 7.9 million of annual tourists in 2030 and up to 5 million residents after a continues growth (1).

It is important to note here the urban structure framework plan was not geographically limited by the administrative boundaries of the city, but included its urban region and furthermore its natural boundaries (2), as for the Lulu island which is one of the new zones of urban development: The Central Business District (CBD), The Capital District, the Grand Mosque District and the Lulu District (Figure 2).

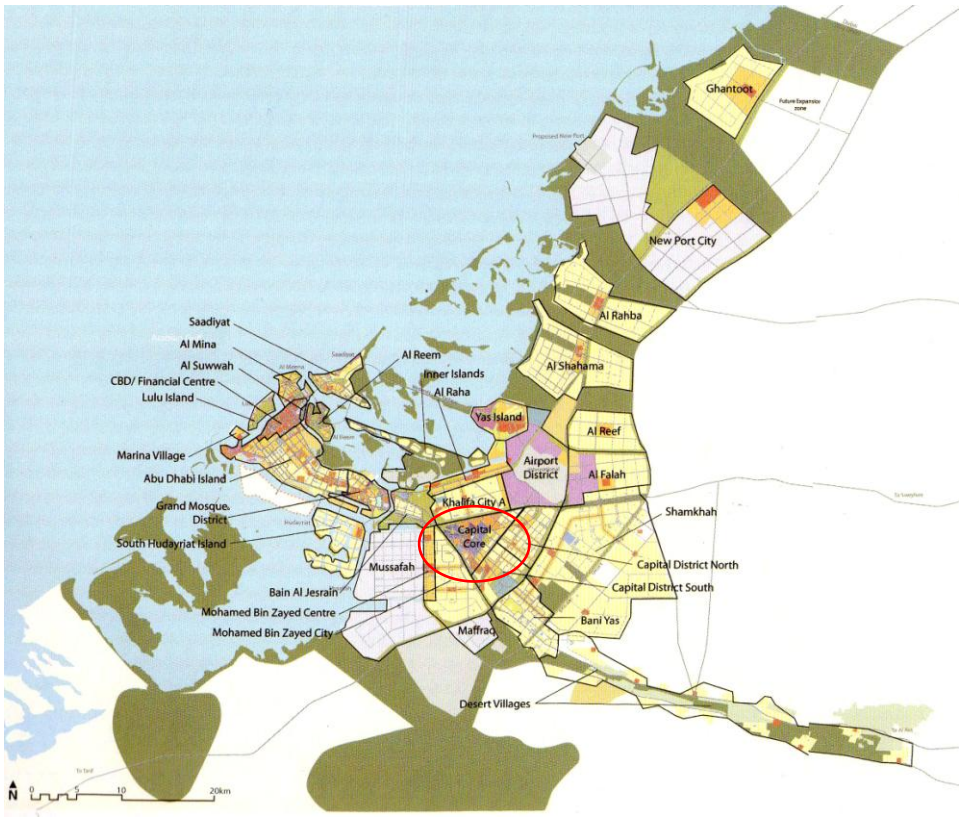

Figure 2.The location of the new zones of urban development. Source: The Abu Dhabi Urban Planning Council, 2007

These districts belong to the two major parts of the Abu Dhabi 2030 plan, which are connected by a developed transportation infrastructure based on the transit system. The first core is situated in the northeast of Abu Dhabi island and includes the historic center and the expanded Central Business District (CBD). The second one contains the new capital district located in the south of Abu Dhabi Island and will represent the second downtown of the city which will be designed to reflect the role and image of Abu Dhabi city as the capital of the federal government and a modern, sustainable Arab city (figure 3). Hence we are interested to take the capital district as a study case in this research.

Figure 4:The 3D model of the main square in the capital district. Source: Source: The Abu Dhabi Urban Planning Council, 2007

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3.3 Capital District

That capital district is planned on 45km2 of land for a population of 367,253 residents and 813,650 of daytime population and will provide 100,000 jobs (1). It is well connected to the first part of the city through highways, trams and metro networks. Its urban structure and urban forms are designed in way to orient its visual axes to the CBD and to end with the Federal Precinct that represent landmarks and important buildings not only at the level of the city, but also the nation (Figure 4).

Its planned sustainable compact mixed uses distributed in different heights and densities makes from the Capital city a good place for integration between Emirati people and other ethnic groups, between different working classes in the society and a perfect mix of different cultures. From one hand low rise buildings of universities, research centers, mosques, community neighborhood with all the necessary facilities, sports and conference venues, embassy neighborhood, and from other hand high rise buildings of offices and commerce, national governmental house and buildings (Figure 5). They are distributed in the 2030 master plan to six major precincts: Federal Precinct, City Center Precinct (CBD, Souk District, North Spine District, Federal Mosque District), Emirati Neighborhood, Sport Hub Precinct, South Spine Precinct and Palace Precinct, based on land use distribution, location to transit infrastructure, density, urban form and open space (2) (Figure 6).

Figure 5: land use map of the Capital district- Abu Dhabi 2030 Master Plan. Source: The Abu Dhabi Urban Planning council, 2007

4 METHODOLOGY

The software applied in this research is Depthmap by UCL and the map we used is the urban spatial structure of the capital district designed by the Abu Dhabi Urban Planning Council. We used Axial map in order to check the integration and accessibility related to visibility of open spaces and roads within the whole urban system of the capital district.

The author first created automatically the axial map from the drawing file of the urban spatial structure of the capital district (Figure 7). A segment graph was generated from the axial map in order to conduct a detailed analysis through a segment analysis smaller scale: streets The resulting graph was after that analyzed according to the connectivity, Integration, total depth, choice, node count, etc (8). Later on an analysis using metric type of radius was run.

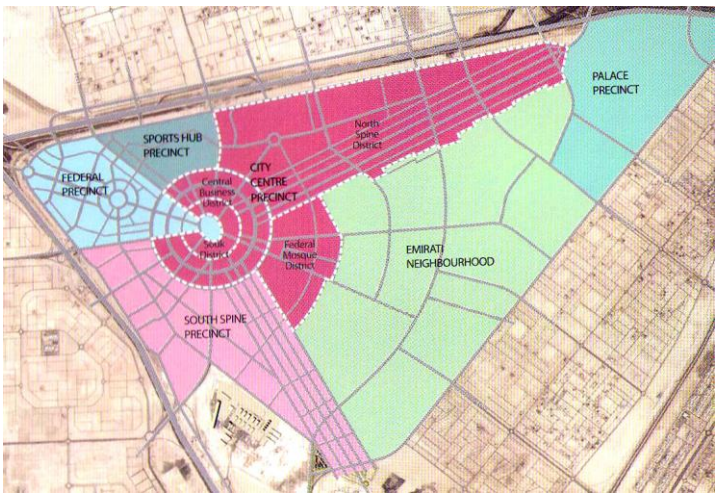

Figure 6: The six major precincts of the Capital District. Source: The Abu Dhabi Urban Planning council

The author chose 5mn, 10mn and 15mn of walking , which is equivalent to walk 400m, 800m ,1200m and cycling 7.5minutes and compare it with the walking and cycling map, which represents the tram and metro stops and the related 5mn walking distance from them, the streets hierarchy and the land use maps in order to identify which area from the capital district is well integrated in the whole system of the urban structure and more accessible and also to check if the walking distances proposed in the plan is enough to reach comfortably in an optimum time different destinations: open spaces and facilities, land marks, etc, especially in the hot climate of UAE.

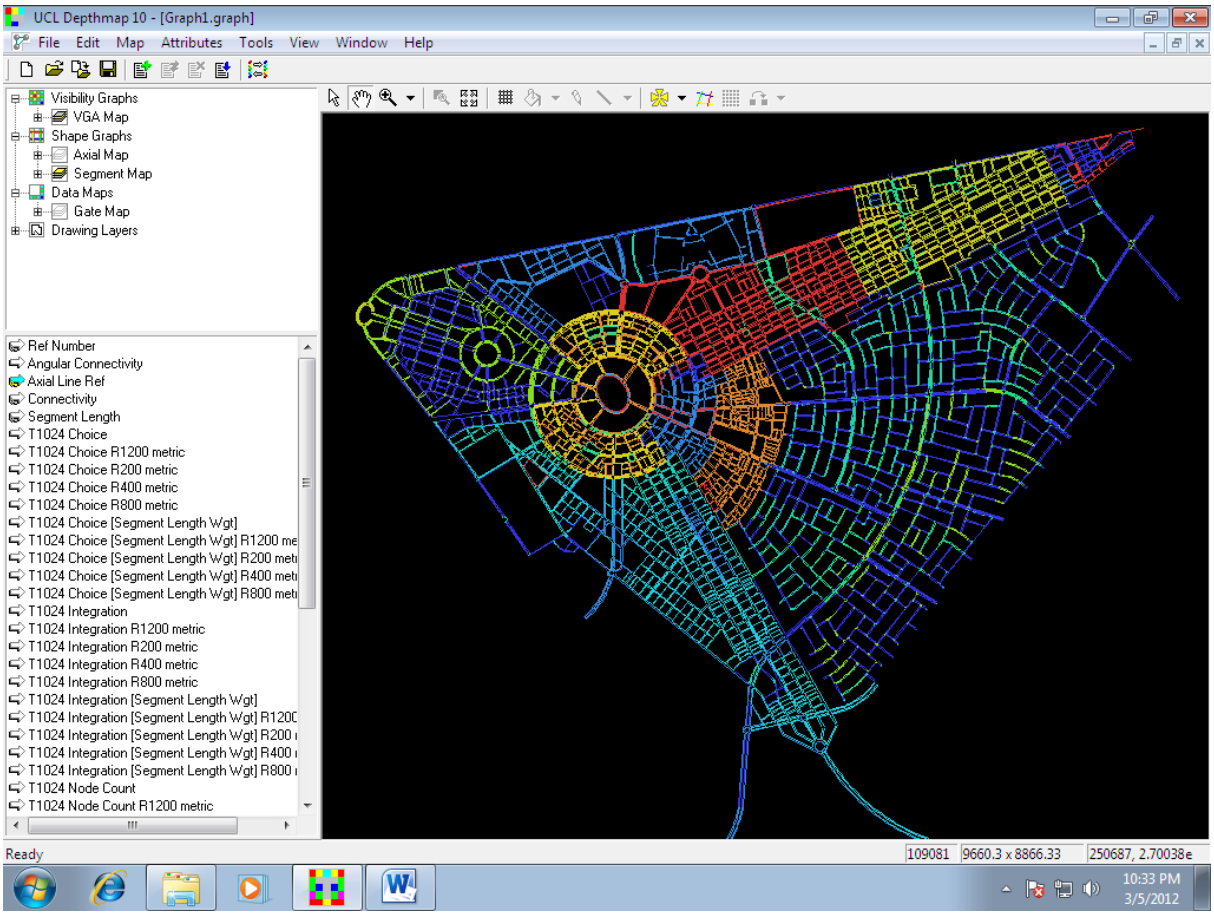

Figure 7: Axial lines references. Source: Rim Meziani, 2012

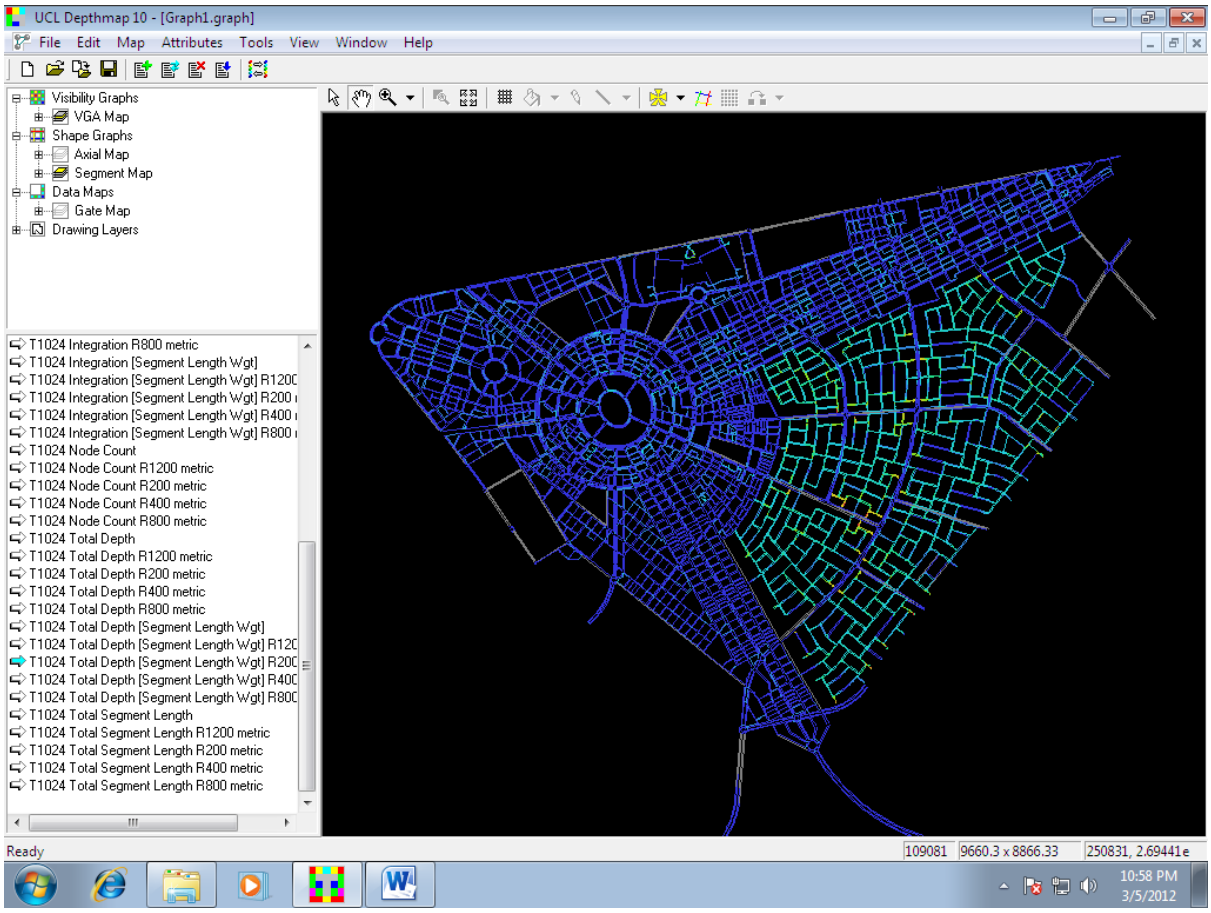

Figure 8 :Total depth -Segment length weight- R200 (5mn walk). Source: Rim Meziani, 2012

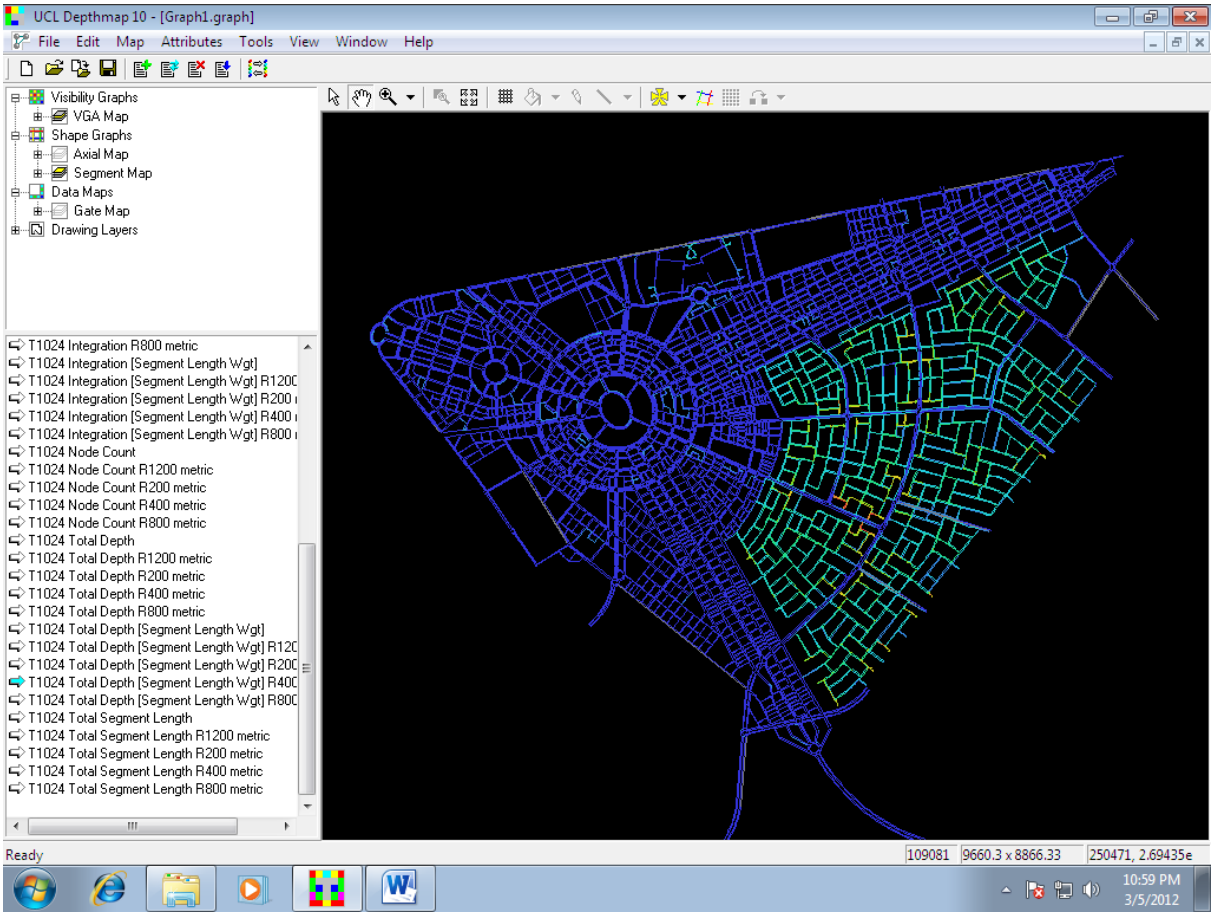

Figure 9: Total depth -Segment length weight- R400 (10mn walk). Source: Rim meziani, 2012

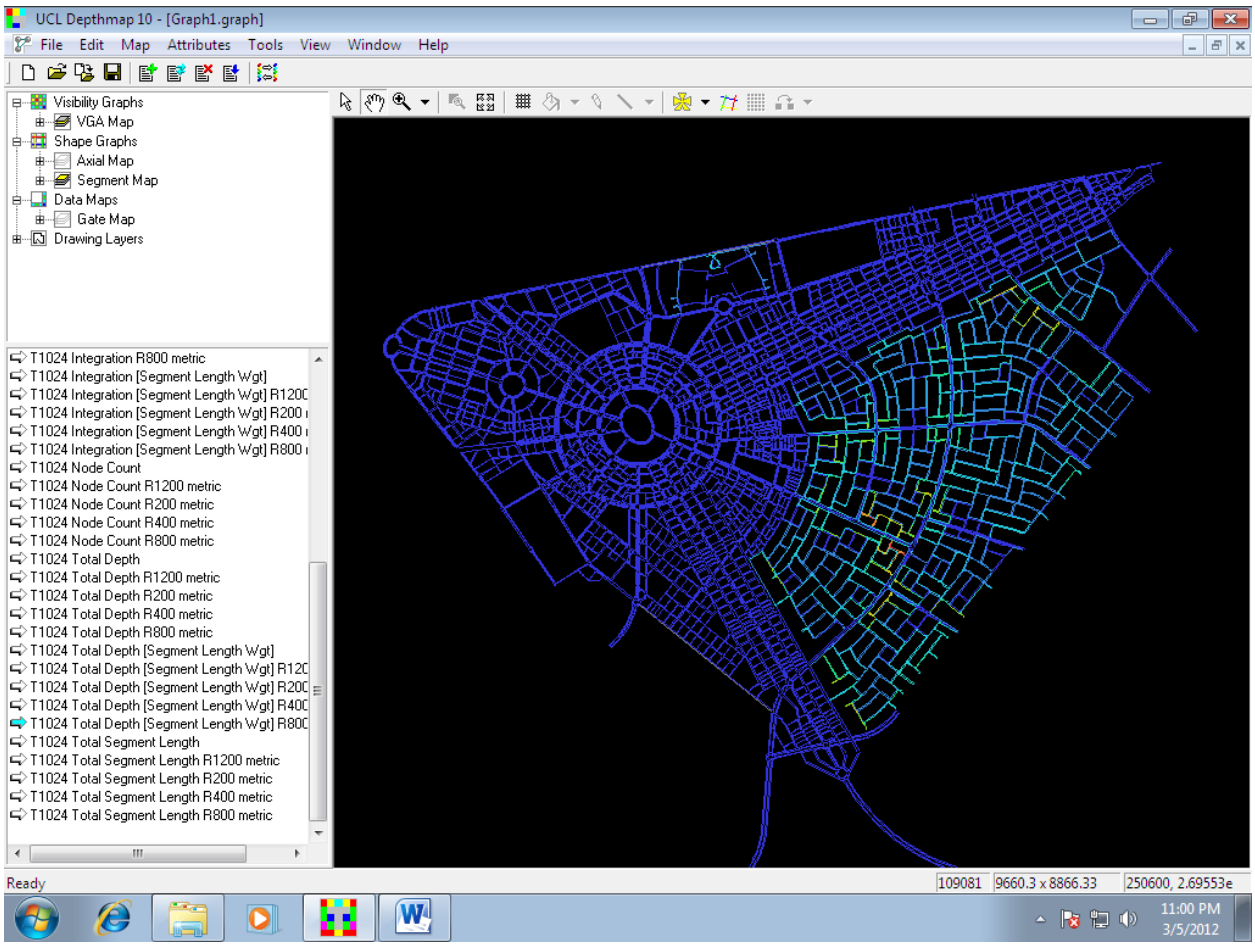

Figure 10:Total depth -Segment length weight- R800 (15mn walk). Source: Rim Meziani, 2012

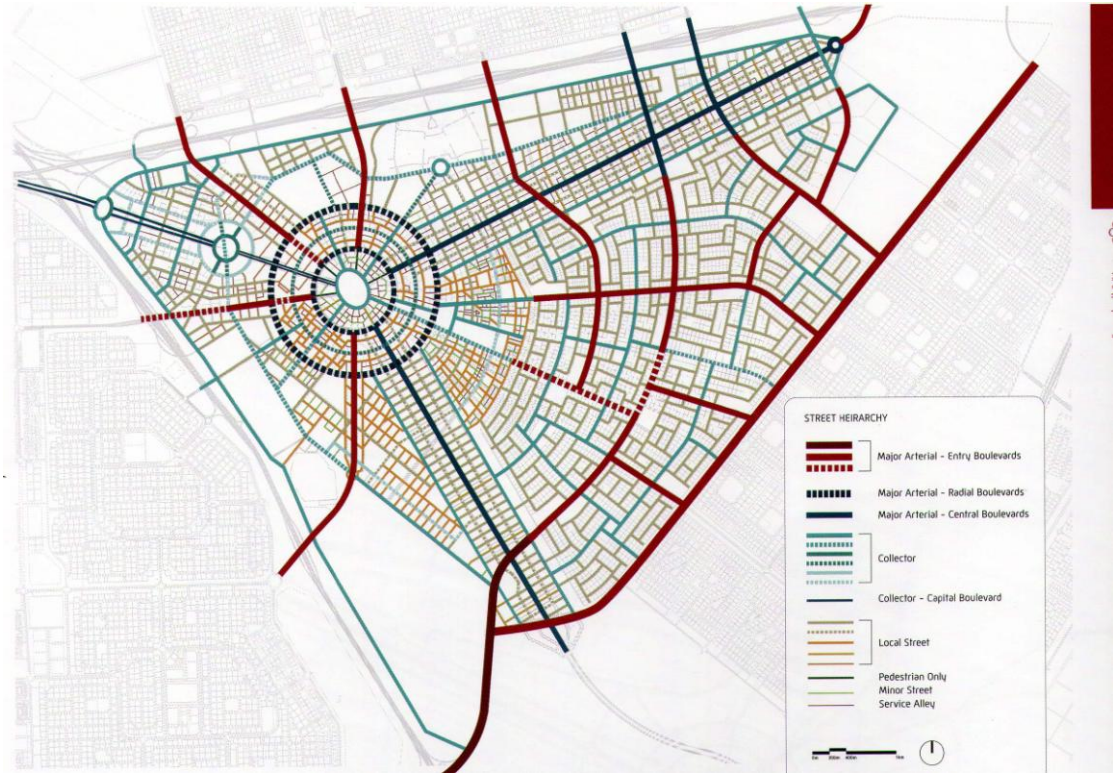

Figure11 : Street hierarchy of the Capital District. Source: The Abu Dhabi Urban Planning council, 2007

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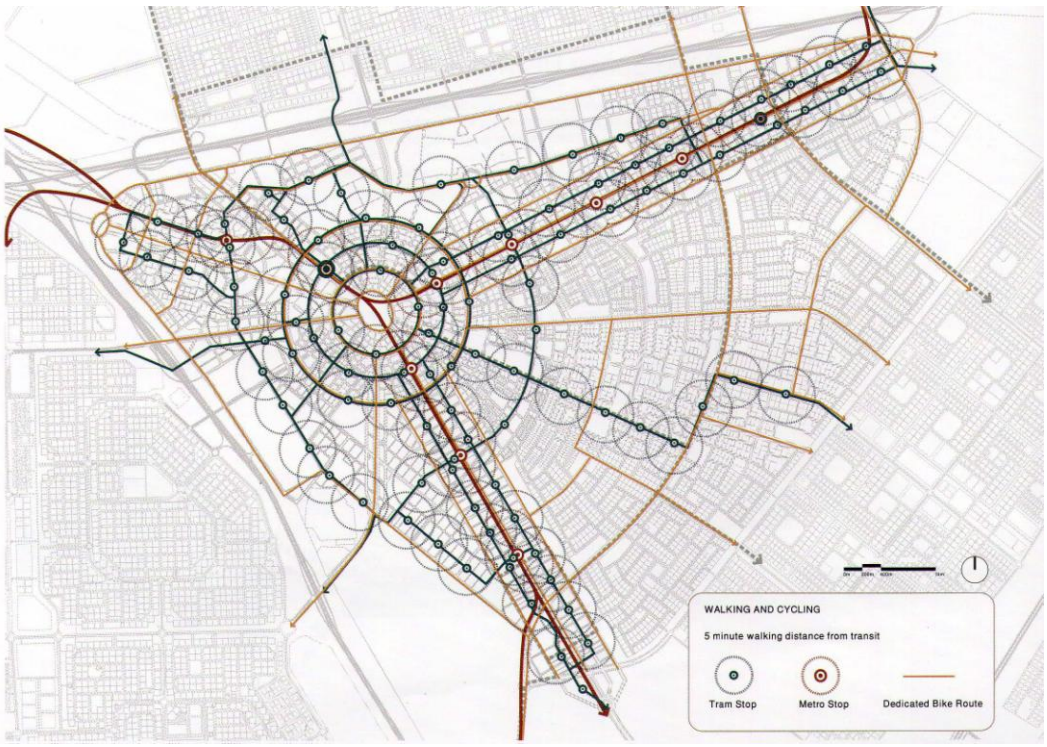

Figure12 : Walking and cycling map of the Capital District. Source; Abu Dhabi Planning council, 2007

5 RESULTS ANALYSIS AND FINDING

Before starting the analyze it is important to understand the meaning of the total depth. Turner (9) defined the total angular depth as: *The cumulative total of the shortest angular path to the segments.*

The total depth values are represented in the graph by a gradation of color by default from blue: Lowest value to green, to red: highest value. The total depth graph generated for the Capital district area (figure8) indicates that both collectors and local streets in the Emirati neighborhood (Figure11) has high value than the major arterial, which means that a large number of shortest path are connected to them.

Where comparing the total depth graphs (segment Analysis) for a radius of 200m, 400m and 800 meters that is equivalent to 5mn, 10mn and 15mn of walk (figure 8, 9, 10) , and the land use, the streets hierarchy maps with the walking and cycling map (figure 12) we found out that:

(1) The segments in the graphs with 200m, 400m and 800m radius (figure 8, 9, 10) related to the neighborhood area that represent the cycling routes and the major bus routes in the urban structure of the capital district have less total depth values (blue) that means that they have a small number of shortest angular paths connected within the walking distance mentioned above.

(2) The non residential land use planned in the neighborhood such as facilities for example: schools, mosques, healthcare, and open spaces are not always located near the public transportation stops. Knowing that riding bikes by the women is not popular because of a cultural issue, plus the hot climate represent constraints for cycling long distances.

(3) Only one major arterial entry boulevard and one collector have tram stops, which leave people with a long distance of walking. Furthermore, dedicated bike routes that are connected to the major arterial-entry boulevards, radial boulevards, central boulevards from one hand and to collector and collector-capital boulevard are the one with low value of total depth, which means that people will need more time to reach their destination, since they will take their bikes near by the trams and metro stations, and have to take a longer route. This does not promote the transit oriented model, at the contrary encourages the use of cars.

It is important to note here that 115.677 of the total expected daytime population and the 69.728 of the total residential population in the neighborhood precinct of the capital district (2) will circulate in and out in the neighborhood area. Hence, cycling routes have to be reconsidered and public transportations have to be integrated more in the neighborhood, in particular stations have to be planned near by the facilities at a optimum walking distance that is 5mn to 10mn. In this case, bus as a transportation mean will be a good

solution if extending trams and metro lines inside the neighborhood area is not possible for an economical or physical factors for example.

6 CONCLUSION

Depthmap by UCL was applied in this research and axial lines with an analysis of segment maps of the neighborhood area within the capital district, one of the most important district of the future development of Abu Dhabi was used together with land use maps, streets hierarchy and walking and cycling maps proposed in the 2030 master plan of Abu Dhabi of the urban spatial structure of the capital district designed by the Abu Dhabi Urban Planning Council in 2007. We used Axial map in order to check the integration and accessibility related to visibility of open spaces, facilities and roads within the whole urban system of the capital district and used the segment graphs for a detailed analysis at the level of streets.

We found out that that the proposed cycling and major bus routes and are planned far away from the facilities and open spaces that represent the major attraction points to the daytime population of the neighborhood which is planned as more than 100.000. The graphs showed that these routes have a small number of shortest path even walking 15mn, which does not help having a comfortable walk to optimize mobility and to raise the pedestrian movement growth all over the year and influence the livability of the city that is one of the goals of the future development of the city. Hence this part shall be reconsidered accordingly.

Encouraging walking and cycling under a hard climate such in the UAE cannot be made without providing climatic comfort, like cooling and shading through specific urban forms, good arrangement of buildings and open spaces, etc, and also urban scale street designs.

This paper presents a small part of a research that tries to cross three factors: 1) visibility of important buildings, open spaces, roads of the capital district, 2) buildings forms and arrangement and 3) the micro-climate, in order to propose kind of guidelines or orientations for land use, transportation planning, urban forms, etc which provides: 1) livable and pleasing walk paths in an optimum time to the city functions, 2) climatic comfort for pedestrian's walk, mainly shaded and ventilated streets and open spaces and 3) high visibility to landmarks, natural settings, national symbols and monuments, etc.

Even though this work focused on the neighborhood area of the capital district of the 2030 Abu Dhabi master plan due to lack of time, our target in further research is to conduct an analysis on the whole district including its 6 parts in order to study their interrelation and their integration in the whole system of the proposed urban structure of the capital district.

7 ACKNOWLEDGMENT

The author presents her thanks to Abu Dhabi Urban Planning Council which provided her with the data necessary to conduct this research and also to the Abu Dhabi University which funded this research and the author's participation to the REAL CORP 2012 conference.

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Wayfinding Performance of Visually Impaired Pedestrians in an Urban Area

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1 ABSTRACT

Movement from an origin to a destination within a city is an inevitable activity for all inhabitants, especially for those who are commuters. For the visually impaired, this movement task is a difficult activity, given inability to use visual properties and hence reliance on hearing and smell for navigation. This study seeks to determine the type of information that is acquired by the visually impaired to navigate from an origin to a destination. In essence the study is attempting to determine the wayfinding process in familiar environments among the visually impaired. An experiment with 12 totally visually impaired and 12 partially visually impaired students was conducted in Mashhad city. Our method is based on an analysis of wayfinding from a school for the visually impaired to a familiar destination in the urban area of the city. Questionnaire survey methods were used to determine reference points, which senses (hearing, touch, smell) were used and problems experienced in reaching the destination by walking. The key findings show that there are differences between the two groups in terms of their use of reference points, use of the senses and problems encountered on the wayfinding trip to the destination. The totally visually impaired displayed a reliance on touch, smell and hearing for gaining information from the environment, as opposed to the partially visually impaired who could rely on sight and other senses for their information. As a result of the study it is suggested that those who design aids for the visually impaired should have stronger experiences of the perceptions of the needs and problems encountered by the visually impaired during the wayfinding process. For urban planners and designers the results suggest the need for greater consideration of the problems and needs of the visually impaired in terms of street layout and pattern, pavement slope and material, and safety and security.

2 INTRODUCTION

Finding one‘s way is a significant task for individuals engaged in daily activities. However, being oriented in a place with regard to objects and knowing where to go next, and ultimately how to return, is a main concern for inhabitants and, in particular, the visually impaired. Orientation refers to an individual’s awareness of his/her position in the environment by maintaining the relationship to other objects (Hersh and Johnson, 2008). Sighted people in an airport would be aware of their position at that moment, similarly for the visually impaired who can hear the verbal announcement of the flights. But what about being in a large public space where there are no verbal announcements for blind users. Lack of information for the visually impaired about the potential to encounter different temporary obstacles or hazards, as well as deficiency in gaining information about distant landmarks, make wayfinding a serious problem for this target group (Loomis et al. 2001). This leads to not making independent journeys outside their neighborhood areas, or only to restricted or familiar areas (Clark-Carter, et. al, 1986).

The present study addresses path integration in a wayfinding process among a sample of blind and visually impaired students in a familiar area as regards both navigation-based and resource-based learning strategies. The questions the present study attempts to answer are whether blind and low-vision persons keep reference points in mind instead of visual cues, as opposed to those who are sighted. What are the characteristics of these reference points such as the type and frequency of usage of them among the blind and low-vision users separately? What sort of visual cues, if any, do low-vision students use? What are the other kinds of aids they may use? What is the dominant sense for the target group in deficiency of vision? How can street pattern influence the wayfinding process? And finally, how do blind students differ from low-vision students in their wayfinding process? To grasp the importance of information in visually impaired wayfinding, we hypothesize that one’s wayfinding process and, in particular, the reference points that are used depend on his/her ability of vision. In other words, if the user is visually impaired (either blind or low-vision), then reference points are used to obtain information in familiar environments. Accordingly, the main hypothesis could break down to a sub-hypothesis; if the user is blind, then the dominant sense is to rely on familiar

urban areas as a tactile experience. If the user is low-vision impaired, then visual cues similar to those used by sighted people are used for wayfinding. If the user is visually impaired, we argue that the grid street pattern is clearer and more legible for him/her in their wayfinding process. To test the hypotheses, we surveyed visually impaired students in a setting with which they are familiar in terms of the variety of landmarks and where they have a higher likelihood of using different senses. Furthermore, we clarify some definitions and related theories in wayfinding performance. In section 4, visual characteristics of the study area and respondents are presented. The relationship between reference points, familiarity, street layout and, ultimately, the problems encountered in the area are categorized in Section 5. The final section provides conclusions and directions for future work.

3 LITERATURE REVIEW

3.1 Wayfinding concepts

Wayfinding is the ability of travelling between locations either with an internal or external map of the environment (Kalia, 2009) as purposeful and directed movement from an origin to a specific distant destination (Allen (1999) and Golledge, 1999). Such behavior involve interactions between the traveler and the environment (Raubal, 2001). Further, wayfinding is a behavior (Bechtel and Churchman, 2002, p, 427) which cannot be successful unless you know where you are, know your destination and follow the best route to your destination, recognizing your destination and finally being able to find your way back (Carpman and Grant 1993). Thus, it is the process of collecting information from our built environment, to know where we are related to where we want to go and how to get there (Woyciechowicz and Shliselberg, 2005). In addition, wayfinding is one aspect of people's cognitive map knowledge which includes all aspects of encoding, processing, and gaining information about the environment (Blades et. al. 2002). Basically, two components of wayfinding are movement and decision-making (Xia et. al, 2008). Seamless integration of movement, perception and memory are required for successful wayfinding (Kalia, 2009). Indeed, path integration - obtaining information while walking- is one source of information for humans which assist them in determining their location in urban areas (Kalia 2009). Thus, wayfinding, a cognitive process (Golledge, 1999), can be defined as spatial behavior (Julian, 2010) that involves the ability to learn a route and retrace it from memory (Blades et. al. 2002), to move from an origin to a destination while maintaining orientation in and around objects, people, and spaces.

3.2 Commuters and the level of familiarity with the environment

Wayfinding or being oriented within an urban area is an important task which involves interaction among people and the environment while undertaking daily activities. It is of high importance especially when travelers are commuters -those who travel back and forth on a regular basis- and require frequent navigation within cities. Commuting enables people to live in areas and work in a place spatially separated from their living places (Heinen et. al, 2011). This would increase their familiarity with the environment through which they are travelling as they regularly travel to and from a particular place. As familiarity with an environment increases, performance in wayfinding and spatial orientation tasks improves (O'Neill, 1992). Understanding and awareness of surroundings provides a sense of security for individuals (Kaplan, et. al, 1998 and Cutting, 1996). Therefore, users' feelings of safety follow from understanding a place, and familiarity, in turn, can increase this feeling. Commuters regularly follow the same order of routes or use the same reference points to recognize their ways. Nevertheless, people may choose different reference points, and landmarks may vary depending on the environment they are moving through (xia, et. al, 2008).

3.3 Reference points

According to Lynch (1960) inhabitants have a shared image of their resident area. A clear image of the city makes it possible for the users to navigate freely within urban areas. Familiarity with a neighborhood can be defined as having a "clear image". A clear image of the environment makes it possible for individuals to know the spatial position of places they are traveling through. Hong (2007) notes an interesting point on the five elements Lynch proposed- edges, nodes, landmarks, districts, paths. He stated that one similar function among all the five elements is geo-referencing. This indicates the role of image these elements have in a users' cognitive map to be utilized as a "reference point" (Hong, 2007). In other words, to have a clear image of the environment one requires knowing and storing the spatial relations among the five elements within an

urban area that is similar to the "anchor point" theory of Golledge (1999). "Anchor point" theory indicates spatial relations of landmarks, familiar districts and path segments as laying the foundation on which other information is anchored in cognitive maps. As an image develops based on a two-way process between man and environment (Lynch, 1960), it can be strengthened by either the perceiver to be retrained or the surrounding be reshaped. In addition, disorientation can take place when landmarks are unavailable (Dudchenko, 2010). But what if the user cannot see the surroundings properly?

3.4 Visually impaired and spatial information

Regardless of loss of vision or being visually impaired, obtaining information from the environment through which navigation is performed is important for commuters and would be a prerequisite for them. One needs to know the spatial relations between self and object as well as updating that to perform an efficient wayfinding (Turano et al. 2005). This information can be taken in two different ways, either from knowledge in the environment or knowledge in one's head (Raubal, 2001). Nonetheless, vision plays a primary role and provides plentiful information for helping the wayfinder to orient oneself in regard to spatial relations among objects. Previous studies on the visually impaired show that there are two main levels that the blind and visually impaired use to attain knowledge for orientation and mobility, namely perceptual and conceptual (Ungar et. al, 1996; Schloerb et. al, 2011). "Mobility" refers to being able to move from one point to another safely and efficiently (Hersh and Johnson, 2008). Hill and Ponder (1976) define it as the capacity to move, the readiness and the facility to move. This will involve negotiating any obstacle in sidewalks which would be temporary or any unexpected change in direction. "Navigation"refers to travelling from one place to another by using mobility skills while keeping oriented in relation to the purposeful course (Hersh and Johnson, 2008). At the perceptual level, other senses perceive information due to lack of vision or certain ability to overcome the impairment in the best way (Schloerb et. al, 2011; Goldstein 1999). The conceptual level focuses on developing strategies for mapping of space and generating an orientation path (Schloerb et. al, 2011). Furthermore, according to Hersh and Johnson (2008), and related studies, there are two perspectives for gaining spatial information; navigation-based learning and resource-based learning strategies. The difference between these two processes lies in experiencing the environment. Whereas in navigation-based learning the user experiences the environment directly, in resource-based learning information is acquired from diverse sources like TV, maps, asking others, or for the visually impaired from tactile maps, braille newspapers and so on. In spite of this, however, visually impaired users express their spatial knowledge differently in comparison to sighted people. As an example, Bradley and Dunlop (2003) stated that visually impaired provide more information while they were describing a path they have taken in comparison with sighted people. This difference in expression also differs among different visual impairments (ie. peripheral vision loss, central vision loss and so on) (Bradley and Dunlop, 2003 and 2004). Blind participants and central vision loss, for instance, asked more questions regarding steps, distance, and obstacles along their way in comparison with peripheral vision loss participants (Bradley and Dunlop, 2004).

To recapitulate, the present study addresses path integration regarding navigation-based learning and resource-based learning among a sample of visually impaired students at a perceptual level of orientation in a familiar urban area.

3.5 Street patterns

Zannaras (1976) suggested that city structure has an important role in urban images. On the other hand, Appleyard (1970) and Lynch (1960) declared paths as the main elements and organizer of a city. A street pattern has diverse forms and varies from star-like, linear, circular, treelike, radial, grid to an irregular pattern (Heinzle et. al 2006, Marshall 2005, Zhang, 2004,). A grid pattern makes the block similar and Hall & Poterfield (2001) stated that a feature of the grid network that makes it successful is the predictability of intersections. They noted this feature as providing cues and reference points for users in wayfinding processes. From an urban planning view point, the grid layout provides permeability in addition to preventing rotating districts (Design guide, 2005). The grid pattern has some privileges as it is also characterized by highly connected streets with shorter distances, and more route choices (Southworth and Ben-Joseph, 2004).

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Editors: Manfred SCHRENK, Vasily V. POPOVICH, Peter ZEILE, Pietro ELISEI

4 DATA AND METHODS

In Iran unlike many other countries (e.g. Finland) visually impaired children without additional handicaps are educated in special schools distinctively designed for them. The respondents in the present study are students from such a school - a school for the visually impaired. The selected study area (Fig. 1) includes the educational area of a visually impaired high school in Mashhad City. The setting encompasses the school as the central focus, and approximately 500 meters away from the school is a well-known intersection named "Faramarz Intersection" (Fig. 2). There are three strip malls close to the intersection in addition to a clinic, two banks and several retail shops such as a bakery, fruit shop and supermarkets. In general, medium-income citizens are living in Faramarz district.

Fig. 1: The setting

Fig. 2: Reference Points

The street pattern in the surrounding area of the school is a typical rectangular street in a "grid-like" pattern which is converted to cul-de-sacs for vehicles. This pattern supports row houses and low-rise apartments in the Faramarz district. Faramarz Boulevard functions as a "Connector"route type, which is a main road in a connective grid network of the district that brings the stream of traffic in a hierarchy from the "cul-de-sacs" and "spines" to the "Fredosi Arterial Collector" (Fig. 1). Thus, the area consists of similar blocks and intersections. The education area is approximately one hectare which includes two schools for girls and boys, with separate dormitory facilities for those who come from rural areas or the suburbs.

4.1 Respondents and procedure

The survey's target participants were students in the Blind and Low Vision school of "Taghva" and "Omid "- two high schools for visually impaired students for females and males respectively. A group of twelve 15 to 18 year old girls and an equal number of boys within the same age range were selected for the study. Half the students from each group were totally blind and the others were low-vision impaired (N=12 blind, N=12 low sighted). All respondents were asked to come to the school library individually and answer a questionnaire survey. It was conducted in Persian and divided into 4 parts; selected socio-economic characteristics (age, gender and education), questions regarding landmarks or reference point for the target group, questions regarding wayfinding performance which, in turn, consisted of questions based on path preferences and their behavior in a new environment as well as finding their way in difficult situations without any aids and, finally, questions about the use of their senses to figure out how they are performing wayfinding given their deficiency of vision. A pilot survey was initially undertaken at the same schools to better develop the questionnaire survey. Having completed the interviews, the researchers took photos of the reference points that respondents mentioned and then categorized these with respect to height, color, and function.

Gender	Visual impairment	Frequency	Age		Years of Education		Years of blindness	
			Mean	Age	Mean	School level	Mean	Years(min-max)
Female	Blind	6	18	15-21	3.2	1-4	7.35	0[1]-21
	Low-vision	6	16.5	14-19	2.8	1-4	12.25	10-19
Male	Blind	6	18.5	15-22	3.5	1-4	6.5	0-22
	Low-vision	6	17.5	15-20	3.1	1-4	14.30	13-20

Table 1: Characteristics of respondents

Table 1 shows the characteristics of sample respondents. A diverse group of blind and low-vision sample respondents allow us to investigate hypotheses regarding relationships between visual impairment and reference points as well as the utilization of different senses. The average age of the sample is similar with a mean age of 17.6, as is the frequency of male and female visual impairments. Sample respondents were fairly homogeneous with respect to age and education. For example, they were all high school students from level one to four and the mean school level was 3.1 which indicates most of them were in their third year of high school. Years of blindness depicts the minimum and maximum years that respondents have suffered visual impairments. It varies from birth to four years for the female low-vision students and from birth to two years for the male low-vision students. For the blind respondents visual disability mainly appeared after birth.

5 RESULTS

This section describes the relationships among reference points, street layout and familiarity revealed by the sample of blind and visually impaired students. We find that the level of visual impairment among the sample, plus previous familiarity with the setting, generates differences in how they behave and perform wayfinding in an urban environment. Descriptive statistics (Chi-Square and Cramer's V) are used to test for association and correlation on predominantly categorical data.

5.1 Reference points

There were several reference points that the visually impaired sample students utilized, and were presented to them as visual cues in wayfinding performance including a Braille pavement, bakery, strip Mall, supermarket and fruit shop, bank, and finally school walls (table 2). We note here that the sidewalk in Faramarz Street is facilitated with the Braille pavement from the intersection to both "Taghva" and "Omid" schools. Interestingly, the reference points differ in how they are used by blind or low-vision students. Around 67% of low-vision students indicated the "Braille Pavement" as a reference point in comparison with the blind students (33.3%). However, the blind students, and most of the low-vision students, preferred not to walk on the "Braille Pavement" because of the uncomfortable feeling that it generated as a result of harsh materials and breaks and bumps on the surface. The smell (aroma) emanating from a bakery was one of the main guides for students, particularly for the blind students (60%). Strip malls (8.3%), the supermarket (12.5%) and school walls (12.5%) were other cues for both groups. Approximately 67% of the blind students, in comparison with the low-vision sample, made use of the school walls by touching them when

[1] (0) denotes being blind from birth.

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getting closer to their school. They find it different from other walls due to the painting on the wall that makes the brick walls become smooth and even; therefore, they used tactile senses (Fig. 1). Among all the elements mentioned by the student sample, the "Bank" was one of the main landmarks they indicated (25% of blind and 41.7% of low-vision students) followed by the bakery, Braille pavement, supermarket, and school walls. ATM's were also a reference point for them particularly for the low-vision sample as they stated that the queue of people is a clue for them. It is also worth noting that the "Bakery" and "Bank" were cues mentioned by about half (50%) of the blind student sample, this was followed by the supermarket and school walls. It appears from the data that the reference points the target group can use to pinpoint their location in the urban area are more related to senses other than vision. Even though low-vision students named banks (41.7%) as cues, (which have different forms and functions in comparison to residential buildings that can be distinctive for them), they rely more on hearing people's sound. In other words, it is not the façade or the shape of the building that is functioning as a clue for them but the sound of crowds of passing people or people passing along commercial buildings such as the strip malls.

Our data highlights a significant finding - while all the blind respondents find using the Braille pavement helpful, most of the low-vision respondents (66.7%) did not find it practical. Further analysis shows that they prefer to have different colours on the pavement to help them get around the city. Some visual impairment leads to not being able to see some colors like white and gray. Thus, respondents made requests for the use of colors in urban areas; for example, at stairs to guide them to find out where the steps are. This suggests the use of suitable colors in walkways to be used as a guide for the visually impaired. Colour should be distinguishable even in the high light at noon or the lower light during night time. Therefore, this would require the sidewalks to have a high contrast with the environment and background, and indeed avoid using colours that are not suitable for color blind people. The most common type of colour blindness is "red-green" such that dark green, for instance, may appear black to them (Hersh and Johnson, 2008).

The respondents were asked to describe what they imagine in the selected study area around their school to focus on the cues they utilize as reference points for their wayfinding. The researchers categorized the elements indicated by respondents in terms of frequency and types (table 3). Among all the respondents 75% named "Hatami primary school" and "street trees" in Faramarz Avenue. "Hatami School" is a primary school located close to the "Taghva" and "Omid" school (Fig. 2). Almost half of both blind and low-vision respondents mentioned "Hatami School" because of the sounds of playing at school in the morning before entering the school, or at noon when they are going back home. Another obvious element for the respondents was street trees. Faramarz Avenue is green with trees on both sides of the street as well as the middle island (Fig.1). Trees, in general, are ideal elements for the target group.

They can feel the freshness and smell of trees or grass and enjoy walking in walkways equipped with green facilities. People waiting in line at a bus stop are another cue for the low-vision respondents in the area surrounding their school. In addition, they experienced other alternative cues like the bleeping sound at pedestrian crossing walkways which inform them of safety to cross the street (Fig. 2). This suggests that this target group should be equipped with devices focusing on the hearing sense. On balance, an urban area should also have a plentiful distribution of green facilities for the target group. There are two major reasons for this; first, the good feeling they get while walking along a green walkway results in a sense of security, and second; green facilities function as an insulator of sounds from vehicles and according to what the respondents stated, they get confused in a busy area full of vehicle noises and cannot continue walking.

What are the reference points you keep in mind when finding your way between Faramarz junction and the school?			
	Blind (%)	Low-vision (%)	Total (%)
Braille pavement	33.3[2] - 8.3	66.7 - 16.7	100 - 12.5
Bakery	60 - 25	40 - 16.7	100 - 20.8
Strip Mall	50 - 8.3	50 - 8.3	100 - 8.3
Supermarket	66.7 - 16.7	33.3 - 8.3	100 - 12.5
Bank/ATM	37.5 - 25	62.5 - 41.7	100 - 33.3
School walls	66.7 - 16.7	33.3 - 8.3	100 - 12.5

Table 2: Landmarks and reference points

[2] Note: The first percentage value represents the row percent; the second percentage value represents the column percent.

Describe your imagination during your way when finding your way between Faramarz junction and the school?			
	Blind (%)	Low-vision (%)	Total (%)
Park	66.7 - 16.7	33.3 - 8.3	100 - 12.5
Shops	100 - 8.3		100 - 4.2
Hatami School	44.4 - 33.3	55.6 - 41.7	100 - 37.5
People waiting at bus stop		100 - 16.7	100 - 8.3
Street trees in Faramarz st.	55.6 - 41.7	44.4 - 33.3	100 - 37.5

Table 3: Cues utilised as main reference points

Table 4 highlights that bus stops (50%) and counting junctions (33.3%) as a cue for the blind respondents in contrast to high buildings (41.7%) and shops (50%) for the low-vision respondents. It is significant that the blind student respondents rely on cues that are more related to other senses like hearing the sound of people waiting in line for the bus as opposed to low-vision student respondents who try to rely on their vision but also need to use other senses. As an example, low-vision student respondents were not able to see the height of buildings but they can see the buildings shadow and felt cool in the shade. In addition they heard about the specific strip mall, for instance, that is located close to the intersection. So they knew the approximate location of some buildings. Most of the respondents, whether blind or low-vision, had some familiarity with different buildings, besides residential ones, in the area as their friends or parents accompanied them only for the first or second trips there. Most were afraid of entering a new area and heavily rely on their parents for describing the area to them as part of their first timid steps in visiting a new environment. Gradually they try to understand the whole area but still do not have the confidence to perform an individual trip. Although gender differences are not a focus of this study, it is likely that the fear of entering a new area decreases more among boys as they have more confidence in exploring new areas.

Which factors help you more to find your way?			
	Blind (%)	Low-vision (%)	Total (%)
High buildings		100 - 41.7	100 - 20.8
Bus stop	85.7 - 50	14.3 - 8.3	100 - 29.2
Counting junctions	100 - 33.3		100 - 16.7
Shops	25 - 16.7	75 - 50	100 - 33.3

Table 4: Factors that assist in wayfinding

5.2 Wayfinding process

A chi-square test was performed to find the relationship between being blind or low-vision and the approach respondents would take to find their way when they get lost. In order to reduce the options for the question of "How would you find your way when you get lost?" there was a pre-test which summarized responses into the two categories - "asking residents" and "keeping in mind some elements as clues". As highlighted in Table 5 the chi-square value is 6.171 with p-value of 0.018; this implies a statistically significant relationship between the two groups we are comparing. Those with total blindness are being used to asking residents in these situations (83.3%) while different pattern is repeated for the low-vision students. Most of them try to keep in mind some landmarks or reference points as visual cues to assist them find their way (66.7%). The overall pattern seems being based on social matters. On the whole, it seems best that neither of the respondents want to ask others. They prefer to perform independent trip however, those who are blind got more stresses and cannot remind the clues they had previously used in such situations. Low-vision students seems to be more confident and try not to ask anybody but keep going to reach to their visual cues. Not using any devices like the white cane, has such drawbacks for them but calming down the car noises, utilizing suitable materials in the Braille pavement, using tactile graphics on walls, using reasonable size characters on the signs with high contrasts in colour would be definitely helpful for the target group.

How would you find your way when you get lost?			
	Blind (%)	Low-vision (%)	Total (%)
Ask residents	71.4 - 83.3	28.6 - 33.3	100 - 58.3
Keep in mind some elements	20 - 16.7	80 - 66.7	100 - 41.7

Table 5: Association between level of blindness and reference points to find the way

To be able to obtain the exact reference points used by the target group, other than understanding the differences in their wayfinding performance, we asked some similar questions but in a different way. For instance, in addition to the previous questions which were based on landmarks the following question was asked in another way to find out the cues they refer to (table 6). It is amazing that only 25% of the blind

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respondents reported that they rely on the Braille Pavement; however, they all mentioned it as a practical and useful element in their wayfinding process. This finding suggest that the blind respondents do rely on the Braille pavement but they do not want others to believe they have a disability and are therefore inclined to be more independent. Table 6 reveals that the majority of respondents (87%) rely on their sense of hearing in getting closer to their school. This includes either the sounds of children playing or the pedestrian bridge beside the "Hatmai" primary school. The reason for mentioning the pedestrian bridge is that they hear people going up and down the bridge when they get closer to it.

How do you understand when you are getting closer or reaching to school?			
	Blind (%)	Low-vision (%)	Total (%)
Braille pavement	100 - 25		100 - 12.5
pedestrian bridge	50 - 25	50 - 25	100 - 25
children's noise in the Hatami school	40 - 50	60 - 75	100 - 62.5

5.3 Senses

To answer the question of which senses do the target group rely on with a deficiency of vision, some parallel questions were asked of the respondents. To figure out whether they use the sense of smell, all the respondents trust their sense of smell (100%). They recognize the bakery before passing it or the fruit shop and the flower shop as well. It is noteworthy to mention that these shops function as cues for them in their trips as being commuters. The two principal factors the target group realizes by entering an open space or intersection in the city are the sound of a crowd sound and the noise of vehicles, and at the same time feeling a vacant or open space (table 7).

Table 8 highlights that, among those who answered 'yes', the overwhelming majority are blind respondents who indicated that vehicle noise helps them in their wayfinding. Among those who answered 'no', the differences between the blind and low vision respondents are less marked. For these latter respondents, vehicle noise meant they were not able to concentrate as well on their current location and perform wayfinding within a busy environment. This was true among almost all the low-vision respondents (91.7%) and most of the blind respondents (66.7%). In contrast, these two target groups were satisfied with the crowd sounds 100% and 58.3% respectively (table 8). Crowd sounds would only become devastating for them when it becomes too high or noisy that would confuse them of understanding their spatial location. Otherwise, it helps them understanding where the others are to make decision of what space it would be (i.e. for example, whether they are passing a mall or it is a school they are passing).

How do you understand when you reach a junction or an open space in the city?			
	Blind (%)	Low-vision (%)	Total (%)
noise of vehicles and the sound of a crowd	54.5 - 50	45.5 - 41.7	100 - 45.8
feel a vacant and open space	46.2 - 50	53.8 - 58.3	100 -54.2

Table 7: Reliance on sense of hearing

Do noises from vehicles and the sound from crowds help you in wayfinding?						
	Blind (%)		Low-vision (%)		Total (%)	
	Vehicles noise	Crowd sound	Vehicles noise	Crowd sound	Vehicles noise	Crowd sound
Yes	80 - 33.3	63.2 - 100	20 - 8.3	36.8 - 58.3	100 - 20.8	100 - 79.2
No	42.1 - 66.7		57.9 - 91.7	100 - 41.7	100 - 79.2	100 - 20.8

Table 8: Use of vehicle noise and crowd sound in wayfinding

To sum up, hearing is a sense that a sizeable proportion of the respondents get help from. It follows that devices which make use of hearing sense would be ideal for these respondents; however, we did not test different devices on respondents, that is the subject of a future study.

5.4 Problems

Table 9 illustrates the problems that blind and low-vision student respondents have in the selected study area. A comparison between the two groups indicates that the blind generally feel unsafe and did not find the walkway to be of good quality. Unevenness, inundations and steps of pathways were three often mentioned problems (most of these are due to poor maintenance). On the other hand, low-vision respondents, in most cases, were not satisfied with signage (83%) and barrels on the pedestrian walkways (67%). The problems encountered by the low-vision respondents were the result unexpected and temporary obstacles on the sidewalk such as temporary digging for water pipes or even cars that are parked in front of houses. They

indicated that they are afraid of not recognizing these obstacles or of colliding with them while walking as part of the wayfinding process. Generally, the blind student respondents require a flat sidewalk while low-vision respondents have a need for special signage with larger letters and suitable colors to be placed in advance of the obstacles. Further, the visually impaired respondents indicated that they do not intend to use any aids such as a white cane, thereby enabling them to be just like other pedestrians. The absence of a cane means they are not recognized as being visually impaired. However, non use of a cane can become a high risk for this group when they are crossing streets.

What problems do you have on pedestrian pathways?			
	Blind (%)	Low-vision (%)	Total (%)
unsuitable walkway	72.7 - 66.7	27.3 - 25	100 - 45.8
barrels on the pedestrian pathways	33.3 - 16.7	66.7 - 33.3	100 - 25
unsafely	100 - 8.3		100 - 4.2
lack of suitable signage for visually impaired	16.7 - 8.3	83.3 - 41.7	100 - 25

Table 9: Visually impaired and problems encountered on pedestrian pathways

5.5 Street pattern

With regard to street pattern most of the respondents prefer to pass through straight streets (table 10). A grid pattern or straight street pattern is generally a much easier pattern to learn and experience; however, the low vision respondents in particular seem to like to walk through curvilinear paths, thereby adding an element of mystery and exploration (of diverse alleys) to the wayfinding process.

Do you prefer to walk through a curvilinear path or a straight one?			
	Blind (%)	Low-vision (%)	Total (%)
curvilinear	20 - 8.3	80 - 33.3	100 - 20.8
straight	57.9 - 91.7	42.1 - 66.7	100 - 79.2

Table 10: Visual impairment and path preference

We used Cramer's V test to indicate if there is a relationship between the level of disability of visually impaired (blindness or low-vision) respondents and taking the same or different path. The test statistic for Cramer's V is 0.458 with a p-value of 0.025. In other words, being blind or of low-vision has an effect on choosing the same or different path. Table 11 indicates that a high proportion of blind student (92%) respondents always use the same path while is the reverse tends to be true for low-vision respondents. Half of the low-vision students take either of the paths; however, compared with the blind students almost 86% of the low-vision students take a different path in going to and returning from the school.

Do you prefer to walk through a different path or the same path?			
	Blind (%)	Low-vision (%)	Total (%)
same	64.7 - 91.7	35.3 - 50	100 -70.8
different	14.3 - 8.3	85.7 - 50	100 - 29.2

Table 11: Visual impairment and path preference

6 CONCLUSION

This study underscores the relationships between visual impairment- being either blind or low-vision- and the reference points the target group utilizes in comparison with the visual cues used by people with sight. The reference points the target group have utilized in our study –bakery, diverse retail shops like the flower shop or fruit shops, ATM's, "Hatami" school, street trees, school wall, pedestrian bridge, and the Braille pavement- were all related to those senses other than that of vision. Low-vision student respondents and showed similarity to the blind respondents in selecting some common cues such as the bakery, flower shop, crowd noise, street trees, and "Hatami" school. Moreover, the principal sense that both groups relied on was hearing. The sense of hearing was the principal sense they utilized and this is in contrast to our hypothesis that the sense of touch would be predominantly used. Further, smell emanating from particular shops such as the bakery and flower shop proved very practical in guiding them to understand their current position in relation to other elements in the area. It can be concluded that wayfinding aids for the visually impaired were based primarily on reference points that one can hear such as the cluster of people at a mall, and in some cases smell such as that emanating from a bakery.

Our findings suggest enhancements to the quality of life of the target group in the selected study area regarding reference points they gain information from to continue their walking and wayfinding. One immediate outcome is the need to insulate walkways with green facilities to reduce the problem of noise.

Sound-proof green facilities allow the target group to be relaxed as well as to feel safe while concentrating on their walking. In terms of street pattern, the target group indicated they were afraid of exploring curvilinear paths even though some of them, particularly among the low-vision student respondents- were inclined to experience different paths. Based on this finding, one suggestion is for city planning officials to avoid designing complicated curvilinear paths, especially in areas which are likely to be used by the visually impaired.

6.1 Future works

This paper serves to assist those who design aids for the visually impaired to understand their behavior in the simple case of a familiar environment. They can plan for methods to be utilized that make use of the dominant sense of hearing to assist the visually impaired in their daily trips and in experiencing new environments. Future study will need to focus on diverse tools the target group could use to support their movement in unfamiliar settings. More research is required on signage -size and characters– and considerations for the color-blind and various low-vision users. Urban Planners and designers should consider the needs of the target group in performing not only daily trips but also exploring new settings through facilitating walkways free from unexpected obstacles or barrels. Designers should consider the size and color of the signage for low-vision or color blind pedestrians.

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reviewed paper

Without Planning? Incremental Emergence of High Density Mixed Use Centres in Mega Manila

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1 SUMMARY: EMERGENCE OF MULTI-TIERED POLY-CENTRAL AGGLOMERATION BY MARKET FORCES

Regional Growth patterns. Metro-Manila, also referred to as the National Capital Region (NCR) of the Philippines, is composed of 16 cities and one municipality and is home to about 12 million residents. The conurbation Mega-Manila includes Metro-Manila and several provinces in its periphery. It has been the traditional focus of the national economy and is continuing to grow beyond 26 million, more than one fourth of the country's population. Its recent spatial development patterns can be described as: 1. Expansion at the peripheries mainly north and south due to topographical context, 2. Growth of higher density areas from the core out into the region and increases in densities of centre cities 3. Growth of regional cities skewed towards the direction of Manila, 4. Land use segregation and primarily horizontal developments at the periphery - but notably with heightened densities for the various typologies, 5. Expansion of urban centres with increasing compactness, densities and land use mix, 6. Emerging new centres and centre clusters at locations with preferential access. (For 1-3 compare: Corpuz, Art 2010).

New, distributed compactness. Urban centres are increasing in density and expanding geographically, and high-density integrated clusters are starting to develop at transit stations. Pedestrian circulation and the acceptance of public transit, especially of the younger middle class, are increasingly significant. Despite high temperatures and tropical rains, outdoor activities for public gatherings, festivals, markets, concerts and daily activities such as al-fresco dining, taking a stroll along a shopping street and a park, children's play in parks and playgrounds, jogging etc. are becoming more visible. This seems true for all strata of the broad low-middle-high middle class and has a tangible impact on the urban environment. Commercial, entertainment areas and malls are starting to add multi-level outdoor spaces, plazas and pedestrian streets and landscaped sidewalks with shops at ground floor levels. The desire to live in these mixed use centres, being able to avoid traffic congestion, as well as a new young middle class that can afford small condominium units and investments by overseas workers are drivers of residential high-rise and integrated developments.

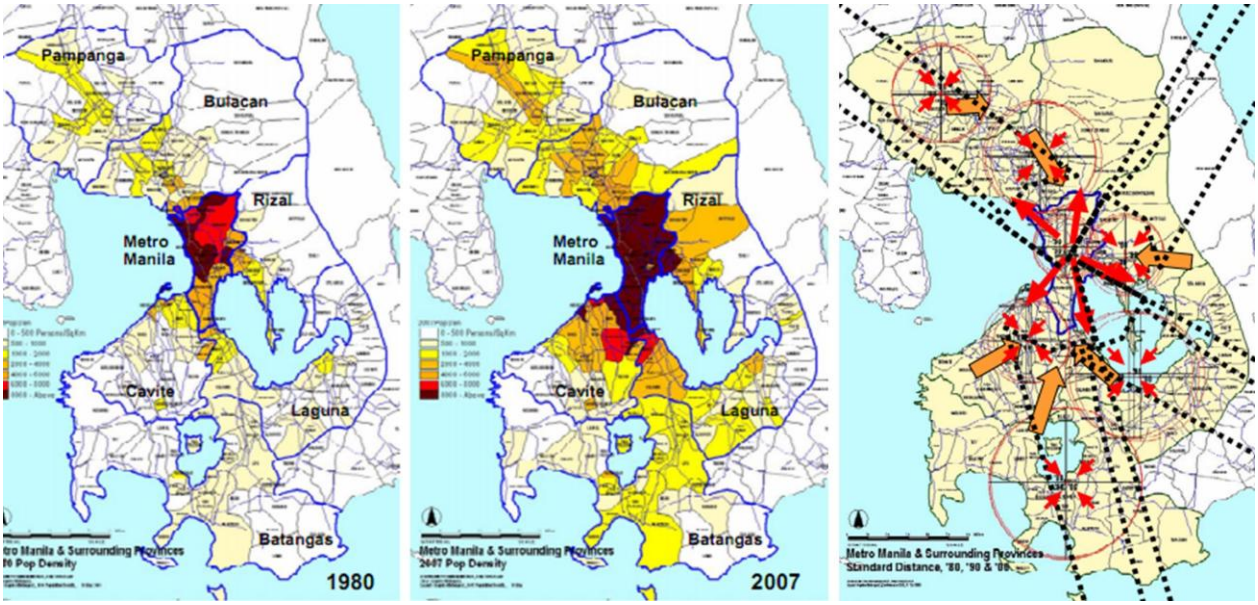

Image 1: Mega Manila population density and spatial development trends. Source: Corpuz, Art 2010.

A multi-tiered, poly-central region is emerging one could almost say 'naturally' following market demand. This appears consistent with a more compact and eco-efficient land use pattern. Market forces, however, inefficient, seem to be the primary driver with private sector initiatives guiding as well as following lifestyle preferences in their competition to attract customers. Although individual city and land use plans exist, formal, institutionalized planning seems to play a marginal role due to a weakness of implementation as well

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as the lack of an effective metrowide plan. But there appears to be a renewed recognition for inter-municipal coordination e.g. the recently announced Metro-Manila Greenprint 2030 initiative in March 2012. Metro Manila and its surrounding provinces continue to face many pressing problems (e.g. traffic congestion; lack of affordable housing, open space and recreational areas; increasing risk from natural and man-made disasters; poor air quality). But thepotential for more active and purposeful planning to guide and support current development trends and opportunities is increasing even as it remains unfulfilled.

2 PLANNING SYSTEM: DEVOLUTION VERSUS CENTRALIZATION, PLANNING VERSUS IMPLEMENTATION

Devolution following centralization. To understand why governmental, institutionalized planning at the regional level is relatively weak, one must understand a basic aspect of administrative culture and look at a specific piece of history following the ouster of former President Marcos in 1986. The landmark Local Government Code of 1991 devolved administrative powers to local government units. That included selected tax resources and responsibilities for providing a defined set of comprehensive services to the local community. The result has been unprecedented local autonomy, particularly for cities and municipalities, at the expense of metropolitan and regional institutions. The benefits accruing from local autonomy are clear—including greater local participation and stewardship and potential for bottom up innovation—although it has also led to a fragmented planning and governance structure to the extent that a federal system has been proposed as an intermediate level to overcome the challenges that have risen from devolution.

Barangays. Below the city level and sometimes only a few blocks in size, is the Barangay level, which can translate into the local village or neighbourhood level. Barangay administrative authority is limited to its relatively small area of jurisdiction but its leaders (Barangay Captains) can sometimes wield significant political power especially if they are closely allied with the City or Municipal Mayor. In some cases this leads to fragmentation of planning and implementation, which tend to fall along local political alliances and corresponding decision making processes.

Cities/Municipalities. Formal planning authority, particularly land use planning and zoning, lies with cities and municipalities. Local plans are ratified by provincial and regional committees and in some cases the national level Housing and Land Use Regulatory Board, but as a whole, cities and municipalities enjoy substantial autonomy in local governance and planning. Nonetheless, local land use and development plans appear to have had limited impact on development. Only a minority of plan, projects and activities identified in local plans (about 15%-30% according to one provincial level study) have been budgeted and implemented. And the key contstraints relate to inconsistent planning practices and processes, lack of enforcement and political interference. Typically, the weak planning and implementation role of government has allowed private developers, especially those with relatively large landholdings, to drive urban growth trends and directions with their large scale developments. These include the provision of public transportation and other infrastucture, land use management, and other quasi-public services.

Metro- /Mega-Manila. One of the major casualties of local autonomy is the Metro Manila Development Authority (MMDA). Once at the leading edge of metro-level governance, planning and management (prior to the passage of the Local Government Code), the MMDA now has limited legislative and executive authority, with jurisdiction only with respect to a few metro-level concerns such as selective transportation management, waste management, flood control and a few other tasks. Current plans to extend two light rail lines and the addition of another line are in place but these are under the jurisdiction of national agencies (i.e. Departments of Transportation and Finance). No substantive strategy exists as far as the structure of Metro Manila is concerned and it appears that without further major intervention, it will develop according to the incremental impacts of various uncoordinated and separate sectoral investments (i.e. public works, transportation and communication, tourism, etc.) driven by national level agencies and the private sector. Mega Manila, meanwhile, has no formal status and authority or organizational body and is used solely for statistical purposes and planning considerations.

Provinces and Regions. Formal planning exists at the provincial, regional and national levels. The National Economic and Development Authority (NEDA) is responsible for making long and medium term national development plans and, through their regional development offices and councils, regional development plans. Each of the 14 regions of the country includes clusters of the provinces. Regional councils are

administrative and planning organizations without political mandates and are governed by representatives of local governments and national agencies, with the regional NEDA office serving as technical secretariat.

Mega-regions. Like other administrative regions, Regions 3 and 4 have their own regional development plans and each of their component provinces have provincial development plans. Because Regions 3 and 4 surround Metro Manila, they are collectively referred to as "Metro- Luzon"--one of four so-called Mega-regions in the country. Metro Luzon forms the economic core of the country, accounting for the bulk of national economic output. Metro Luzon is used only for planning and statistical purposes, primarily by NEDA.

Opportunity of alliances for planning? It seems that key challenges for Metro and Mega Manila are the coordination of fragmented plans of their constituent local governments and with implementation. Many local government units have limited financial resources to provide for relevant infrastructure. At the regional and national levels, enforcement of regulations, successful financing mechanisms, implementation of plans and cohesive decision-making through the various administrative levels and lining up budgets and financing of projects following integrated plans is severely constrained. And yet despite these challenges, there is a discernible trend within Mega Manila towards a consolidation of a multi-tiered spatial structure with higher densities, compact centres and public transit links. If inter-municipal cooperation as well as coordination among large private sector players and involved institutionals can be organized effectively, then the opportunities to build on and enhance this trend through more efficient planning, financing, implementation and enforcement are likely to produce even much greater results.

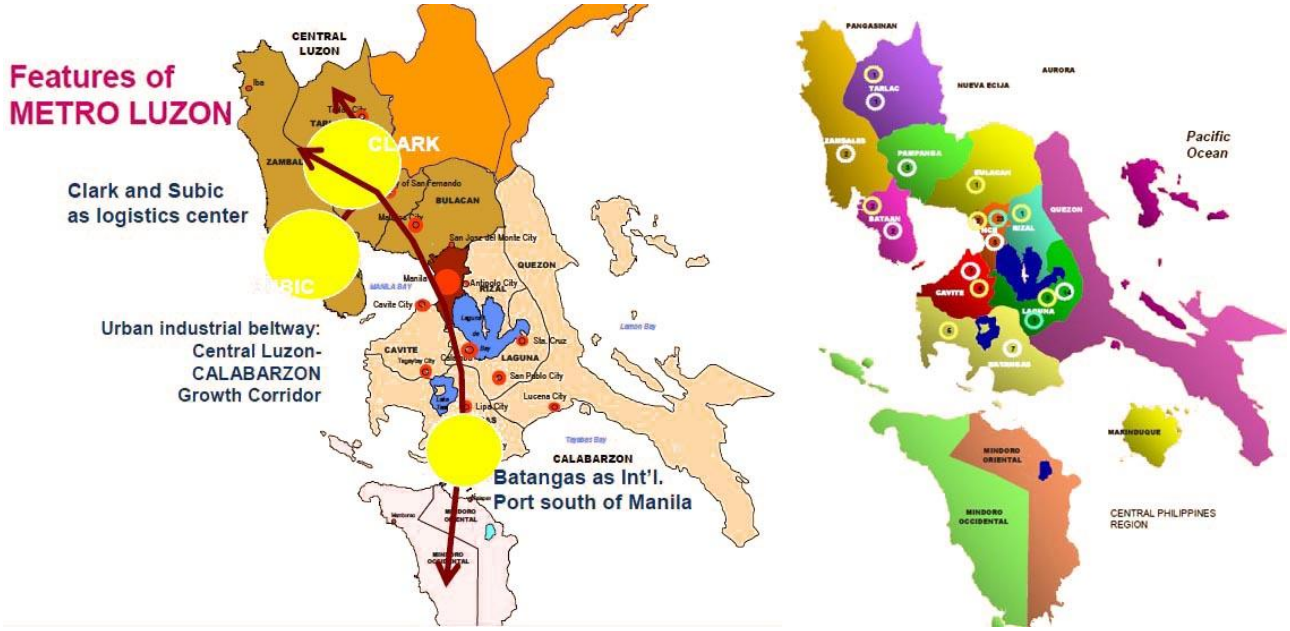


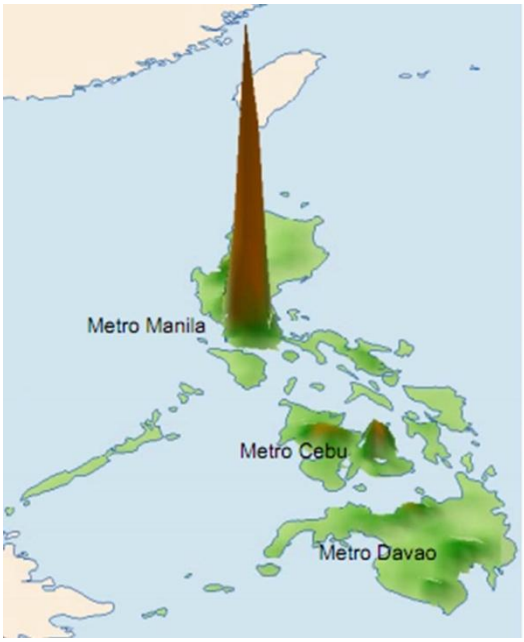
Image 2: Metro-Luzon "Super-Region". IT parks and SEZ's. Source: NEDA 2006.

3 CONTINUED GROWTH OF METRO- AND MEGA-MANILA AND METRO-LUZON: THE NATION'S FOCUS

Economic growth. Following the Asian crises in 1997 the Philippine economy has fully recovered and grows at a rate of 4%-7% annually. Selected sectors are driving the country's income namely BPO (business process outsourcing often referred to as call-centres), manufacturing of consumer electronics for export, tourism, mining, agriculture, furniture, trade, logistics. Also the growing number of Overseas Filipino Workers (OFWs) and their remittances to their families have become a significant contributing factor to the national economy and domestic consumption. All these promote urban development and, in particular, the real estate business industry in the capital region.

Concentration of economy in Manila Region. Most of the economic activities continue to locate in the larger Manila region creating jobs and attracting new residents. One third of the country's GDP is generated in Metro-Manila, even more than one half in Metro-Luzon and 26% of the 102 million Filipino population reside in Mega-Manila. This trend allows for a regional economy of significant scale with synergies and efficiencies as various economic sectors cluster in this region. The flip-side is that such concentration

burdens technical and transportation infrastructure as well as the integrity of the physical environment. Social disparity and spatial polarizations are also more apparent. These are severe challenges which require solutions at the regional and local levels.



Region	Population Density (persons/sq km)			GDP at current prices (in million pesos)	
	2007	2000	% Increase	2006 1/	2000
Philippines	**260**	**225**	**15.6**	**6,032,624**	**3,354,727**
NCR (Metro Manila)	18,650	16,033	16.3	2,244,705	1,179,471
Region IVA - CALABARZON	707	561	26.0	692,904	469,477 2/
Region III - Central Luzon	451	381	18.4	463,833	263,944
Region VII - Central Visayas	403	359	12.3	417,046	236,043
Region I - Ilocos	349	323	8.0	172,724	103,376
Region VI - Western Visayas	332	301	10.3	396,833	218,779
Region V - Bicol	282	258	9.3	147,773	86,430
Region XI – Davao Region	204	180	13.3	263,832	195,198
Region X - Northern Mindanao	194	172	12.8	276,456	124,525
Region IX - Zamboanga Peninsula	189	181	4.4	134,813	78,196
Region XII - SOCCSKSARGEN	170	143	18.9	195,866	84,720
Region VIII - Eastern Visayas	168	155	8.4	137,334	81,003
ARMM	129	86	50.0	53,038	31,285
Region II - Cagayan Valley	108	100	8.0	105,960	73,830
Region XIII - Caraga	107	98	9.2	76,360	48,907
Region IVB - MIMAROPA	86	78	10.3	124,245	
CAR	78	70	11.4	128,901	79,541

Image 3: Visualizing Economic Density in the Philippines. Source: Corpuz, Art 2010 / World Bank. Population and GDP per region. Source: http://www.nscb.gov.ph/factsheet/pdf08/FS-200806-SS1-01.asp

4 SPATIAL DEVELOPMENT AND LOCATION PATTERNS IN METRO MANILA: DENSER, HIGHER AND MORE MIXED IN THE CORE

Expansion with higher densities and centre-clusters at the periphery. Compared to previous peripheral developments in the region, recent growth at the fringes are of higher densities. Even with single family subdivisions, lots tend to be smaller and thus lead to higher density developments. Mid-rise and in some cases even high-rise residential and office developments are now visible in new clusters at the periphery, e.g. the consolidation of Alabang Town Center in Muntinlupa City as it expands as a commercial and business centre with some high-rise office and housing. The average density of Metro Manila is about 20,000 people per square kilometer and some of the higher density core areas are twice to three times this level.

Expansion, densification and completed mix in existing centers. Mature centres, including the largest in the country (Makati and Ortigas) as well as others such as Binondo (Chinatown), Ermita/Malate etc, are likewise evolving with new developments that have a wider mix of uses (residential condominiums, offices, hotels, and entertainment and cultural facilities), higher densities (due to the continuous appreciation of land values) resulting in more compact urban forms.

New centre-clusters in the region's core at transit stations. High density mixed use clusters are emerging along the main arterial corridors of Metro Manila especially the ring roads EDSA and C5 and in proximity to transit stations. Typically developed with high-rise condominiums and shopping malls, these clusters are also attracting high-rise offices mostly catering to the BPO industry and leisure facilities. Examples are Pioneer Highlands, East Avenue Station, Magallanes Station and the Taft Avenue Corridor along the LRT2 line.

Limitations of transport and transit lead to constraints of centre locations. The current public transit system falls short of Metro Manila's requirements. Plans and budgets for two LRT line extensions are currently being worked out. This is a good start, but significantly more rail-based transit as well as BRT are needed, along with more effective management of other public and semi-public transportation services such as buses, minibuses ("jeepneys"), and tricycles. The demand for more transit lines is likely to increase, especially if traffic congestion worsens but even at current growth levels.

Image 4: Metro Manila Transit: One MRT, two LRT and two regional rail lines. Source: www.johomaps.com & www.urbanrail.net

5 MAIN DRIVERS FOR DENSITY AND COMPACTNESS: HIGH-RISE RESIDENTIAL AND OFFICE DEMAND

The overall economic growth the country has been experiencing over the past decade has accelerated activities in urban and real estate development and private investments.

Sectoral industry growth, especially the BPO industry, manufacturing of electronics for export, MICE, tourism and generally the service industry continues to create demand for space in various market segments:

- Demand for smaller condominium units by a growing young middle class with jobs in the BPO, manufacturing and services sectors.
- Demand for office space for BPO in lifestyle-themed places that are popular and accessible for young professionals; competition among BPO developers and locators have encouraged deconcentration even as the large metropolitan areas of Metro Manila and Cebu remain the preferred cities of address because of the availability of higher level services and transportation infrastructure.
- Demand for hotel rooms for a growing number of business travellers, MICE participants to Manila as well as recreational tourists visiting the country's abundant and picturesque beach destinations.
- Demand for retail, f&b and entertainment space mostly in integrated locations with higher densities.

OFWs have been sending remittances to their families at home, enhancing purchasing power for commodities and real estate products; Many OFWs directly invest in condominiums preferably in high rise mixed use developments similar to those in the foreign countries where they work.

With savings and cash reserves increasing, well to-do families are buying luxury condominiums in premium locations as investments in light of property price appreciation as well as to add to their personal portfolios a downtown residence in parallel to suburban single family residences.

6 EMERGING MULTI-TIERED CENTRES STRUCTURE WITH NEW TRANSIT ORIENTED CLUSTERS IN METRO MANILA

A differentiated centres hierarchy is emerging in Metro Manila following the general trend of increasing densities. Noticeably, the importance and relative weights among centres are shifting according to incremental developments and expansion of the core areas.

At the top of the list are two CBDs that serve as the primary, national-level centres of business in the Philippines: Makati and Ortigas (1A and 1B, with an estimated 3.5 and 1.5 million office gross floor area, respectively). Both have experienced robust growth with Makati clearly leading in terms of quality and coherence of development as well as delivery of services. The "new star" rising among Manila's centres is Bonifacio Global City. This 340 hectare, master-planned mixed-use urban district was developed starting in the mid-1990s and is rapidly becoming the preferred business and residential address of the metropolis; it is

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approximately 30% built-up and, because of its proximity to the Makati CBD, may be expected to merge with the Makati to form the largest CBD of the country. A few second tier centres like Binondo Manila's Chinatown and others are in the process of incremental redevelopment through private investors that have added high-rise residential and office developments and upgraded retail malls. A major question mark concerns the future of the large scale reclamation area in Manila Bay that started with much promise many years ago but remains at the functional fringe of the primary CBDs of Metro Manila.

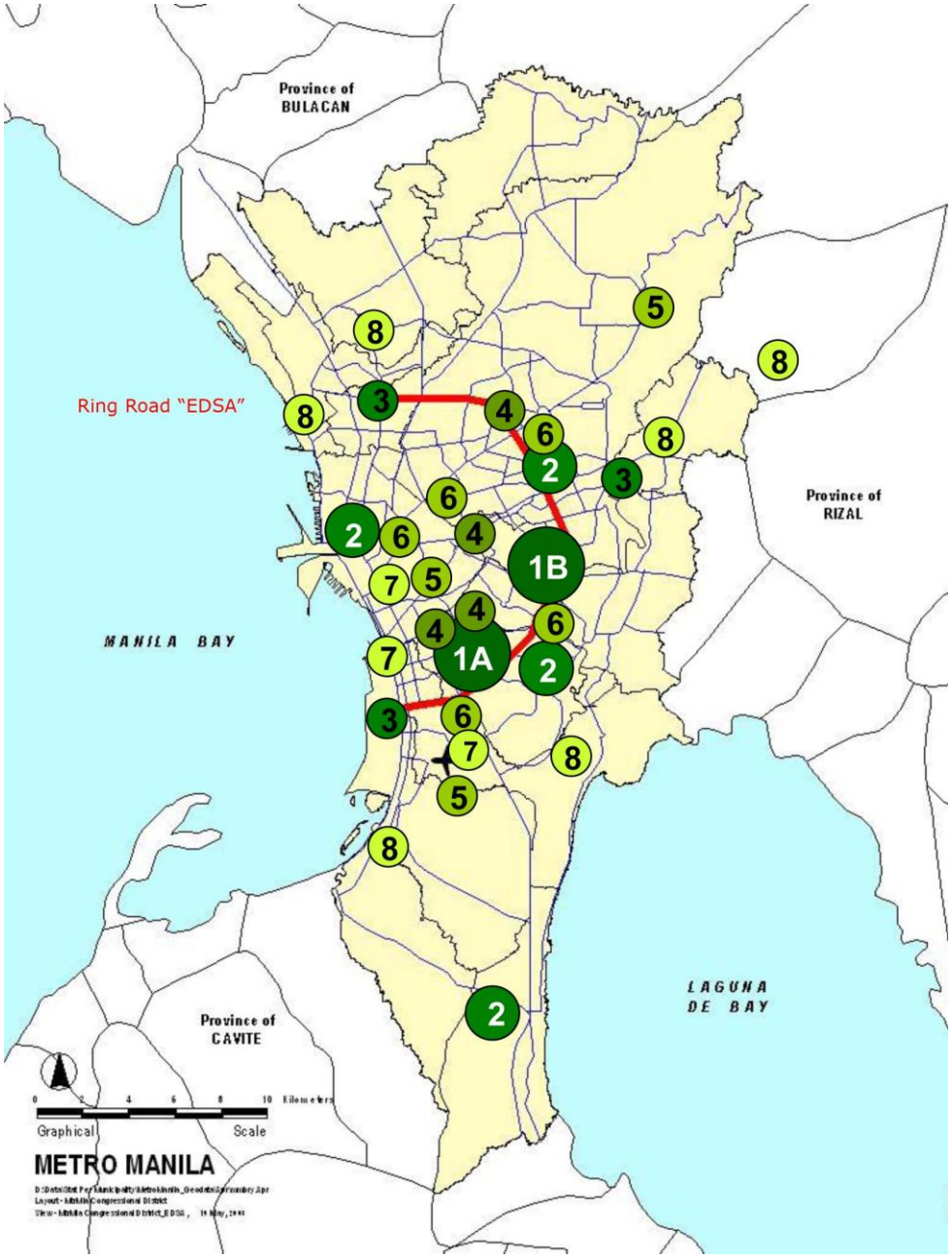

Image 5: Mapping Metro Manila's centres according to the hierarchy suggested above. Source: Art Corpuz

The current multi-tiered hierarchy of centres may be described as follows:

(1) Primary CBDs with international and national businesses and linkages, shopping, F&B, entertainment, residential, medical, government, hospitality, culture (Makati: 1A, Ortigas: 1B - Future: Makati + Bonifacio Global City 1A+, Ortigas 1B)

(2) Second tier CBDs (Bonifacio Global City (at present), Binondo-Divisoria, Cubao, Alabang)

(3) Centers with critical mass and mix that are focused on commerce (Manila Bay Reclamation with Cultural Center and Mall of Asia, Eastwood, Monumento, etc.)

(4) Mixed-use clusters and -developments as satellites to first tier CBDs or at arterial roads (Jupiter, Rockwell, Greenhills, North Triangle, etc.)

(5) Centres focused on government and institutions (Batasan Government Center in Quezon City, University Belt, NAIA Airport Complex, etc.)

(6) Emerging transit-based high-density mixed-use clusters (Pioneer/Boni Avenue, East Avenue Station, Quiapo, Magallanes Station, Banawe-Sta Mesa, etc.)

(7) Centres focused on entertainment, commerce, hospitality (Newport-Resorts World, EDSA / Roxas Ermita-Malate, etc.)

(8) Mixed-use districts and city centres, typically mid- and low-rise higher density (City centers of Taguig, Pasay, Pasig, Antipolo, Marikina, Valenzuela, Malabon, etc.)

Image 6: Makati CBD Skyline. The Nation's first and primary address for national and international businesses. Source: Stefan Rau.

Image 7: Ortigas Center. Metro Manila's second top tier CBD anchored by ADB, San Miguel and major malls. Source: Stefan Rau.

Image 8: Pioneer / Boni Avenue at EDSA. Emerging mixed-use cluster based on transit station of MRT line. Source: Stefan Rau.

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7 METRO MANILA'S SHOPPING MALLS: COMPLETE INTERNALIZED CITY CENTRES – FOCUS OF URBAN LIFE

In discussing Metro Manila's centres, one needs to note the special relevance of shopping malls to the local culture in order to understand their extraordinary importance to public life compared to other countries. Local governments, through devolution, are tasked to provide a variety of public services and yet in many cases they have been unable to deliver—because of lack of funds, capacity and other resources. One key element that has not kept up with the increasing demand brought about by the increasing population and affordability is contemporary public spaces that can serve as centres of civic activity and public services. In its place, privately owned and operated shopping malls have become urban and civic centres in their own right where retail and other events that would typically happen in public spaces take place. Further, these malls are air-conditioned, an aspect that shouldn't be taken too lightly given the tropical climate. More important, the malls have become increasingly complex and complete in their mix of retail, food and dining, entertainment, professional, medical and educational services, cultural activities, and even religious worship. Undisputably, they have become the location of choice for all kinds of service providers, both public and private.

The church, the tax official, the car-registration office, the notary public, the attorney, the clinic, the hair-dresser, classrooms are next to the bingo-hall, retail stores, market stalls, supermarkets, food courts, restaurants, bars, movie theatres, farmer's markets, realtors, game-rooms etc. creating a complex, completed world that one hardly needs to leave. Malls have become the primary spaces of public life in Manila. And not surprisingly, malls have become attractors and catalysts for high-density developments with offices, residential and hotels.

8 PREFERENCES FAVOUR PUBLIC OUTDOOR SPACES

A fairly recent trend that can be observed is that public outdoor space is re-emerging as accepted places for public life, gatherings, al-fresco dining, cultural and entertainment events, markets, sports and recreation. Despite the unavoidable heat and rain of the tropics, pedestrian-based activities in public parks, plazas and sidewalks are becoming popular across a broad section of the middle class and across ages.

This trend and lifestyle preference is affecting a wide range of urban typologies. Shopping malls are adding outdoor spaces or are being reconfigured altogether to focus on green space. New malls are being designed around open spaces with open galleries blurring inside and outside spaces. Roads and sidewalks are being redesigned from being purely transportation corridors to becoming main-streets with improved sidewalks and added shops and show-windows on the ground floor, sometimes requiring modifications or even in violation of traditional zoning restrictions.

Image 9: Makati "Greenbelt". Open spaces and galleries are focus of new Malls. Source: Stefan Rau.

In new developments pedestrian-friendly design is being planned from the start, e.g. the case of Bonifacio Global City with its "High-Street" providing a heart to the district with a beautifully landscaped pedestrian public space west-to-east including inspirational and interactive pieces of public art and lined by attractive retail, restaurants and services.

Mixed-use developments directly link to transit stations allowing people to walk to public transportation, which is an accepted mode of transportation among the middle class. Throughout the metropolitan area, public transit enhancements are being planned and a BRT line has been proposed.

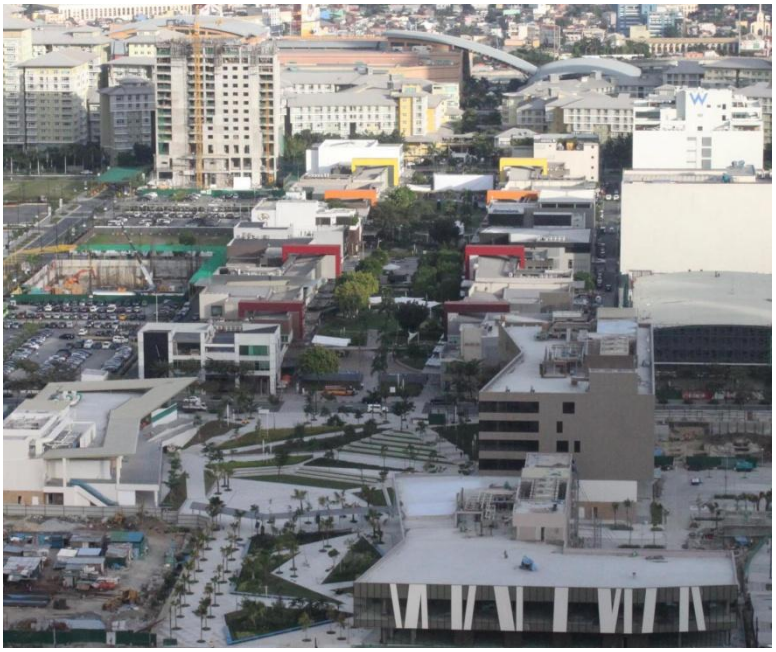

Image 10: Bonifacio Global City. Pedestrian "High Street" is heart of new district. Source: Stefan Rau.

9 CONCLUSION: TRENDS LIKELY TO CONTINUE AND HAVE THE POTENTIAL TO POPULARIZE AND STRENGTHEN PLANNING

The emerging multi-tiered, poly-centred structure of Metro Manila is mainly a result of private ownership and market dynamics following economic growth and social behaviour. Formal planning has not yet had a large impact on this trend. Yet planning does have opportunities to play a more significant role building on two main trends in behaviour: increasing transit popularity and preferences for urban lifestyles and open spaces.

The trend of increasing compactness in locations with critical mass and transit-oriented development is a positive contribution to a more eco-efficient agglomeration. This trend will likely continue; at least two additional transit lines have been approved for implementation and this will only encourage further transit oriented developments. Given the large scale and high density character of Metro Manila, however, many more transit lines have to be planned and implemented in order to increase and improve linkages among existing centres and to create more opportunities for integrated nodes. With their growing popularity, the general public, developers, and other market players will appreciate the introduction of new transit lines.

The renewed acceptance of open, exterior spaces as a venue for a wide variety of activities among an increasing segment of the general public carries a great opportunity for a new understanding and appreciation of planning. Rediscovering the power that good public space offers as an instrument to integrate many aspects of community, sustainability, transportation and urban life can only enhance the value and popularity of urban design.

We wish to propose a few principles of how the profession and practice of planning can make a significant contribution towards the improvement of the quality of life in Metro Manila:

(1) Planners take the initiative and establish credibility and moral authority for strategic guidance, regional visioning, coordination and action, building on existing professional associations (i.e. Philippine Institute of Environmental Planning Advisory Committee) or creating a new one (e.g. Mega-Manila Planning and Policy Advisory Association)

(2) Develop and get broad consensus on a vision and principles for Metro Manila's future, recognizing its importance to overall national development and its leadership in establishing models of best practice among national leaders, regional and various competing local leaders and stakeholders as well as competing institutions, political and business players.

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(3) Prepare structural frameworks for various sectors (leaving local governments to handle detailed land use and master plans). These can include trunk or arterial infrastructure particularly roadway and rail networks, waterways, green network, social initiatives.

(4) Directly zoom in on a few, doable key projects, build consensus, coordinate and streamline action through all levels national, regional and municipal, identify business heavyweights for PPP to secure funding and timely implementation.

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Zielgruppeneinbindung in Verkehrsplanungsprozesse mittels neuer Technologien?

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1 ABSTRACT

Im Rahmen des Projekts „ways2gether: Zielgruppenspezifischer Einsatz von Augmented Reality und Web 2.0 in partizipativen Verkehrsplanungsprozessen“, gefördert durch das Bundesministerium für Verkehr, Innovation und Technologie (Programmlinie3 „ways2go“), wird erforscht, ob und wie neue Visualisierungstechnologien wie Augmented-Reality und auch Web-2.0-Einbindung die Beteiligung von Bürgerinnen und Bürgern an Verkehrsplanungsprozessen erleichtern können. In einem ersten Projektschritt, der hier vorgestellt wird, ging es darum, spezifische Hindernisse in der Beteiligung bei Planungsprozessen zu erheben. Diese Hindernisse wurden nicht allgemein identifiziert sondern in Bezug auf zwei wesentliche Perspektiven: Zum einen ging es darum solche Hindernisse zu identifizieren, die Anknüpfungspunkte für den Einsatz neuer Technologien anbieten, in dem Sinn, dass diese Hindernisse durch neue Technologien wie Web 2.0 überwunden werden. Zum anderen wurden Verkehrsplanungsprozesse identifiziert, bei denen Augmented-Reality (AR) eingesetzt werden kann um die Kommunikation in Planungs- und Beteiligungsprozessen zu unterstützen.

2 FRAGESTELUNG

Ziel dieses Forschungsprojekts ist es, Wissen für die Anwendung von AR- bzw. Web-2.0-Instrumenten zu generieren, die im Rahmen des Projekts in Testfälle einfließen, erprobt und geprüft werden. Dieser sehr anwendungsorientierte Zugang soll ermöglichen, das generierte Wissen in die Praxis der Beteiligung und in die weiteren Entwicklungsprozesse dieser neuen Technologien einfließen zu lassen.

Die forschungsleitenden Fragestellungen sind daher:

Welche Hindernisse können bei der Beteiligung von Zielgruppen können durch AR bzw. Web 2.0 wie (auf welche Weise) minimiert werden?

Welche AR und Web 2.0 Instrumente können die Beteiligung von bestimmten Zielgruppen verbessern? Was müssen diese Instrumente können? Was kann von diesen Instrumenten nicht erwartet werden?

Wie können durch technologische Instrumente (AR, Web 2.0) schwer erreichbare Zielgruppen erreicht werden?

Was ist bei der Gestaltung und Durchführung von Beteiligungs- und Planungsprozessen zu beachten, wenn technologische Mittel zur Reduktion der Beteiligungsbarrieren eingesetzt werden?

Um auch verallgemeinerbare Ergebnisse ableiten zu können, wurden die zu entwickelnden Testfälle nach unterschiedlichen Kriterien ausgewählt. Berücksichtigt wurden verschiedene Maßstabsebenen (zwischen Masterplan und Straßenraum), räumliche Differenzierungen (Stadt, Land, Bestand, Neubau), sowie mögliche Zielgruppen („bildungsferne“ Menschen, Menschen mit Betreuungspflichten, Erwerbstätige mit wenig Zeit, Kinder, EntscheidungsträgerInnnen) sowie unterschiedliche Prozessphasen (planungsprozessbegleitende Entwicklung einer AR-Anwendung und die Ergebnis-Visualisierung) .

Das Forschungsprojekt wird nun zu folgenden Ergebnissen führen:

(1) Wissen darüber, wie Zielgruppen, die sich üblicherweise weniger in Beteiligungsverfahren einbinden lassen, mittels dieser neuer Technologien besser erreicht werden können,

(2) wie sich erreichte Zielgruppen im Beteiligungsverfahren mittels dieser neuen Technologien in den Prozess besser einbringen können,

(3) in welchen Prozessphasen der Beteiligung und Planung diese neue Technologien eingesetzt werden müssen und in welchem begleitenden Setting diese angewendet werden müssen,

(4) welche Anforderungen für die technologischen Instrumente bestehen.

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3 AUSGANGSLAGE

Die Beteiligung der Öffentlichkeit, insbesondere die Partizipation von Bürger und Bürgerinnen bei der Verkehrsplanungen und Verkehrsentwicklung ist auf nationaler und internationaler Ebene ein breit akzeptierter und erfolgreicher Ansatz in der (Verkehrs-)Politik und der Verwaltung (vgl. u. a. Europäische Kommission 2002; BKA 2009; Arbter et al 2005; Hamedinger et al. 2008). Bürgerinnen und Bürger erwarten mehr und mehr, dass sie in politische Entscheidungen einbezogen werden. Dabei entsteht – auch aus demokratiepolitischer Überlegung heraus – der Anspruch, dass die unterschiedlichsten Gruppen, Milieus und Altersgruppen einbezogen werden (z. B. Jugendliche, Bildungsferne, Personen mit Betreuungspflichten, Frauen, …). Diese Gruppen aber lassen sich nur begrenzt alle gleich beteiligen. Determinanten politischer Partizipation finden sich auf objektiv-struktureller und subjektiver Seite. Je nach sozioökonomischer Ausstattung, verfügbarer Zeit, Bildungsstand, Betroffenheit, bzw. materieller und personeller Ressourcen haben Menschen unterschiedlicher Milieus mehr oder weniger Zugang zu Partizipationsprozessen. Das Vorstellungsvermögen, Pläne und Modelle entsprechend lesen und verstehen zu können, hat ebenso Einfluss wie Erfahrungen darüber, wie Entscheidungsprozesse beeinflusst werden können. Aber auch das Beteiligungs-Setting hat Auswirkung darauf, ob sich Menschen beteiligen oder eben nicht. Versammlungen am Abend beispielsweise ermöglichen für die eine Gruppe die Integration in die Prozesse, während andere Gruppen gleichzeitig ausgeschlossen werden (z. B. Alleinerziehende). Mangelnde sozioökonomische Absicherung schließt Bevölkerungsgruppen tendenziell aus, weil diese Menschen die Zeit für das Überleben investieren müssen, während Menschen, die wichtige berufliche Funktionen ausfüllen auch aufgrund von Zeitmangel ausgeschlossen sein können. Menschen mit Migrationshintergrund mit nicht-deutscher Muttersprache sind benachteiligt, weil sie gefordert sind, ihre Interessen bzw. Betroffenheit in einer Fremdsprache einzubringen. Erst der Gebrauch einer altersgerechten Sprache ermöglicht es bestimmte Zielgruppen (z. B. Jugendliche) in die Prozesse einzubinden. Menschen mit weniger Bildung verstehen komplex formulierte Einladungen nicht. Aber auch eingeschränkte Mobilität behindert Menschen bei der Beteiligung (vgl. u. a. Munsch 2003; Lüttringhaus 2000; Herschkowitz 2007; Gruber 2007; Dangschat et al. 2000)

Aus der Gender-und Diversitätsforschung aber auch aus der Auseinandersetzung mit Raum als sozial produzierter und angeeigneter, sowie machtdurchzogener Raum zeigt sich, dass Menschen divers angesprochen werden müssen. Je mehr Gruppen und Milieus einbezogen werden sollen, desto differenzierter und zielgruppenspezifischer muss dabei vorgegangen werden (vgl. u. a. Damyanovic; Kessl et al. 2005; Löw 2001)

Diese zielgruppenspezifische Vorgehensweise differenziert sich weiter aus in Bezug auf die Prozessphasen und in Bezug auf die Beteiligungsintensität. So macht es einen Unterschied, ob es darum geht, dass Nutzer „nur“ informiert werden, mitreden oder sogar mitentscheiden sollen (zu den Beteiligungsstufen vgl. u. a. Lüttringhaus 2000).

Differenziert werden muss auch, ob es je nach Prozessphase darum geht, Nutzerinnen und Nutzer anzusprechen, einzuladen, „zu aktivieren“, in die Prozesse zu integrieren, oder die Beteiligten dabei zu unterstützen, ihre Interessen so einzubringen, dass sie in der Planung aufgenommen werden können. Je nach Phase und Beteiligungsstufe kommen daher unterschiedliche Methoden zum Einsatz (vgl. auch Ley/Weitz 2003; Kollmann et al. 2003, Diebäcker 2004; Krisch 2009; Riege et al. 2002): u. a. Information, Befragung, aktivierende Erhebung, Versammlungen, Arbeitsgruppen, Begehungen, moderierte Beteiligungs-veranstaltungen, Planungswerkstatt, Modellbau, Wettbewerbe.

Trotz einer Vielzahl an Methoden, werden nach wie vor nicht alle Gruppen ausreichend erreicht. Daher besteht die Anforderung, Methoden auf deren Wirkung zu untersuchen, weiterzuentwickeln und Methoden neu zu entwickeln, mit denen Zielgruppen erreicht werden können, die bisher schwer zu erreichen waren. Mit webbasierten und AR-Instrumente könnten technikaffine Zielgruppen erreicht werden (vgl. dazu auch Bundesministerium für Gesundheit, Familie und Jugend 2008), aber auch v.a. Gruppen, die über wenig Zeit verfügen. Möglicherweise können Benachteiligungen aufgrund mangelnden Vorstellungsvermögens ausgeglichen werden. AR-Tools können aber auch in Bezug auf die Schnittstelle zwischen Planung und Politik die Kommunikation erleichtern. Die Kommunikations-Schnittstellen zwischen den Planern/-innen und den Entscheidungsträgern/-innen sowie den Planern/-innen und den Nutzern/-innen sind daher die zentralen Ansatzpunkte im Projekt ways2gether für die Entwicklung von planerischen und partizipatorischen Ansätzen zur Implementierung von Web 2.0 und AR-Lösungen.

4 PROJEKTDARSTELLUNG

4.1 Projektakteure/-innen

Die Partnerinnen und Partner des Konsortiums sind: Joanneum Research ist als Leadpartner zuständig für die technologische Entwicklung des AR-Tool-Sets, das Institut für Landschaftsplanung (BOKU Wien) und das Kompetenzzentrum für Soziale Arbeit (KOSAR) sind verantwortlich für die wissenschaftliche Grundlagenforschung in Bereichen der Planungs- und Beteiligungsprozesse, das Ingenieurinnenbüro Jauschneg ist zuständig für die Konzeption des Tool-Sets für die Praxis anhand der Testfälle und die Forschungsgesellschaft Mobilität sowie das Verkehrsplanungsbüro verkehrplus sind zuständig für die Evaluierung des selbigen.

Die methodische Herangehensweise ist geprägt von einem sehr praxisorientierten Ansatz. So stellen Expertengespräche mit verschiedenen Planungs- und Prozessverantwortlichen die Grundlage für die Identifizierung von konkreten Anknüpfungspunkten für die Entwicklung des AR-Tool-Sets dar. In der Phase der Konzeption des Tools wird sehr eng mit Entscheidungsträgern sowie Prozessbegleitern in der Praxis zusammengearbeitet: Mit der Seestadt Aspern, der Entwicklungsgesellschaft 3420 wird an einer Visualisierung eines bereits fertig geplanten Straßenabschnitts gearbeitet. In Zusammenarbeit mit der Gebietsbetreuung im 20. Wiener Gemeindebezirk entstehen Tool-Bestandteile für planungs-begleitende Kommunikation und Visualisierung von Straßenplanungs-Projekten.

4.2 Beschreibung der Testfälle:

Es steht im Mittelpunkt der Konzeption der Testfälle aus dem möglichen AR-Tool-Set (browserbasierte online Tools und browserbasierte mobile AR Tools) verschiedene Anwendungsfälle zu erproben und damit die in der Systemanalyse getroffenen Annahmen bezogen auf die Anwendbarkeit und Nutzen etc. zu überprüfen und weiter zu entwickeln.

Überblick über das ways2gether-Tool-Set:

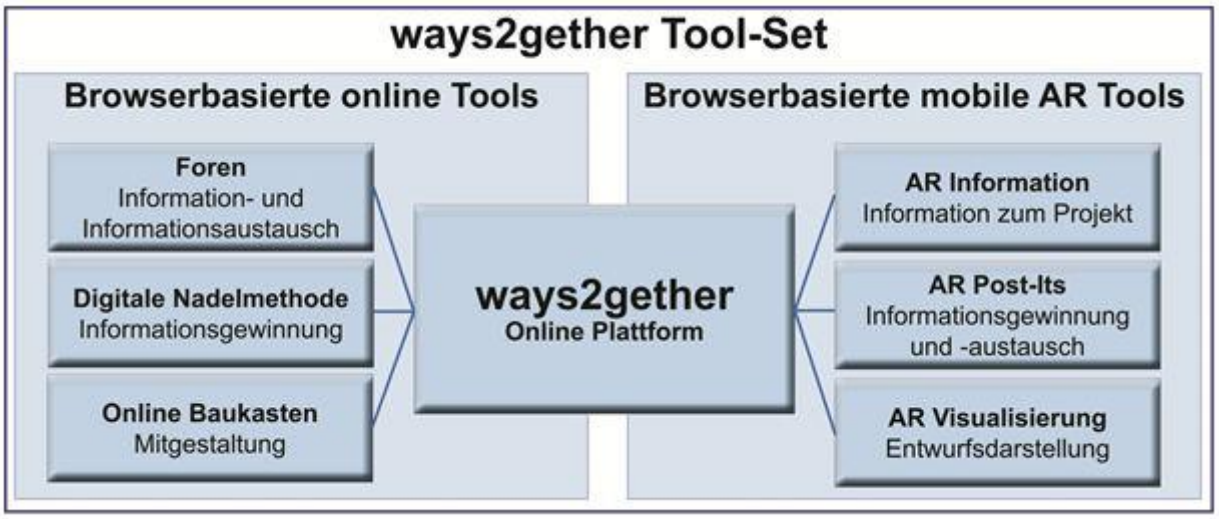

Abbildung: Tools des ways2gether Toll-Sets (Quelle: 2012, Reinwald, et al. 2012)

4.3 Konzeption der Testfälle

Bei der Konzeption der Testfälle für das ways2gether Tool-Set wird aus den bisher gewonnenen Erkenntnissen ein Design entwickelt, das sowohl Forschungsfragen im Bereich der technischen Entwicklung als auch im Bereich der Planung und Prozessbegleitung abdeckt. Dieses wird fallspezifisch an die jeweiligen Rahmenbedingungen, die sich vor allem aus der Planungsphase und den zu beteiligenden Zielgruppen ergibt, angepasst.

Forschungsfragen der Evaluierung zu AR Visualisierung:

- Welche Zielgruppe wird durch AR aktiviert?
- Wie ist der Aktivierungsprozess bei dem Einsatz von AR Instrumenten?

- Was verändert die AR-Anwendung für die Begehungs-Gruppe?
- Welche Interaktionen finden statt?
- Wie reagieren die Einzelnen und die Gruppe im Verlauf der Begehung?

Forschungsfragen der Evaluierung zur digitalen Nadelmethode/AR Post-Its:

- Welche Gruppe/welche Zielgruppe wird durch diese Tools aktiviert?
- Welche Kommentare/Informationen der Nutzerinnen und Nutzer bringen den Prozess und die Planung weiter?
- Wie können „nützliche" Kommentare generiert werden?
- Was ist der tatsächliche Mehrwert von AR und Web 2.0-Tools für Beteiligung und Prozess?

	Aspern	**GB20**	**Lange Gasse**	**Steiermark**
Zielgruppen	Entscheidungs träger, Fachplaner in Verwaltung	Kinder und Jugendliche sozioökonomisch Benachteiligte Menschen mit Migrations-hintergrund	Aktive, technik- und planungsaffine Bewohner	Personen mit Betreuungs-pflichten, Ältere
Räumliche Differenzierung	Urban Neubau	Urban Bestand	Urban Bestand	Ländlich Bestand/Umbau
Maßstab	Masterplan Regel-querschnitte	Objektplanung, Detailplanung Straßenfreiraum	Objektplanung Detailplanung Straßen-freiraum	Straßenraum
Planungsprozess	Ergebnis-visualisierung (Planung-sprozess abgeschlossen)	Entwicklungs-visualisierung (Planungs-Prozess-begleitend)	Entwicklungs-visualisierung (Planungs-Prozess-begleitend)	Entwicklungs-visualisierung (Planungs-Prozess-begleitend)
Beteiligungs-stufe	Information	Information, Mitsprache, Beratung	Information, Mitsprache, Beratung	Information, Mitsprache, Beratung

Tabelle: Überblick über die geplanten Testfälle und deren planungsprozessualer Charakteristika:

Bei den Testfällen kommen sowohl quantitative als auch qualitative Methoden der Evaluierung zum Einsatz. Das Setting der Evaluierung ist wie folgt geplant: Es ist ein Kontrollgruppen/Zielgruppen-Design geplant. D.h. zwei Gruppen begehen eine Straße mit je ca. 25 Teilnehmerinnen und Teilnehmern. Jede Gruppe macht eine Begehung: Die Zielgruppe macht die Begehung mit der AR-Methode. Mittels mobiler Endgeräte und mit Begleitung der Planer/Prozessbegleiter wird der augmentierte Straßenabschnitt begangen und die Planung begutachtet. Die Kontrollgruppe macht die Begehung mit der „old school" Methode, sprich sie gehen, angeleitet vom PlanerIn/ProzessbegleiterIn, mit einem analogen Plan/analoge Visualisierung durch die Straße. Die Evaluierung erfolgt sowohl parallel zur Begehung durch Beobachtungen der Interaktionen der Teilnehmerinenn und Teilnehmer, als auch im Anschluss an die Begehungen durch die Beantwortung eines Fragebogens.

Beispiel für das Konzept Testfall GB 20 – Wallensteinstraße:

Das Ziel dieses Testfalles ist der Einsatz des AR Tools in der Beteiligung bei Planungsvorhaben im Bestand. Die Maßstabsebene ist Detailplanung/Objektplanung im Straßenraum. Von den Instrumenten des Tool-Sets kommen AR Visualisierungen, Web 2.0-Information mit der Möglichkeit, Kommentare zu hinterlassen (digitale Nadelmethode, AR Post-Its) zum Einsatz. Die Nutzerinnen und Nutzer sollen über die geplante

Umgestaltung eines Straßenstückes informiert werden, ihre Meinung soll dazu eingeholt werden (sie haben aber geringe bis keine Mitbestimmungsmöglichkeiten).

Charakteristisch für diesen Testfall ist es, dass hier insbesondere eher schwer zu beteiligende Zielgruppen wie Kinder und Jugendliche und Menschen mit Migrationshintergrund erreicht werden sollen. Daher liegt hier der Schwerpunkt aus nicht-technologischer Sicht auf Methoden der Aktivierung dieser Zielgruppen und das begleitende Setting, in dem das AR-Toolset zur Anwendung kommen soll. Geplant sind persönliche Gespräche mit Multiplikatoren, das Herstellen von Flyern, die Verlosung eines Tablets sowie eine wiederholte Präsenz der Prozessbegleiter im Straßenraum. In Form von „Streetparties" an zentralen gut frequentierten Orten (Plätzen, Kreuzungsbereichen an Samstag-Vormittagen) soll über die AR-Anwendung niederschwellig informiert werden und die Möglichkeit bestehen, das AR-Tool-Set vor Ort auszuprobieren – zum Beispiel im Internet die digitale Nadelmethode anzuwenden. Dabei werden die einzelnen Prozesse, Kommentare, Gespräche im Verlauf des Austausches zwischen Prozessbegleiter und Nutzer als Reflexionsgrundlage dokumentiert und protokolliert.

5 VORLÄUFIGE THESEN ALS ZWISCHEN-ERGEBNISSE

Da die Durchführung der Testfälle noch nicht abgeschlossen ist, können hier nur thesenartige Zwischenergebnisse formuliert werden, die sich aus der Auseinandersetzung mit der Theorie und der Entwicklung der Testfälle gemeinsam mit den Praktikerinnen und Praktikern ergeben. Diese Thesen werden im Rahmen der Testfälle noch überprüft.

5.1 AR-Anwendungen haben Potenziale im Rahmen der Öffentlichkeitsarbeit und PR-Arbeit.

Im Rahme des Neubaus besteht von unterschiedlichen Akteuren (Bauträger, Kommune) das Interesse, die Attraktivität der Neugestaltung zu veröffentlichen und zu vermarkten. AR-Anwendung sind einerseits aufgrund des Images als innovative Technologie interessant, andererseits aktivieren AR-Anwendungen Zielgruppen dazu, sich mit dem Neubaugebiet vor Ort auseinanderzusetzen. Außerdem besteht die Möglichkeit potenziellen Zielgruppen durch die Visualisierung die zukünftige Gestaltung realitätsnäher zu vermitteln als über Modelle bzw. Pläne. Bildungsfernere Zielgruppen, aber auch Zielgruppen, die weniger Zugang zu neuen Technologien haben, dürften über AR-Anwendung allerdings schwer zu erreichen sein.

AR-Anwendungen können darüber hinaus (auch gekoppelt mit web 2.0 – Anwendungen) genutzt werden, um breite Öffentlichkeits- und PR-Arbeit zu unterstützen.

5.2 AR-Anwendungen benötigen spezifische Settings, um Zielgruppen besser erreichen zu können.

Über AR-Anwendungen ist es möglich, Zielgruppen zusätzlich zu anderen Methoden der Bürgerbeteiligung anzusprechen und damit in die Planungsprozesse mehr einzubinden. Aufgrund des starken Orts-Bezugs bei der Anwendung von AR könnten Nutzerinnen und Nutzer des öffentlichen Raums erreicht werden, die auch besonderen Anspruch auf den öffentlichen Raum haben. Insbesondere auch bildungsfernere Gruppen (auch Menschen mit Migrationshintergrund), Jugendliche aber auch ältere Menschen könnten besser erreicht werden. Das spielerische Moment könnte dabei förderlich sein. Entscheidend dabei ist, wie das Setting rund um den Einsatz der Anwendung gewählt wird. Dabei wird es notwendig sein, auf klassische Methoden der Bürgerbeteiligung zurückzugreifen. Es wird die Notwendigkeit bestehen, Aktivierungsarbeit, z. B. über ein Straßenfest zu leisten, und zur AR-Anwendung beispielsweise Gruppenbegehungen und -diskussionen durchzuführen und zu moderieren. Die AR-Anwendung benötigt außerdem eine gute fachgerechte Begleitung, um diese Zielgruppen besser ansprechen zu können. Aufgabe dieser Begleitung ist es, mögliche Hemmschwellen zur Technologie zu überwinden und die Diskussion anzuleiten (Begleitungs- und Prozesskompetenz, Planungskompetenz, Technologiekompetenz).

Nur wenn die AR-Anwendung allerdings weitgehend pannenfrei funktioniert, kann sie diese Wirkung auch entfalten.

5.3 AR-Anwendungen verändern die Auseinandersetzung der Zielgruppen mit dem Planungsprozess.

Im Vergleich zu Begehungen mit einem Plan wird die Begehung unter Einsatz einer AR-Anwendung, die Auseinandersetzung der Zielgruppen mit dem Raum und dem Planungsprozess sowie untereinander verändern (zwischen den lokalen Akteurinnen und Akteure untereinander und mit Planungsverantwortliche). Folgende Beobachtungen könnten gemacht werden:

- Der Raum wird mehr als Raum wahrgenommen und die geplante Veränderung wird realitätsnäher wahrgenommen,, was dazu führt, dass schneller über die Inhalte der Veränderungen diskutiert werden kann.
- Das Detail einer Darstellung rückt ins Interesse der Beteiligten und lenkt vom Inhalt ab.
- Die neue Technologie hat zur Folge, dass die Beteiligten sich weniger zueinander wenden müssen, da sie sich mehr mit der Technologie auseinander setzen können, was Aushandlungs- und Kollektivierungsprozesse erschweren könnte.
- Technologie-affine Personen können sich stärker und besser einbringen als Menschen mit Skepsis zu neuen Technologien.

Diese möglichen Beobachtungen müssen erst empirisch überprüft werden.

Diese Wirkungen können allerdings nur beobachtet werden, wenn auch die technologische Umsetzung gelingt. Eine wichtige Fragen dabei ist, wie ein erweiterter Raum dargestellt werden kann (z. B. Autos, die „wegretuschiert" werden müssen). Außerdem sollte die Darstellung nicht zu realitätsnah sein – einerseits um nicht manipulativ etwas zu vermitteln, was in der Praxis vielleicht nicht umgesetzt werden kann, und um die Diskussion nicht zu sehr dorthin zu lenken, sich mit der Darstellung von Details auseinander zu setzen.

5.4 AR erreicht Zielgruppen mit wenig Zeit nur, wenn zusätzliche Methoden (z. B. web 2.0) eingesetzt werden.

Es ist davon auszugehen, dass eine bloße AR-Anwendung die Beteiligung von Menschen, die über wenig Zeit verfügen nur begrenzt erhöht werden kann. Die Einbettung in web-2.0-Anwendungen allerdings könnte zu diesem Effekt führen.

5.5 Erweiterungsmöglichkeiten: Kinderperspektive

Durch animierte Anweisungen bei der AR-Anwendung besteht die Möglichkeit, sich mit anderen Perspektiven, z. B. der von Kindern auseinanderzusetzen. Mit einer Aufforderung mit dem AR-tool „in die Knie zu gehen" könnte angeregt werden, sich mit anderen Perspektiven als die eigene auseinanderzusetzen.

5.6 Einsatz: Aktivierung, Konsultation und Information

AR-Anwendungen könnten Wirksamkeit zeigen

- bei der Aktivierung von Zielgruppen, die sich traditionell weniger beteiligen,
- dabei, die Zielgruppen dazu anzuregen, im Prozess präziser eigene Interessen einzubringen
- und dazu, dass Zielgruppen über geplante Veränderungen realitätsnah informiert werden.

6 SCHLUSSBEMERKUNG

Der Mehrwert des Projektes ways2gether besteht darin, dass konkrete Praxiserfahrungen in Planungs- und Beteiligungsprozessen im Projektteam reflektiert werden und so erstmals konkrete planerische Anwendungsfälle konzipiert und durchgeführt werden. Damit können seit längerem in der Community bestehende Annahmen über Einsatzmöglichkeiten (vgl. Qualitätssicherung, Nash, 2010, vgl. Siegler, Wietzel 2009) überprüft und genauer erforscht werden. Zugleich liefert dieser Ansatz die Basis dafür, dass die Entwicklung von technologischen Kommunikationsmitteln für Planung und Beteiligung an die sich wandelnden Anforderungen der Praxis angepasst bleibt (sog. Fit-in-Lösungen).

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A Planning Support System as a Tool for Sustainable Urban Planning

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1 ABSTRACT

The process of urban planning includes multiple task fields carried out by planners oder designers. They are confronted with complex planning procedure, complex data management, and multi-dimensional spatial presentation. The advanced computer technologies are able to aid and take over some workscopes in the planning process. The study introduces a developed program named 'eco-city Planning Support System (ePSS)' to help the ecologically oriented urban planning, especially for the planning practices like new town project or new city project which encompasse the entire process from land use decision to detailed building planning. In those planning procedure, the practices are far from ecologically sound planning because the urban planners are provided only some physical data and materials, not the environmental useful informatio, they are engaged in conventional development planning, and only little time is left to take the tasks to carry out additional ecological consideration.

In this background, the pivotal purpose of the introduced ePSS is designed to lead the planners to ecologically oriented planning. The program is composed of various functional subsets which are required during the urban planning procedure. One subset is designed to produce the ecological maps in the field soil, water, biotop, micro-climate, ecological connectivity and recreational suitability, in which result maps are served as spatial decision map for land use planning. This subsystem is constructed both to simply usability using Quick-Menu and to more detailed analysis and assessment. The next subsystem is designed to land use concept and land use plan in which not only 2- but also 3-dimensional planning are possible and the changeover can be simply done. The last part of the ePSS carries out environmental analysis and simulation like solar access, visual openness, and green visuality and visualization of of planning environment.

The end-users of this program are planners in planning companies and planner in engineering firms in Korea. The system is compatible with usual CAD and GIS data so that the wide usage is guaranteed.

2 INTRODUCTION

Sustainable use of natural resources is even more important now where the resources become scarce and therefore must play a pivotal role in the planning. But the reality of the planning is not supposed to reflect sufficiently the urgency to preserve and to use the rare resources sustainably. Analysis of environmental capacity and potentials of the natural resources has to play an important role in the sustainable Land Use Planning.

In Korea, there is a plethora of planning relevant regulations and planning process which make urban planning too complicated and difficult to understand fully. It is not an easily accomplishing task, to perform planning even for planners and civil servants. In particular, the lack of spatial planner's ecological knowledge and supporting planning instrument leads to ignorance and insufficient consideration in the spatial planning.

Often the citizens are excluded from the planning process or the participation is merely fulfilled in a formal way guaranteed by the regulations (Lee 2005), although the enormous progress in computer technologies in Korea might give opportunity to support planning more easily understandable (Kwon 2008).

There are already a number of planning support tools like planning support system (PSS), decision support system (DSS), spatial decision support system (SDSS), and the others in literature and in practice, though all with very different objectives. Geertman and Stillwell (2009) point out the computer-based support systems developed by researchers have not found its application in planning practice or policy making.

The main objective of this paper is to introduce a planning support system developed since end 2008. The software of this PSS is not designed to replace the planning or planner's task, but to facilitate and accompany their planning process and to help decision-makers and other participants understand spatial, contextual plan environment.

3 THEORY AND PRACTICE OF PLANNING SUPPORT SYSTEM

3.1 Definition of terms

PSS is relatively new in planning practice and theory introduced in the mid-1990s to support and improve the performance of those related to the planning (Batty 1995; Klosterman 1997). PSS is associated with GIS. GIS is a system which is serving as capturing, storing, manipulating, analysing and displaying spatial data, whereas PSS carries out GIS-functions and also is related to SDSS or SDD, but its main focus is to support specific planning tasks. PSS enables planners to better handle the complex planning procedure, resulting in the improvement of planning quality and reduction of time and effort (Geertman and Stillwell 2009).

Batty (1995) considers PSS as a subset of GIS which is designed to explore, represent, analyse, visualize, predict, prescribe, design, implement, monitor, and discuss planning related issues. Kim (2004) defines PSS as „computer-aided planning system combining geographic information system (GIS), urban models, and visualization tools, has been actively researched and applied in many developed countries".

Kim (2004) points out the key difference of PSS is to finde in adoption of visualization technologies and possibilities of collaborative planning process.

3.2 Spatial Planning Practice in Korea

The spatial planning system is associated with administrative hierarchy system in Korea. It is from comprehensive national territorial plan to comprehensive province plans, to Metropolitan city plans, and to basic urban plans. As the system indicates, it functions in a top-down approach, so spatial planning system should not contradict the higher-ranked planning system. Also on the ground that the spatial planning in the higher level deals with detailed spatial issues, the possibilities for flexible handling of lower-ranked plan are in general restricted. Moreover, because the basic urban plan is a long-term plan focusing at the comming 10 to 20 years, there is a lot of uncertainty in the planning to flexible, rapid respond and to deal versatile and swift change of planning situation.

The other characteristics of spatial planning in Korea is that the planning environment has been changed from top-down to bottom-up system and in the course of new city development planning many interest groups like communal government, city parliament, NGOs, civil activists are broadly participated. But even though planning participation includes diffent groups, the planning practices stick to the conventional ways, so there are increasing conflicts between different interest groups. This leads to various problems of delay, distortion, and change of the planning(Park 2001).

In order to improve such ineffectiveness of planning-related decision system, a comprehensive decision support system in spatial planning has to develop able to provide with spatial information, to widen civil participation so that the planning decision processes are more transparent both to the decision maker and to the public. For such system improvement, first of all the administration and institutions have to be changed and a supporting system is required to deliever information and data needed. The main aim to use PSS is to reduce irrational decision and to prevent errors resulting from planners' limited information, knowledge and experiences. Especially it is expected to be effective for the case of urban planning process entangled due to complex interests

The rational decision making of urban planning would be possible if there were spatial data available to clarify the spatial context and phenomena and to suggest objectively analysed information. Taking into consideration that a lot of planning participants are related and the interest conflict is anticipated, such data and information are more important.

4 OVERVIEW OF THE PROJECT

Here we present our software tool of an planning support system (PSS) which has been developted since end of 2008 in one of the national R&D Projects supported by Korean Minstry of Land and Maritime research project. The project was created in the response of governmental requests and needs to lead and create the future development power by Research and Development in field of construction technology. Reflecting this, the project has started to develope a ecologically oriented planning support system as a software tool to help the planners and decision-makers in the urban planning process. The Software will accompany the planning practice based on the planning system and practice in Korea.

The background to develop a planning support system is based on the circumstances that the planners devote most time to implement routine administrative tasks such as permit processing, so that little time is left to undertake true planning in conventional terms (Klosterman 2009). Taking into consideration that there is no legal ecological planning instrument like landscape planning, e.g. in Europe, prcaticies of land-use plannng practice in Korea are devoted generally to maximize the built-up environment only following the minimum standard of ecological regulations,. Urban planners are willing to have a ecological supporting tool at their disposal, because spatial decision would be more easily made if some leaning point and arguments would be given, which leads to more ecologically oriented spatial planning.

With regard to planning process which includes spatial analysis, evaluation, goal setting, spatial allotment and developing implementing strategies and last but not least participation of public and agencies, the planning support system is dedicated to provide the planner computer-based tools to handle the complex planning task. Otherwise, the spatial decision support system has its main function in support to find of optimal location for diverse demand on space in area by means of spatial analysis and evaluation.

The main user differ from the planner, decision-makers, planning consulting commitee, and citizens. The designed program is designed to facilitate planners time-consuming task on the one hand and to help decision-makers understand and control the context of space, content, effec of the proposed plans as a control and admission institution.

5 STRUCTURE AND FUNCTION OF "EPSS" PLANNING SUPPORT SYSTME

5.1 Structure of the Planning Support System "ePSS"

The presented eco-city Planning Support System (ePSS) is composed of four different subsystems: the ePSS-Analyzer as spatial decision support system (SDSS), the ePSS-Planner as land use planning support tool, the ePSS-Designer as a auxilary tool to take over the designing task, and the ePSS-Simulator for 3D simulation of the planning area (figure.1).

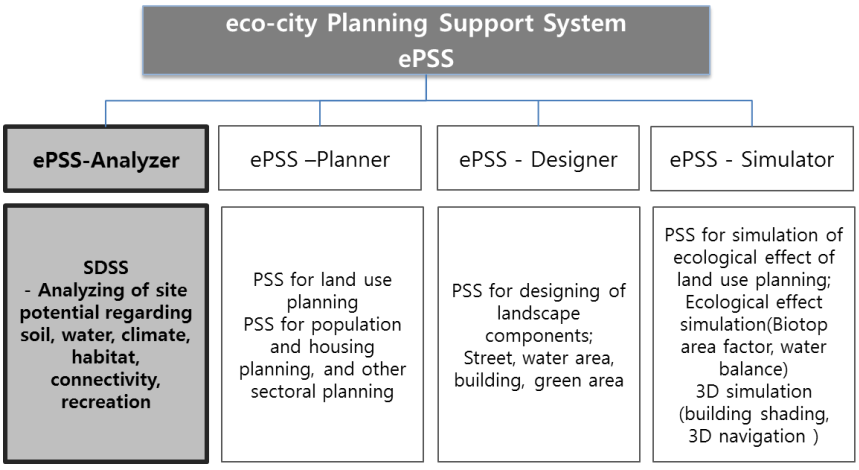

Figure 1: Structure and Submodule of the planning support system ‚ePSS'

The subsystems can operate independently, but are interlocked so that the whole system can be used or the individual subsystem is available for the planning use. The database management framework is integrated as basic system for managing integrated database to drive modules. A graphical user interface is designed.

5.2 Functions of the Planning Support System "ePSS"

The ePSS-Analyzer as a ecological spatial analysing system

The subsystem ‚ePSS-Analyzer' is constructed to analyze and assess the default environmental factors. For the sector of soil, water, climate, biotop (habitat), habitat connection, and recreational potential as natural resources, the default analyzing and assessing algorithm is installed. In case that other additional environmental or ecological sector will be desired, it can be also additionally installed.

This module is of great importance in Korea, because there is no ecological planning instrument with legal planning status. Therefore it can take over an important role for urban planning to lead more ecologically.

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The instruments like strategic environmental assessment, environmental impact assessment have real influence to check and control spatial planning, even though the need for ecologically oriented planning is not controversial among the planning experts and civil servants (Lee & Suh 2007), there is no real ecological planning instrument.

Recently the discourse about sustainable development and the introduction of landscape planning or environmental planning finds a broad acceptance among planners and researchers and the relevant methodologies have been suggested (Jung 2010). The here proposed spatial decision support system is able to help planners and decision makers provide with useful ecological information and allow effective decision support by analyzing, displaying and visualizing ecological spatial Data applying computer-based information system.

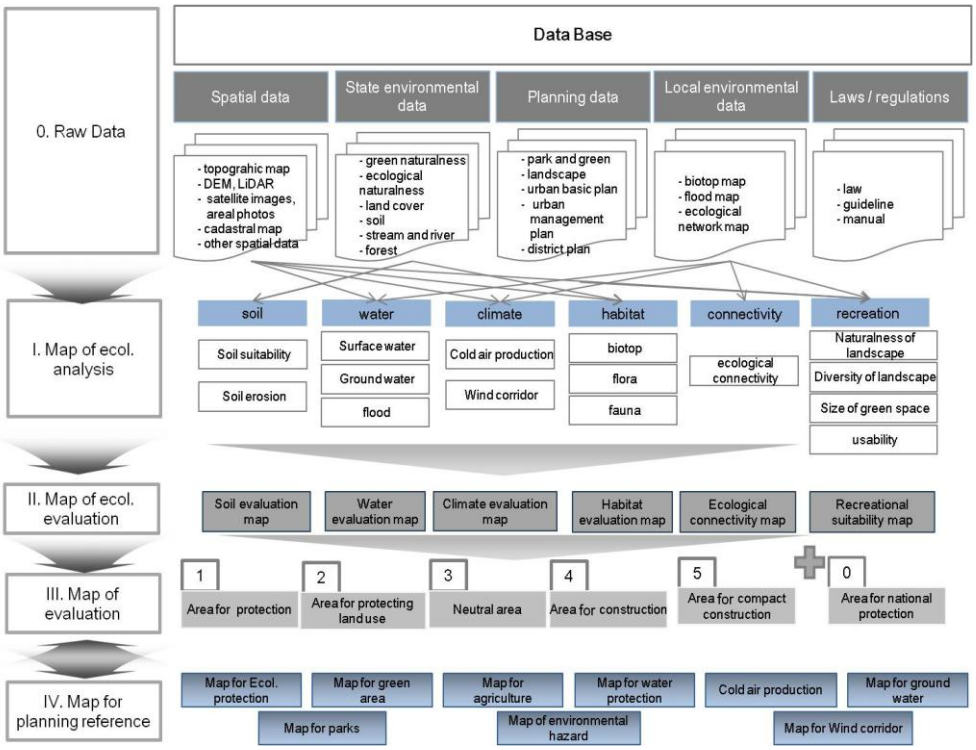

Figure 2 The general procedure of Spatial decision support system

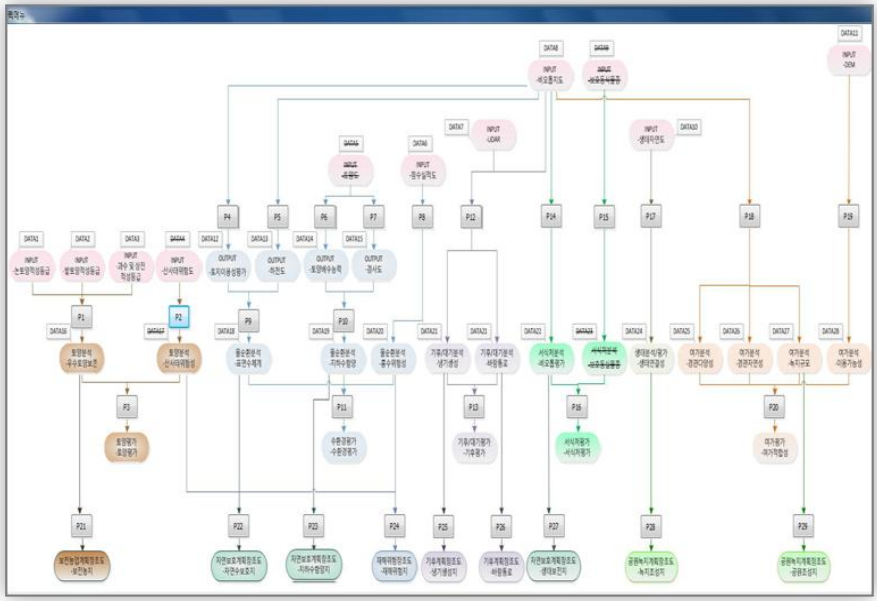

Figure 3: Quick module GUI of spatial decision support system

QUICK MODULE OF SPATIAL DECISION SUPPORT SYSTEM

The above described methodic procedure can be alternately done by "Quick Module" installed. The visual model which is consisted of graphical flow charts in sequence of analysis is an exploration to make the user acquainted to the complex program (Hocevar & Riedel 2003.) The quick module serves to combine the geo-processing into a sequential chain, which can operate automatically. The steps are the same as above mentioned, the quick module can be operated also manual or full automatically. The user can click the button where they want to produce the map, and the default analyzing process can be done. The corresponding raw data have to be uploaded beforehand in the defined folder, so that the process can grab the needed data. The GUI of "Quick Module" is designed in a tree structure, to provide user's convenience (figure 3).

This system is usefully applied, as far as the users have knowledge neither in analysis methods nor computing procedure. The advantage of using the quick module is to speed up the process and the users who have not profound knowledge in GIS and ecological analyzing methods can use the system effectively. The raw data required for this quick module must be beforehand installed in defined location.

The ePSS-Planner as a tool for 2D and 3D Land Use Planning

The ePSS-Planner is a tool to support planning tasks in new city development plan, city renewal plan, building renewal plan, and urban regeneration plan. The system supports to draw spatial structure and to show in 2D and 3D plan format according to plan goal and direction. For these, the ePSS-Planner has different functions as follows:

First, planners are able to inquire informations of landscape-ecology, urban planning, national spatial data etc. Also it enables visualization of the maps analyzed in the ePSS-Analyzer like analyzed, evaluated maps or planning reference maps.

Secondly, it supports for planners to draw land use concept. Land use concept means the procedure of schematic land use concept and structure in coarse level. Prior to the phase of land use plan, zoning the plan area, putting thematic axis, and designating spatial thematic issues (land use concept, settlement concept, green area concept, transportation concept, specialization concept etc.) are displayed in a planning area. The planner uses the drawing tools for these tasks.

Third, it supports the phase of land use plan. The functions are to draw street, and to form blocks, to dedicate land use purpose and density, to construct 3D building, and at last to give planning report.

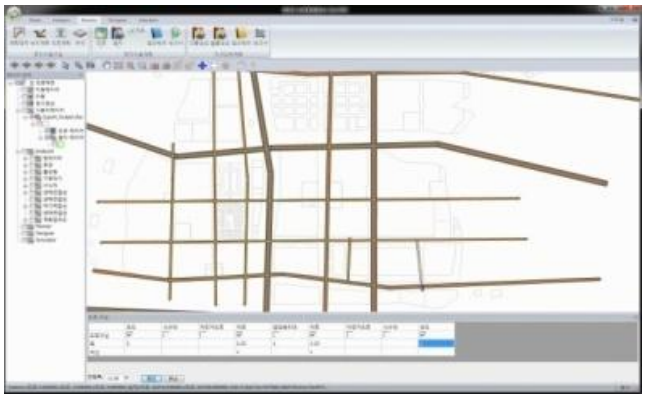

Figure 4: Formation of Road and Block

The ePSS-Designer as a Design tool of planning components in Land Use planning

This system supports to visualize components consisting of urban spatial structure from 2D to 3D map components. By means of this subsystem, components of virtual planning area are provided, so that planner, administrative personals and the public can understand better the spatial structure and contents of the plan. The main design components are building, street, street trees and other outer space elements like topography, green area, and water.

The difference to construct 3D building mass between the ePSS-planner and the ePSS-designer is that building can be drawed easy and rapidly out of the building type library

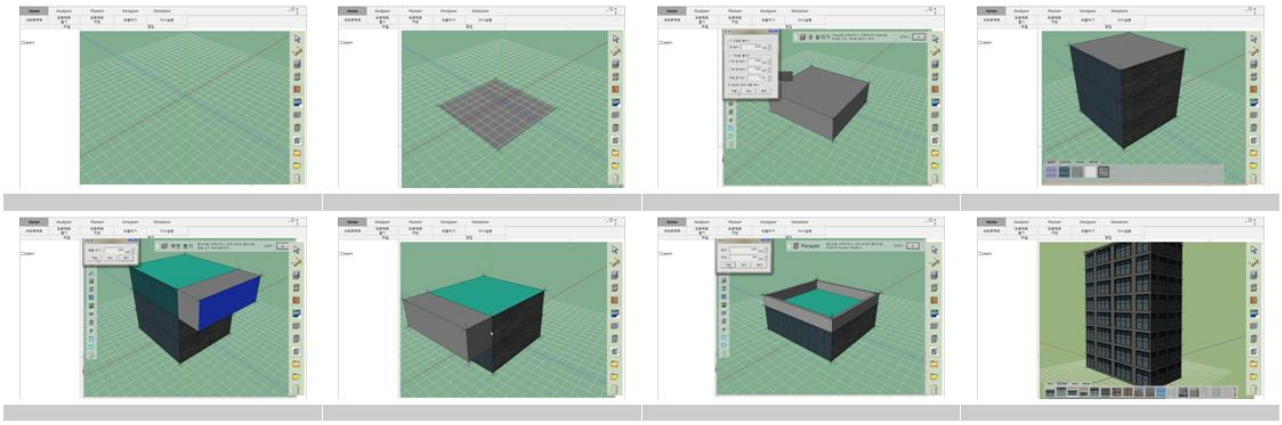

Figure 5: Building Modeling Process

The tool of street designing is to help to design lane type, lane width, pedestrian lane, bicycle lane, street tree lane, or central strip and to enable 3D street modelling. The planner can design and change tree planting intuitive using Drag and Drop function, in which type, shape, number, and space can be determined and visually confirmed.

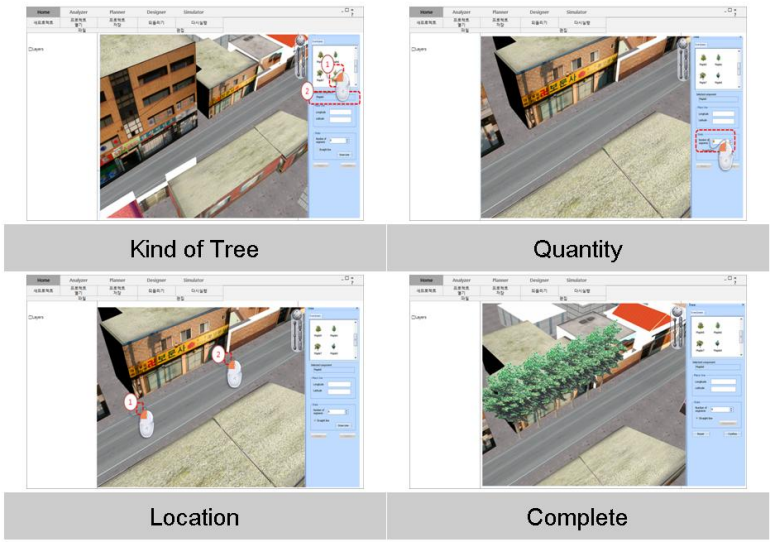

Figure 6: Street Tree Modeling Process

The planner can make and change elevation of topography, and the surface can be decorated with given texture. Within this topographic modelling, lake, see and stream can be made and visualized.

The ePSS-Simulator as a 3D virtual simulation and spatial analysis tool

The ePSS-Simulator facilitates to analyse the 3D-based spatial environment designed by the ePSS-planner and the ePSS-designer. This subsystem is important because environment and visual landscape can be analysed by changing 2D space to 3D space. The main functions of the ePSS-simulator vary from solar access analysis, visual landscape analysis to moving simulation.

The analysis of solar access gains in Korea its importance since high-reise buildings are very common, so that solar accessability is often deterred by neighbour buildings. This analysis can help to avoid later issuing conflict and to improve residential quality previously. This system provides planners with analysis result of solar accessibility and solar duration and thereafter basic dicision information to regulate location, distance, and height.

The analysis of visual landscape varies from visual analysis, panorama, virtical view shielding, to green visibility analysis. The system can calculate visible boundary from certain locational point and draw visibility rate. Panorama analysis enables analysing of sequential view by using visibility amounts. Virtical view shielding calculates the ratio of building-shielded area against targeted landscape object.

Moving simulation is for visualization of planning space observing from the object view point. The moving path, observer's height, and moving speed can be operated, so that visual simulation is carried out from the view point of car driver, bicycle rider, and flying object. Using this visual simulation, various planning environment can be controlled.

Biotope-Area-Factor calculator (BAF-Calculator) as a ecological settlement control instrument

In order to improve the ecosystem's functionality and promoting habitat quality in cities, Biotope Area Factor is recently introduced in Korea. By this control instrument, natural circulation balance of natural ecological components soil, water, climate, living organisms will be promoted and species habitat is not disrupted by soil sealing. Similar to the urban planning parameters, the BAF calculates the spatial ratio of an area that serves as a location for plants or assumes other functions for the ecosystem of the total proposed area.

The BAF-Calculator enables automatically or half-automatically the calculation of the relevant space. BAF is used as a criterion in Environmental Impact Assessment in Seoul, and newly applied in strategic environmental impact assessment, environmental impact assessment, so that its importance in the spatial planning is increasing(Jang & Kim 2008).

The BAF-Calculator is developed as a separate program installed on PC, by which ecologically relevant area can be promoted in development plans and projects. This program can be linked to the ePSS-simulator.

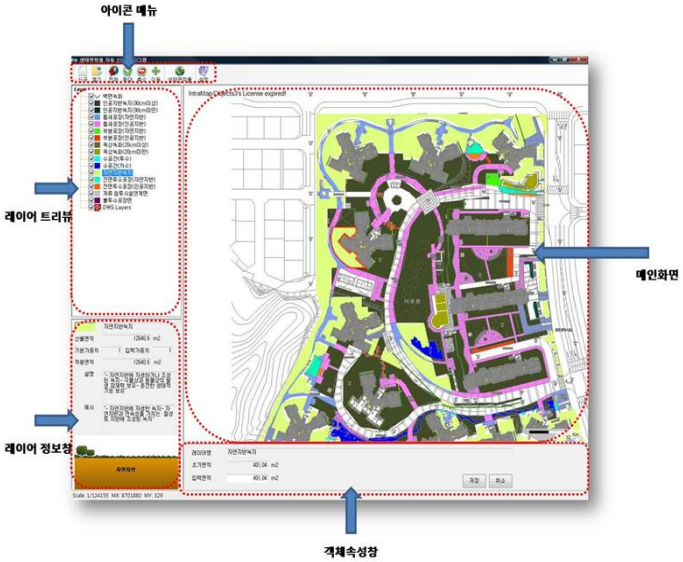

Figure 7: Biotop Area Factor calculator

6 APPLICABILITY OF THE EPSS

In Korea there are meanwihle a lot of spatial data available. Since GIS has been introduced in 1980th, and in 1995 the project for the establishment of GIS basic plan in Korea and the respective regulation and institution framework has begun, the state, local government, and civil organization have tried to establish for a long time diverse data for diverse purpose. But there is still no effective cooperation between the ministries and governmental agencies and the overlapping investment has been criticized (Lee 2006). The data acquisition required for spatial planning is still a difficult, long-lasting task. Another example is the biotop mapping implemented since 2001 by a lot of municipalities in Korea (Ministry of Environment Korea 2010, Moon et al. 2009), which means a valuable data for the analyzing methods of the system.

As the presented PSS, some utility programs for urban planning have been developed. Although we are now facing against some implementation hindrances to combine the spatial DB and implementing tools, there is a hope in near future to coordinate two system fields and to carry out urban planning more effectively and sustainably.

The possibilities to apply the developed PSS are manifold. Taking the fact into consideration that the PSS program has developed recently, the potential user groups encompass from local government, state-run agencies, city-based agencies, planning and engineering firms to architecture and landscape architecture. Since the entire program ePSS is equipped with diverse functions and possibilities of spatial suitability

analysis and evaluation, land use plan, and simulation, the user can choose what they need for their work scope.

As divers in user groups, the PSS is to anticipate multiple applications. As already mentioned, the planning reality which there is no landscape planning in Korea, the PSS can accomplish an important role in urban planning. In Korea, there are many laws and regulations regarding urban development project like urban reconstruction project, housing project, urban regeneration project. Also in outskirt of city there are also many land developing planning and projects like housing, new city, new specialized city, industry, recreation development. The latter occurs in suburbs or natural intact areas, so the environmental destruction of relatively natural areas will be lasted through the respective project. Even though the environmental plan is obligatory, the consideration of environmental aspects into the development plan is not satisfactory, in particular because of the absolute lack of planning time. Characteristic for the PSS is its rapid implementation speed and the quality of the results.

7 CONCLUSION

Recent advances in computing technologies enable the evolution to produce a variety of planning support software, on the other hand networking technology make possible the participation of many groups in the planning process (Kim et al. 2009). There are a lot of developments of planning support system in theory and practice. One of the widely practiced spatial decision support system in Korea is Land Suitability Assessment System.

The program PSS introduced in this study is conceived to perform various tasks needed for spatial planning in Korea, and one special purpose of this PSS is to facilitate planners to ecologically oriented planning. The program supports satial anaysing, land-use planning, spatial designing and plan simulating.

The program is composed of four functional subsystems which are required during the urban planning procedure. One subsystem „ePSS-Analyzer“ is designed to produce the ecological maps in the field soil, water, biotop, micro-climate, ecological connectivity and recreational suitability, in which result maps are served as spatial decision map for land use planning. This subsystem is constructed both to simply usability using Quick-Menu and to more detailed analysis and assessment. The Subsystem „ePSS-Planner“ as a land-use planning supporting tool is developed to carry out land use concept and land use plan in 2- ando 3-dimensions. The Subsystem can be defined as a supporting tool to visualize components consisting of urban spatial structure from 2D to 3D map components. The ePSS-Simulator carries out environmental analysis and simulation like solar accessibitlity, visual openness, and green visuality and visualization of of planning environment.

The end-users of this program are planners in planning companies and in engineering firms in Korea, and also civil servants in admistration. The system is compatible with usual CAD and GIS data so that the wide usage is guaranteed.

The mentioned program is expected to find versatile uses in planning praxis like planning practices and administrative personnel who are responsible for permission of planning in city government or other planning-related agencies. In order to enhance the usability of the program, it is tried to garner and integrate the needs and requests from the city administration and planning companies.

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An Introduction to Major Challenges of Urban Transportation in Metropolises of Iran

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1 ABSTRACT

The rapid growth of population and the consequent utilization of urban facilities and infrastructures has become concurrent with urban development criteria and also has lead to new challenges and problems specially in the domain of urban transport.

Iran was no exception and rapid as well as unexpected growth of urbanization and population in last 3 decades has created enormous problems.

In Metropolises of Iran, due to different reasons such as rural to urban immigration, insufficient development of urban centers, lack of planning and management frameworks of urban growth particularly in city centers and historic centers has maximized the problems facing urban transportation

In this paper, major and common characteristics of Metropolises in Iran are introduced and then obstacles of achieving optimum urban transportation systems will be introduced and analyzed. Among the major problems regarding the urban transportation in Iran, issues such as lack of harmony in urban neighborhoods, destruction of historic heritage, degradation of environment high rate of urban trips and high service of routes, lack of transport infrastructures, urban furniture and so on are introduced and discussed in this paper.

2 INTRODUCTION

Nowadays the main problem with which the societies face is the problem caused by the development of cities and the need for solving the problems of city- dwellers. In Iran as one of the developing countries, development of city- dwelling has progressed over the recent 50 years.

Enhancement of city population from 9895000 people in 1966 to about 50000000 people in 2012 indicates the importance of considering the issue (Table 1).

Number of cities	Average of Growth	Population inhabited in cities	All of population	year
200	-	6002621	18954704	1956
272	02.5	9795810	25788722	1966
373	93.4	15854680	33708744	1976
496	41.5	26844561	49445010	1986
512	47.3	31836598	55837163	1989
612	95.2	36817789	60055488	1995
1012	74.2	48259964	70495782	2006

Table 1: Variations of population in cities in Iran (1956-2006)

Enhancement of population in the cities is not monotonous for various problems. The climate differences in various locations, unsuitable dispersion of facilities in different cities etc. have caused that the development of urban population around some cities becomes more than other cities which has caused the creation of new metropolises in Iran over the past 30 years.

3 CHARACTERISTICS OF IRANIAN METROPOLISES

The process of city- dwelling over the recent years has caused the appearance of new metropolises in Iran, including Tehran, Mashad, Isfahan, Shiraz and Tabriz. Table (2) shows the features of these cities.

Name of Metropolis	**Population**	**Area (Km^2)**	**Congestion (Persian in per Km^2)**
Tehran	8429000	730	10555
Mashhad	2510000	458	9150
Esfahan	1602000	267	5240
Tabriz	1459000	252	7780
Shiraz	1455000	178	6890

Table 2: Characteristics of the main metropolises in Iran

As it is observed, uncontrolled development in these metropolises is due to the unequal development of other cities, centrality of them in geographical limitations, being tourism, religeous and industrial places around

them possibility of earning high incomes as compared with income of some jobs like agriculture and husbandry.

This process has created more problems in different areas. Considering the little space of the paper, just the main traffic problems related to the main urban issues in these metropolises are considred.

4 THE TRAFFIC PROBLEMS OF URBANIZATION IN METROPOLISES OF IRAN.

The traffic challenges on the requirements of developing the land uses and the urban spaces necessary for the development of metropolises in Iran are:

4.1 Problems caused by disregarding the localization of land use

In most of the metropolises, different land uses are established without suitable localization, and unfortunately access to the land use is not possible for disregarding the rules of determining the appropriate place of land uses and also disregarding the relevant models (gravity model and land use allocation model), distribution of the necessary traffic systems and the nature of access to the land use. This violates the essential rules on classification of urban ways and access hierarchy

4.2 Disregarding the logical distribution of land uses.

Disregarding the nature of trips distribution in the spatial organization of cities in principle causes disregarding the situation and the quantity of land use effective in production and attracting the urban trips including trade, sport, educational, administrational and recreational centers, and this causes creating extra trips.

The correctness of this subject can be observed as compared with the rate of trips in lieu of every person or family comparing the ownership coefficient of automobile; the rate of trips is more than the ownership coefficient of automobiles in metropolises which is more as compared with the developed countries.

4.3 Problems caused by the unsuitable determination of compressions considering

The discussion of determining the suitable compressions like population and structural ones creates a balance in supply and demand, and creating the suitable compressions with urban facilities causes order in different districts over the recent years, with regard to using the self- rule policies of municipalities, unfortunately of the main ways of earning the income of municipalities has been the uncontrolled sell of residential, commercial and administrative compression disregarding the capacity of neighbour hoods.

the lack of development of directions has created more traffic problems, increasing the duration of trips and decreasing the service level of ways.

4.4 Disregarding the pre capita of different spaces

Considering the spaces allocated for the residential and commercial spaces, as compared with the per capita allocated for the traffic spuces and parkings, it is observed that disregarding the suitable per capita for the traffic network, disregarding the suitable rates enhances the capacity of passageway network and high density, and the service level is decreased.

4.5 Disregarding the appropriate zoning

Disregarding the zoning of metropolises, the residential, work and recreational performances as well as impossible performance of spaces, integrating these spaces makes the anticipation of the necessary passage way network impossible; and in the future developments of passageway network, more problems have been raised.

4.6 Non- integrity of neighbor hoods

considering what was mentioned before, disregarding the density in establishment of various units causes unappropriateness between the passageway network connected to the land use (especially in old- texture areas_ and other problems raise on direction development (which requires more expense)).

4.7 Destruction of historical and cultural structures and green spaces for passageway development.

The cases mentioned before accompanies another problems including destroying the spaces to develop the directions and to improve the passageway for the new land use which is observed in most metropolises. It harms the old and historical texture of the city and decreases the green space per capita.

4.8 Disregarding the original and destination distance of trips

Unfortunately the lack of comprehensive traffic studies on metropolises or disregarding their exit has caused that the original and destination distance of trips are not considered. Sometimes this problem causes extra trips and traffic difficulties.

4.9 Problems caused by concentration of trade centers on the old and central texture of metropolises

Considering that the growth of Iranian old metropolises has been performed disregarding the essential urban problems, the central sections of these cities have always attracted more passengers. The impossibility of passageway development has been a challenge on this subject, considering the old urban texture, more cost or destruction of old spaces. This has caused more traffic problems in spite of the demand decrease and other traffic management plans in these districts.

4.10 Problems caused by non- development of high- capacity public traffic

Due to the lack of performing the comprehensive traffic plans over the recent years and the lack of metro or motor rail, using the private cars or bus does not meet the traffic needs.

5 CONCLUSION

The Iranian metropolises are the result of the development of old cities, and the lack of their balanced development due to the uncontrolled immigration from the around villages and cities has made that they face with more traffic problems.

Such problem as the lack of comprehensive plans in metropolises, unappropriate localization of land use, illogical distribution of land uses, problems caused by the unsuitable allocation of densities, disregarding the various space per capita, the lack of integrity in neighborhoods, disregarding the access in planning the urban passageways, destroying the old structures and green space, disregarding the original and destination distance in trips and extra trips, uncontrolled land use in the central districts of cities and the undeveloped traffic systems are the most problems that have caused more traffic problems in the metropolises of Iran, which were considered briefly for the little space of paper.

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An Introduction to Socio-spatial Consequences of Urban Poverty in Iran

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1 ABSTRACT

Urbanization is proceeding at an unprecedented scale creating many challenges, especially about how - in a sustainable way - to feed, shelter, and generate employment for the people projected to be added to the population of cities. In cities across the globe, especially in developing countries, hundreds of millions of people live in desperate poverty without access to adequate shelter, clean water, and basic sanitation.

In developing countries like Iran, overcrowding and environmental degradation make the urban poor not only vulnerable to the spread of disease, constant threat of eviction, crime and violence but also affect urban spaces and environments both socially and spatially and given the weaknesses of governance structures, the appalling environmental conditions that already exist in many cities, and existing infrastructure and service shortfalls all lead to manifestation of urban poverty and then, meeting the needs of these people appears an almost impossible task. In this process of urban growth and poverty, slum settlements emerged in most cities of developing countries. These settlements have some characteristics in common with other slum settlements across the glob as well as some unique features related to the history, culture and economy of the area. In Iran, while natural population growth has been the major contributor to urbanization, rural-urban migration continues to be another important factor leading to great increase of urban poverty and negatively affecting the social and spatial dimensions of urban life. In this paper the intention is to analyze the causes and socio-spatial consequences of urban poverty in Iran.

2 INTRODUCTION

According to the United Nations, the global urban population will grow from 3.3 billion people in 2008 to almost 5 billion by the year 2030 (UNFPA 2007, 1). This urban expansion is not a phenomenon of wealthy countries. Almost all of the growth will occur in unplanned and underserved city slums in parts of the world that are least able to cope with added demands. The pace of urbanization far exceeds the rate at which basic infrastructure and services can be provided, and the consequences for the urban poor have been dire. Failure to prepare for this unprecedented and inevitable urban explosion carries serious implications for global security and environmental sustainability [1]. In cities across the globe, hundreds of millions of people exist in desperate poverty without access to adequate shelter, clean water, and basic sanitation. Overcrowding and environmental degradation make the urban poor particularly vulnerable to the spread of disease. Insecurity permeates all aspects of life for slum dwellers. Without land title or tenure, they face the constant threat of eviction. Crime and violence are concentrated in city slums, disproportionately affecting the urban poor. Most slum dwellers depend upon precarious employment in the informal sector, characterized by low pay and poor working conditions. Illegal settlements are often located on hazardous land in the urban periphery. Perhaps most alienated in city slums are growing youth populations whose unmet needs for space, education, health, and jobs can lead to social problems, further undermining security in urban areas.

3 POVERTY AND URBAN LIFE

Most studies attempting to describe urban poverty have focused on drawing out the characteristics of urban poverty, often by comparing rural with urban poverty. However, there is still much debate as to whether urban poverty differs from rural poverty and whether policies to address the two should focus on different aspects of poverty. In some views, rural and urban poverty are interrelated and there is a need to consider both urban and rural poverty together for they have many structural causes in common, e.g. socially constructed constraints to opportunities and macroeconomic policies. Many point to the important connections between the two, as household livelihood or survival strategies have both rural and urban components (Satterthwaite 1995). Baker (1995) and Wratten (1995) illustrate this point in terms of rural-urban migration, seasonal labour, remittances and family support networks and Baker (1995) illustrates how urban and rural households adopt a range of diversification strategies, by having one foot in rural activities and another in urban. Conceptualizing urban poverty as a separate category from rural poverty is also problematic because of different yardsticks for defining urban in different countries. The urban-rural divide is more a continuum rather than a rigid dichotomy [2]. In urban areas, an important aspect of poverty is often

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manifested as the lack of adequate housing and infrastructure. Poor people in cities may have greater cash incomes, but these may be unstable and inadequate, especially when considering the higher costs of living in cities, such as transport and housing. With a lack of formal housing options, many are forced to settle in slums and informal settlements, often on unsuitable land, or live 'invisibly' in overcrowded buildings, and far from employment opportunities. As they often do not own the land they occupy, or possess housing registrations and building permits, they lack a stable asset base, access to credit and basic services [3].

4 URBAN GROWTH AND POVERTY IN IRAN

In Asia, there are wide differences in the urbanization experience both between and within countries. This is illustrated by the differences in the extent of urbanization and projections for the future between countries. In general, there is a strong relationship between urbanization and economic development. Higher-income countries are generally more urbanized than lower-income countries, and urbanization increases more rapidly with economic growth in lower-income countries than in higher-income countries. Over the last five decades, Asia has seen some enormous demographic changes. One of the most dramatic changes of all has been the movement of people from villages to cities. The percentage of people living in Asian cities and towns, as compared to total country populations, is increasing fast. In 1950, about 232 million people lived in urban areas, which represented about 17% of Asia's total population. In 2005, Asia's urban population had risen to 1.6 billion people, or about 40% of the region's total population. There's no doubt that as the Asian region continues to develop, the level of urbanization will increase. The United Nations estimates more than half of Asia's total population will live in urban areas by the year 2025, and by 2030, it is expected that 54.5% of Asia's population will be urbanized. This means that by 2030, one out of every two urban residents in the world will be in Asia [3].

As in many other developing countries, Iran experienced an unprecedented population growth in the second half of the twentieth century. The population of Iran was reported to be about 19 million according to the 1956 census while the 1996 census recorded a figure of more than 60 million for the country's total population. Total population is now estimated to be more than 70 million persons. While the country's rural population has continually increased in the last decades, its proportion to the total population has shrunk from more than two thirds to about one third of the total population, based on recent estimates. The rapid expansion in urban population in Iran between1980-1990 has occurred without the needed expansion in basic services and productive employment opportunities. The problem was compounded by weak urban government structures with very limited capacity to stimulate economic growth, mobilize resources and provide the most basic services (The war between Iraq-Iran caused a delay in planning and preparing a long term Master plan). Investment in urban areas does not mean to undermine rural development.

The concentration of population in the capital and to a lesser degree in other urban centers, along with tertiary sector enlargement, motivate more and more people to leave tribes, rural areas and smaller towns and cities and reside in the capital and other major urban areas. Concentration of population in itself, coupled with class polarization and informal sector's enlargement, means the availability of more and more urban parasite work. Availability of this kind of employment in its own turn leads to the attraction of more migrants into the major urban centers. As migrants arrive at cities looking for any job to get by, the increasingly acute shortages of housing, overcrowding, and inadequate social services, become a part of daily life in urban centers. At the same time land and housing speculations which are routine practices in an economy in which the tertiary sector has the upper-hand, prevent masses of urban poor especially those who are not organized and work in the informal sector, to find shelter in cities [4]. In this process of urban growth, slum and informal settlements emerged in most cities of Iran, especially in the capitals of provinces. These types of settlements represent the constant struggle of the poor to cope with inequalities that are institutionalized and reproduced within societies. In Iran, the cost of housing has always been considered to be the most important item within a family's expenditure basket. On the other hand, for a slum settler securing a shelter, no matter where and under what circumstance, means the elimination of rent and at the same time excluding better nutrition and clothing. The make-up and appearance of many informal settlements are very often misleading. There is no doubt that such settlements are poor, the majority of the population has miserable lives, and the basic needs of many families cannot be met. But the appearance of the neighborhoods, due to a number of cultural factors, habits, and living styles, may be far worse than what

it actually is. Additionally, it is important to understand the dual and contradictory nature of informal settlements in Iran.

5 UPGRADING PROJECTS FOR SLUM SETTLEMENTS

Widespread problems resulted from formation of informal and slum settlements urged many international organizations, donors, and community groups to address the increasing scourge of urban slums worldwide. In the early Twentieth Century, slum improvement programs in many countries were equivalent to slum clearance—hardly a solution to the problem of lack of adequate housing in developing country cities. Beginning in the 1970's the strategy shifted to one of improving and consolidating existing housing—often by providing slum dwellers tenure security, combined with the materials needed to upgrade their housing or—in areas where land was plentiful—to build new housing. Emphasis on in situ improvements has continued to the present. These improvements may take the form of providing infrastructure services and other forms of physical capital, but also include efforts to foster community management, and access to health care and education. At the same time, some have called for replacing slums with multiple story housing either at the site of the original slum or in an alternate location [5]. Among different kinds of projects planned to address the issues of slum settlements, one of the recent and most common projects regarding slum settlements is referred to as upgrading project. Slum upgrading, as opposed to slum redevelopment or slum clearance, is now widely acknowledged as one of the more effective means of improving the housing conditions of the poor and has been hailed as a 'linchpin' of any urban poverty strategy. It has been defined by the Cities Alliance as consisting of 'physical, social, economic, organizational and environmental improvements undertaken cooperatively and locally among citizens, community groups, businesses and local authorities [6]. Most of the core elements of a slum upgrading project involve construction of physical infrastructure: water lines, sewer lines, pumping stations, street paving, schools, clinics or hospitals. These elements require the investment of capital in or very near the slum. Improvement of the houses in the slum also requires capital. Since slums are typically densely settled areas, these capital investments produce economic benefits immediately at a per capita cost that is quite reasonable [7].

Urban Upgrading and Housing Reform Project (UUHRP) for the Islamic Republic of Iran funded by the word Bank was implemented in 2004. Iran has received financing in the amount of US$ 80 million equivalent from the World Bank toward the cost of the Urban Upgrading and Housing Reform Project, and it intends to apply part of the proceeds to payments for goods, works, related services and consulting services to be procured under this project. The project is to be implemented in cities of Zahedan, Bandar Abbas, Kermanshah, Tabriz and Sanandaj and includes three components in which component A lays the foundations for launching and sustaining country-wide urban upgrading programs. Component B aims at enhancing housing affordability and the efficient functioning of the housing market. It will consist of foreign and local technical assistance, training and equipment for further defining and implementing the priority actions identified in the Housing Sector Strategy and component C will finance the cost of office and equipment that are required for project management and implementation. To achieve the above, a three phase Adaptable Program Loan was prepared and is spread over a period of twelve years. The key development objectives of this project are to (i) improve the living conditions in under-serviced neighborhoods in up to five provincial capital cities and; (ii) prepare the systems, capacity, and regulatory foundation and initiate market based housing sector reforms. Like UUHRP of other pilot cities in Iran, first phase of the project for Tabriz which included collection, classification and analysis of data is almost fulfilled, but the consequent phases have not been accomplished yet.

6 CONCLUSION

It is important to recognise that the performance of a number of cities in Iran in carrying forward major pro-poor reforms and programmes in land and housing provision has been encouraging. However, for such slum prevention policies to have an impact on the ground there seems to be need for a lapse in time. Generally, the replication and scaling up of successful initiatives in a particular city to national level remains a serious challenge, and meeting the targets is particularly difficult because of inherent complexities due to unique topography of the area, the number of actors and their diversity, the pervasive effects at all levels of inadequate policies, regulations and their enforcement, the lack of adequate information and the need to find

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solutions tailored to suit local conditions. Given the region's relatively high slum prevalence and slum growth rates, the immediate steps toward meeting the upgrading targets must be accompanied by actions aimed at reducing the current rate of formation of new slums, that – if unaltered – would lead to much more slum dwellers in the area. Therefore, actions on two directions are required: upgrading of existing slums and prevention of new ones. To this end, both adaptive and preventive strategies have to be applied simultaneously in addressing the slum challenge in this area: firstly, a participatory approach to upgrading of existing slums; and, secondly, adoption of urban policies designed to prevent the emergence of new slums.

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Analysis of the Fabric of Hawramane Takht Village from Natural and Climatic Point of View

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1 ABSTRACT

The population growth and human's need for a suitable settlement, serious increase in energy and fossil fuel consumption over the past years and human interference in the nature led him to think of new methods of climatic design of the settlements and conservation of fossil fuel that he could get his requirements without harming the natural environment.

The village of Hawramane Takht is the centre of Hawraman township of Servabad country which is located in the southwest of Kurdistan province, Iran.

The village is a precious form of climatic and natural architecture which can be seen as an extreme use of solar energy and fossil fuel conservation. The fabric and spatial structure of Hawramane Takht village is generally formed by a set of neighborhood units, footpath and public open and enclosed spaces which are on a high slope in the middle of the mountains by a close relation to each other and an organic interaction with natural environment.

Severe shortage of land to be developed, cold climate and mountainous area are the leading causes of a dense complex settlement in the middle of mountains which provides a combination of positive and negative surfaces. In this pattern of mountainous architecture, the roof of each house (building) is the yard of the house above or a part of public footpath. The connection and coherence on public context image and serial juxtaposition method toward south in order to prepare the light and heat are features of this architecture.

Now in the analysis of fabric structure and architecture of the village, the role of the architectural design to respond climatic issues is more understandable. Organic and entirely functional structure has composed a special typological architecture which has its own sensible traits as following items:

1. Adapting to Organic architecture basis.

2. The lowest interference in the natural environment.

3. Harmony of structural architecture with the organic typography and natural environment.

4. Applying the local natural materials.

Precise analysis of the fabric of this village, could lead us find best methods to design new settlements especially in cold regions, more climatically to make a better environment and save more energy to conserve it to next generations.

Keywords, Hawramane Takht village, climatic design, energy conservations, fabric of village

2 INTRODUCTION

Human has thought of settlement to protect him from learning wild animals, extreme weather and any dangers which might threatens them. It is noticeable that architecture has not been formed from the begging and as times went on and human's try efforts and the lasting influence of environment on human to have the idea of improvement are most important elements of forming the conceptual architecture.

3 REASERACH METHODLOGY

In the theoretical research relevant concept and definitions of sustainability and vernacular settlements were studied in the experimental research, required information was collected through survey methods in a descriptive –analytical way in Hawraman-e Takht village. In this research by analysis of the village of Hawraman-e Takht and its architectural and environmental features and also by paying attention to theoretical methods of organic architecture and using solar energy in this village, a complete report of fabric texture and location is achieved that can be gained a special climatic design which can be used in similar areas.

4 IS THE ARCHITECTURE IN HARMONY WITH THE NATURE?

Could human improve his architecture without harming the nature and its environment? The village of Hawraman-e Takht is a valuable paradigm of an organic architecture with its residents by having a good concept of the nature and environment ,climatic designing and best usage of solar energy could build a village like a town without damaging the nature and environment, which although is located in ragged mountains but could have the communications with its own feature for the sites which have similar climatic conditions.

5 GEOGRAPHICAL LOCATION OF THE VILLAGE OF HAWRAMAN-E TAKTH (HAWRAMAN-E TAKHT FROM THE HEIGHTS)

It is the center of Uramanat which is located in southeastern Marivan with a 75Km road linking to Marivan this village is located in an East –west valley in a steep declivity opposite the northern side of the Takht Mountain. [1]

Fig. 1: Satellite map of Hawraman-e Takht

5.1 Why this area is called Hawraman Takht?

Hawraman is comprised of two words "Hawra" or "Hura" which means Ahura and "Man" the meaning house, a place and land. Therefore Hawraman means an Ahuraic land or the land of Ahuramazda. In Avesta "Hur" means the sun and Hawraman means the place for the sun. [2]

6 CLIMATIC CONDITIONS OF THE VILLAGE OF HAWRAMANE TAKHT

Hawraman-e Takht and Marivan are located in a very cold mountainous region which has cold winters with long snowfalls and short and cold summers. This area is very high in comparison to the sea and is surrounded by Northern Zagros mountain range which causes extreme weather and difficult climatic conditions.

Fig. 2: Hawraman-e Takht in winter

7 WATER RESOURCES

Permanent spring waters, and water well and "Sirvan" river are the main water resources. Sirvan is a significant water resource that two parts of this river reach this area from North and southeast, and after they meet each other in a place called "Duab" and then leaves Hawraman and Kurdistan province and finally reaches to Darbandikhan dam in Iraq. [3]

Fig. 3: Sirvan River

8 LAND USE IN THE VILLAGE

The natural environment including high slope lands, stones and root rocks have made almost 52.7% of the village lands to be useless but the main land usage is residential (26%) and street networks (13.8%) and the other land uses are educational religious, healthcare , business and manufacturing.[4]

9 ARCHITECTURAL TEXTURE OF THE VILLAGE

The village is a precious form of climatic and natural architecture which can be seen as an extreme use of solar energy and fossil fuel conservation. The fabric and spatial structure of Hawraman-e Takht village is generally formed by a set of neighborhood units / footpath and public open and recloses spaces which are on a high slope in the middle of the mountains by a close relation of each other and an organic interaction with natural environment. Severe shortage of land to be developed, cold climate and mountainous area are the leading causes of a dense complex settlement in the middle of mountains which provides a combination of positive and negative surfaces. In this pattern of mountainous architecture, the roof of each building is the yard of the building above or a part of public footpath. The connection and coheres on public texture image and serial juxtaposition method toward South in order to prepare the light and heat are features of this architectures.

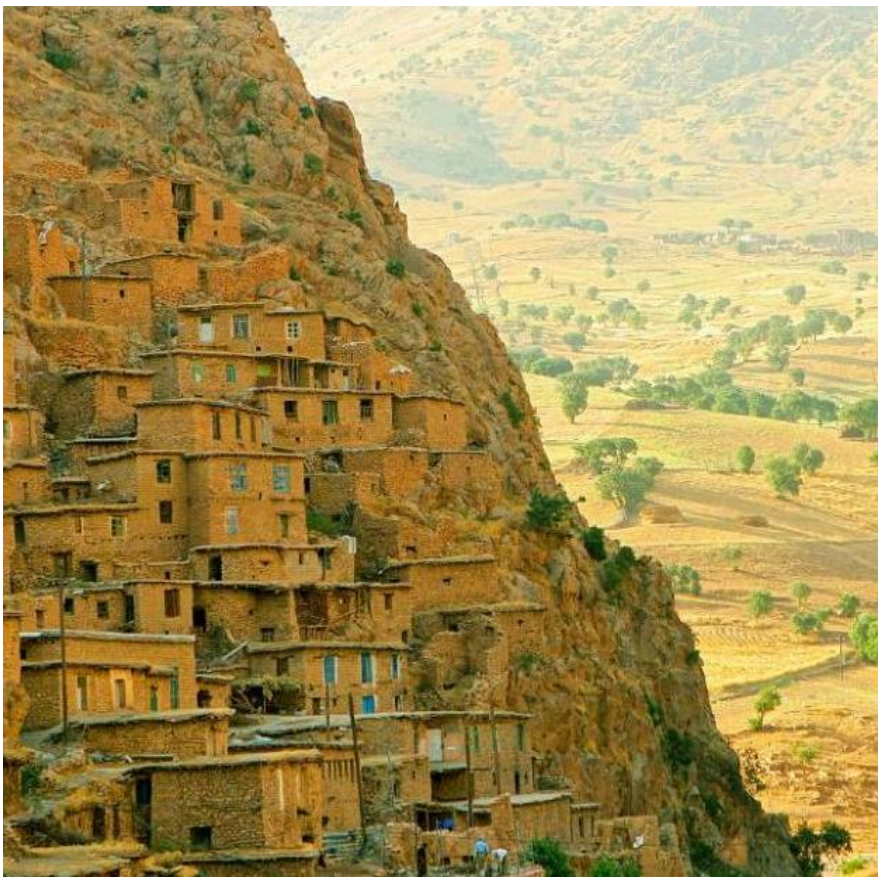

Fig. 4: Hawramane-Takht Texture

10 ARCHITECTURAL FEATURES OF THE VILLAGE

One of the most important architectural features of the village is obeying the architecture rules; here are some of those features:

10.1 Nature and environmental conservation:

The construction in the village has not damaged the nature, unique stairway architecture is according to the high slope of the mountains there, that the village is constructed on a very high slope of the mountain base .This form of architecture even does not harm the nature and is accepted as a part of the nature which is a kind of respect for the nature and the facade is like to come out of the nature and is a part of the mountain itself.

10.2 Using the local materials:

Local and mountainous materials have been used in the architectural texture construction of the village in which houses are built with pieces of stone piled upon each other without the use of any construction materials. Any materials which harm the nature are not seen at all in this village, the texture of each building in the village is quite similar to the nature of Hawraman which is seen as a part of the nature.

10.3 Form follows function

In the construction of the village the function is not only considered although form and function are combined, for instance, in the stair way shape of the village the roof of each house (building) is the yard of the house above or a part of public footpath as a response to high slope of the mountain and the form completely follows the function.

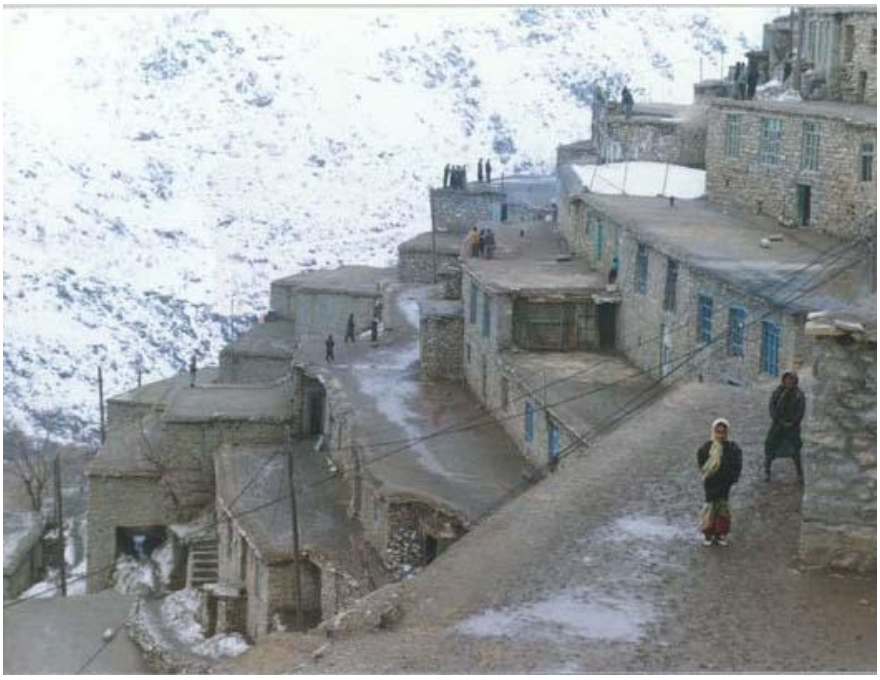

Fig. 5: Stair way shape of the village

11 ARCHITECTURAL FEATURES OF THE VILLAGE IN RELATION TO CLIMATIC DESIGN

We could consider the feature below in climatic design and features of fabric texture design of the houses of the village.

11.1 Orientations of the buildings

The connection and coheres on public texture image and serial juxtaposition method toward South in order to prepare the light and heat are features. Using solar energy is very vital due to difficult transportation of fossil fuel.

Fig. 6: Buildings toward South (using solar energy)

11.2 Access for pedestrian and motorist

Because of high slope of the village the access of the motorist is just in the entrance of that via asphalt way, and the whole part of the village there is only pedestrian access, the mountains which its width sometimes are less than 2m and continues it the summit of the village by passing over the roof of the buildings

11.3 Dimensions of the windows

The windows are designed on the Southern and Eastern sides in which are vertical and their width are 1.40m maximum in order to use the maximum solar energy in cold seasons. In some cases that windows could cause heat loss, they are eliminated. In fact minimalism is noticeable. If Usage of windows is necessary, they are thin, otherwise the wall texture is without an opening.

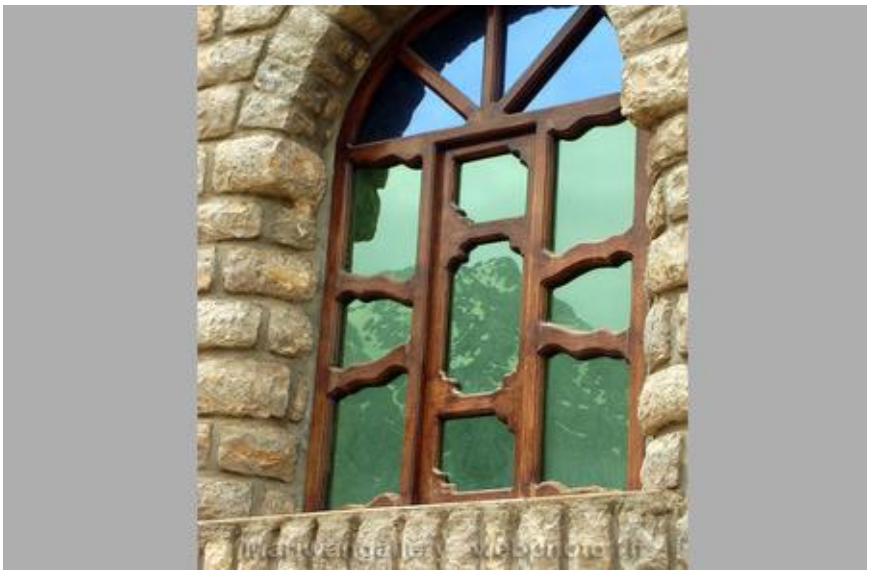

Fig. 7: Window

11.4 The gauge (thickness) of ceilings and walls

The thickness of ceilings and walls are, in a specific shape which heat conductance is prohibited, it means that the walls and ceilings with high thickness protect the inner heat in winter and the buildings stay cool in summer.

11.5 Materials

The materials which are used have high heat capacity; they hold heat and prevent the heat loss. Local wood has been used in making doors and windows and also wood has a vital role in columns and covering the ceilings.

Fig. 8: Stones without the use of any construction materials

12 CONCLUSION

In the analysis of the village of Hawraman-e Takht by consideration of climatic architecture design basis, a conclusioncan be reached that in the modern world which technology and population growth rate and fossil fuel consumption is very high and energy resources have decreased significantly in recent years, by analyzing environmental features of each area on organic architecture basis, fossil fuel conservation and pollution reduction would be gained and by using local and organic materials and solar energy, leads us have an organic sustainable architecture which is economically reasonable.

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ARGUS: Assisting Personal Guidance System for People with Visual Impairment

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1 ABSTRACT

Visually disabled people have striking needs for trustfully navigation systems enabling for efficient mobility services, mainly considering safety and autonomy. In this context, satellite-positioning and navigation technologies available are being implemented in innovative personal navigation devices. But existing products and solutions based on GNSS (Global Navigation Satellite Systems) fail because they lack accuracy and intergrity, they do not provide a suitable and efficient man-machine interface adjusted to this user segment, or rely on costly infrastructure.

The ARGUS project focuses on a satellite based navigation (GNSS/EDAS – EGNOS Data Access System) terminal for people with impaired visually capabilities, guiding them along pre-defined tracks using specifically designed HMI (Human Machine Interface) such as tactile, acoustic and haptic signals. It introduces the opportunity to develop an innovative guidance support system for visually impaired people based on the provision of a virtual-lead-line perception to the end user that can be perceived and followed. This will provide "track navigation" instead the classical "waypoint or route navigation" which is used for car navigation or people with all visual capabilities.

This system will be also usable for professional, scientific and sport activities developed in reduced visibility scenarios that could require accurate guidance on normal or emergency situations, as well as for other people working in reduced visibility environments needing guidance and assistance.

2 INTRODUCTION

Almost 300 million people in the world are visually impaired. About 90% of the world's visually impaired live in developing countries, and about 65 % are aged 50 and older, with an increasing elderly population in many countries, more people will be at risk of age-related visual impairment.

The global response to prevention of blindness have had specifi results in areas of progress over the last 20 years including prevention, eye care servicies, development of policies and strategies, campaigns to raise awareness, and stronger international partnerships with engagement of the private sector and civil society.

But this global response have also had one of the main areas of progress on the developmentet and implementation of technical assistance to the users. Despite the technology state of the art many questions remain open concerning autonomous navigation, acuracy, integrity.

3 MAIN OBJECTIVES OF THE PROJECT

The ARGUS project focuses onto the development of a service platform and a satellite based navigation terminal for people with impaired visually capabilities, to guide them along a pre-defined track, using acoustic and audio-haptic signals. In this sense, the ARGUS system provides a virtual guidance rope for blind and partially sighted persons or people working in environments with low visibility (emergency and rescue services, etc.). Based on GNSS systems, ARGUS acts as a leading climber providing a safety rope to the persons following, leaving for them a secure path.

The main goal of the project is to develop a GNSS based mobility service for people with impaired visually capabilities, to guide them along a pre-defined track, using acoustic and audio haptic signals, which meets the level of accuracy, integrity and reliability they need in urban and outdoor environment for improving their day to day life autonomy.

ARGUS project primarily retrieves benefits from satellite navigation services and technologies to increase the level of positioning accuracy and reliability as well as the level of service availability. But the ARGUS project will also develop a whole set of services aimed at pragmatically support visually impaired people in their day-to-day life mobility. For this purpose, some specific objectives are considered:

- To build up a commercial navigation product for visually impaired people which guides them with acoustic and audio-haptic signals along a secure, pre-defined track. The positioning component uses satellite based positioning
- To develop tactile signals, acoustic and audio-haptic ones, for providing a non-visual track perception and mental map of the path, and supporting the guidance of visually impaired people along a pre-defined track.
- To develop an application for authorised third parties. With the application software, stored pre-defined tracks can be transmitted to the user terminal on demand. Furthermore, the application software uses the positioning information from the user terminal to compute protection levels and re-transmit alerts in case of emergency (e.g. degraded positioning accuracy, etc.).
- Provide an intelligent guiding portable device to support ageing population and visually impaired people.
- Provide updated data through a public Web services sharing information collected by ARGUS users with other ARGUS users or with general public

4 HOLOPHONIC SYSTEM

Throughout history, multiple solutions have been designed to help in guiding blind or visually impaired people, based on different technologies. Speech based techniques, as well as more sophisticated devices based on handheld haptic display using verbal and non-verbal communication technologies for visually impaired pedestrians have been developed and compared. However, the ARGUS project will focus on a specific audio-haptic signal, which is holophony, providing spatial information through three dimensional sound perception.

Therefore by using the holophony the users perceives 3D sound positioning. Based on this holophonic sound perception, the main goal of this project is to guide the visually impaired person through a preselected route. This route can be selected over previously recorded tracks (natural routes: no multilayer cartography available) or selecting origin and destiny (city or urban scenarios, multilayer cartography available). This route is a series of continuous geolocated points in 2D, therefore this geographical map has to be translated into a sound map (holophony) as it is shown in the next figure.

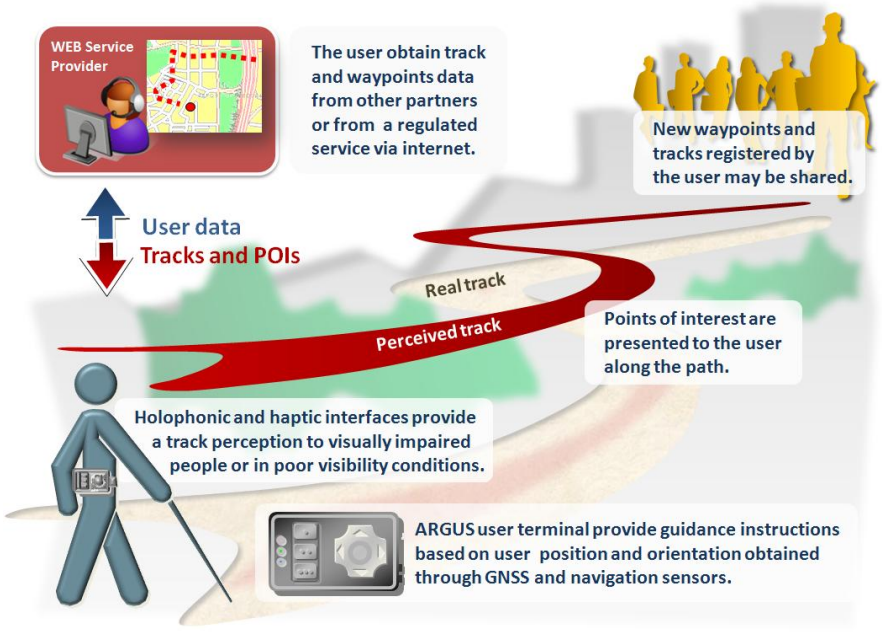

Fig. 1: Navigation based on track perception

Holophony technology record the wave sounds, the way those are received at the tympanic membrane. For that purpose, holophony use auditory system dummies, capturing even the slights differences perceived by the ears caused by direction of the coming sound. Then, holophonic sound recorded may be reproduced by a stereo headphone creating the illusion that sounds come from specific directions and distances.

5 SYSTEM ARCHITECTURE

The ARGUS system will be compound by the next elements:

- A user terminal that corresponds to a portable GNSS based navigation terminal capable of guiding the user along a pre-defined track, using acoustic and audio-haptic signals, and allowing internet access for remote service supply and navigation augmentation.
- A service platform corresponding to the assistance and service platform based on a client-server architecture which will offer services all along the three travel stages i.e. before (planning), during (visiting destination) and after (remembering and sharing experiences).
- Personal user software that corresponds to the software for personal usage to configure the user terminal or load particular navigation information to the user terminal.

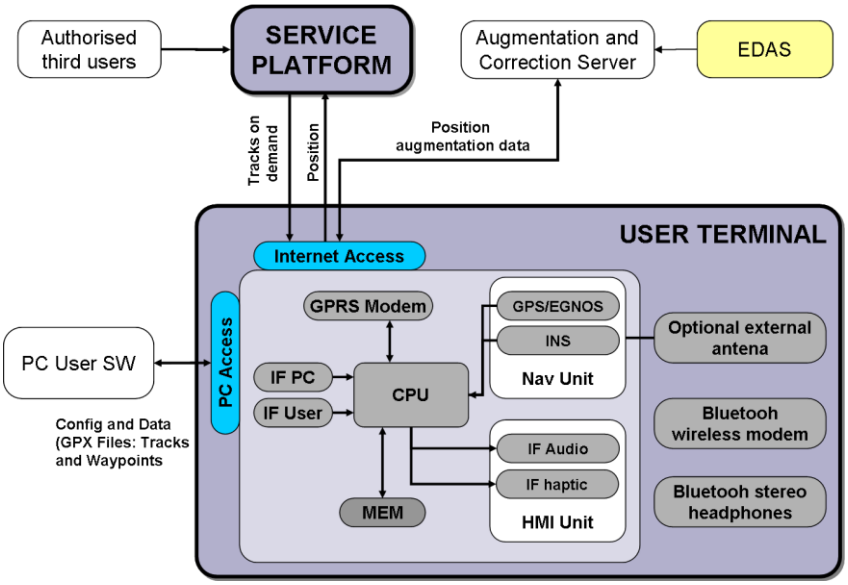

Fig. 2: ARGUS system architecture

5.1 Service platform

Assistance and service platform will be based on a client-server architecture which will offer services all along the three travel stages i.e. before (planning), during (visiting destination) and after (remembering and sharing experiences) in order to:

- Prepare their itinerary at home, taking into account specific scoring processes enabling the integration of route safety in the itinerary calculation.
- Manage their itinerary in real-time, with an accurate positioning.
- Contact the call centre for any technical or practical request (such as programming a modified itinerary or new track request).
- Share experiences with other users, improve the system and enrich the locations database with personal comments and points of interest (POI), trough the community website (social network).

5.2 Multilayer database structure

For routing calculation GIS (Geoinformation system) information is required, therefore different kinds of GIS systems will be tested. On one hand commercial cartography such as Teleatlas and/or Navteq and, on the other hand, local GIS information if it exists. Additionally OpenStreetMap cartography will also be tested since this is an open source initiative and could be added to the product with no extra cost.

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Nevertheless ARGUS is not a replacement for the white cane so the accuracy of the positioning for guidance is important but is not necessary in the cartography where map matching techniques will be used.

Geodata strategy is based on database interconnected layers. Three different layers (data based structured) will be used (TBC) to tackle the objective of the project. This data bases are queried by the algorithms to get the required information so that the accurate itinerary can be defined

- City GIS Database, OpenStreetMap, or commercial database Teleatlas/Navteq
- General information layer
- User generated personal data based: accessible through a web based social network

5.3 ARGUS Website Structure

The project includes setting up and maintaining a public Website providing different services to the users of the ARGUS device, and a collaborative environment open to any persons and organizations that can participate in a social network to help improving the experience of the main users.

The main functionalities implemented in the website will be:

- POIs management: This block allows the users to manage personal Points of Interest and share them with other people.
- Route Calculation: The application to calculate routes from one location to another. Information about the trip, including POIs, will be send to the server where an algorithm will calculate the optimal route taking into account the restrictions of the POIs. Finally the algorithm gives back a file containing the indications to be followed by the user. This file can be stored in the computer and /or loaded into the embedded device.
- Web 2.0: It is dedicated to share experiences of the user and acts as a social network for visually disable people. Any other person (not only visually impaired) could also register in the system so that they can collaborate with auxiliary tasks such as collecting data to feed the system, validate the quality of the data and ensure that there are no changes that could imply risks to the users, or communicate with the users of Argus to share experiences.

6 CONCLUSION

The technical challenges comprise the overall development of a guidance system, which enables the users to follow a pre-defined path autonomously without seeing it by using tactile, acoustic or audio-haptic signals. One main challenge is the tailor-made development of a suitable Kalman Filter for the application under consideration in order to adapt it most suitable to the dynamic behaviour and thus the so-called dynamic movement model. Thus, extensive work will have to be spent onto this issue. Furthermore, the protection level algorithm has to be tailored carefully taking into account the target environments and ways of the potential users. The HMI which integrates multisensory actuators (acoustic, audio-haptic, and visual) is also a very challenging part of the development because of the necessity to integrate the different actuators in a most suitable strategy.

In order to accomplish the track guidance, it will be necessary to develop the holophonic sound map. It will allow accomplishing an innovative solution for the user perception of a non visible track path, and the development of the system that will allow visual impaired people to navigate the track in a safe way.

7 ACKNOWLEDGEMENTS

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Building up Land Use Management Skills

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1 ABSTRACT

Structural changes in society, particularly those that have rapidly occurred in the New Member States (NMS) over the past two decades, resulted in pressures on urban land use management, which ordinary planning procedures were unable to understand or address. This led to planning systems not being able to react to new forms of development pressures arising from new demand patterns. Consequently, it had resulted in a large amount of underused and dilapidated urban land, while at the same time ever increasing Greenfield developments caused a deterioration of land use sustainability and a reduction of local competitiveness.

This paper will discuss approaches of various EU-financed projects focused on building up urban land use management skills in the Central Europe area, especially in the NMS. Five projects from two different EU programs will be reviewed, all with a focus on upgrading urban land use management skills. These approaches, the spectrum of their beneficiaries and their outputs would be examined. The projects LEPOB, BRIBAST and BROWNTRANS from the programme Leonardo da Vinci would be discussed in detail and their local impact would be assessed. From the programme Central Europe, the projects CobraMan and CircUse would be considered and their reach and potential benefits to participants and to local stakeholders would be described.

2 BACKGROUND TO THE URBANISED LAND USE SITUATION IN CENTRAL AND EASTERN EUROPE

The societal and system changes of 1990 installed democracy and market economy to the Central and Eastern Europe states, but they have also put these states through a steep learning curve, which have necessitated an adaptation of their governance formats, changes to their legal frameworks, amendmends to their production or security patterns and reshaping of many of their societal processes and relationships. Furthermore, to attain EU accession prior to 2004, these countries also had to absorb a large amount of EU directives into their already rapidly changing legal frameworks. For a number of issues covering the accession agenda, the candidate states have received ample Technical Assistance from their EU peers. But there was no EU Technical Assistance channelled in the direction of spatial planning and urban development skills, because these fall under national responsibility. And at that time, having their hands full with the accession process, these candidate states failed to address their national, regional and local urban development issues correctly. The changes in society and economy, combined with an absence of spatial planning and urban development skills able to cope with free market situation, have caused a vast amount of an underused Brownfield land to emerge in the candidate states by the beginning of the third millennium, while Greenfield developments have sprung in ever increasing numbers. Upon joining the EU, these NMS were placed in a position where they had to compete on an even footing with much more sophisticated urban management processes in the "old" EU member states.

The lack of development knowhow combined with subsidarity governance principles and unmonitored local planning powers have rapidly worsened land use sustainability in many local communities. Often, local governments considered increases in urbanised land (in no way matched by population increases) for a symptom of local growth. This has caused a large loss of agricultural, natural and forest land to various development activities, produced unsustainable urbanised land use and increased costs of externalities. It has also lowered local, regional and national competitiveness. The societal loss of soil environmental services, which have occurred due to such urbanisation, was not and till today is still not, sufficiently valued or sufficiently compensated. Back in 2003, the EU candidate states had access to EU ISPA funding. But the ISPA funding priorities had no urban dimension and therefore sustainable urban land use – such as Brownfield redevelopment is - could not attract any of the EU funding support. Local support to Brownfield reuse was also problematic. This was mainly due to gaps in land use management skills and to the fact that Brownfields as such were not a "recognised" planning issue or national programs priority.

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3 CZECH NGO INTERVENTION

Faced with these difficulties a Czech NGO, the IURS – Institute pro urdžitelný rozvoj sídel o.s. has addressed this lack of Czech land use management knowhow, initially with the aid of an US grant funding. At beginning of its activities, IURS has concentrated on support for Brownfield reuse, as it was the least controversial and at that time the most pressing urban development issue. The First Czech Brownfield national and regional stakeholders seminars back in 2001 and the ensuing analyses have revealed the main causes for failings in the Czech Brownfield land reuse. These were:

- The Brownfield issue was not "labelled";
- Nobody was responsible for the issue (nationally, regionally, locally);
- No data was available to gauge the size of the issue;
- Multi-disciplinarity and complexity of solutions was not understood;
- Knowledge how to achieve successful solutions was absent;
- Training was nonexistent, Brownfields literature in local language did not exist;
- National priorities to deal with the issue were absent;
- Local authorities freely deregulated Greenfield land for development on a vast scale.

Back in 2003, IURS undertook four important actions aiming to improve urbanised land use practices and promote Brownfield regeneration. Firstly, IURS lobbied at the Ministry of Regional Development to make Brownfields into a "visible" issue and have forced the institution to allocate departmental responsibility for it. Secondly, it lobbied the preparation of the Czech National Plan 2004-2006 and achieved that urban Brownfield priorities were introduced, making Czech Brownfields eligible for EU ERDF funding 2004-2007. Thirdly, IURS lobbied the government to channel research funding and a research programme with a focus on Brownfield regeneration was opened up by 2004. And finally, IURS identified an EU funding source, which would on transnational bases finance the development of teaching materials focused on Brownfield issue. Brownfields training or knowhow resources in local language were then absolutely missing not only in the Czech Republic, but also in the other NMS. IURS first three actions have made changes to Brownfield regeneration in the Czech Republic. The fourth action has changed Brownfield regeneration chances in another 6 EU member states. It has also placed IURS in a position of participation on several other international project and have lead to a substantial enhancement of IURS´s own urbanised land use management expertise.

4 LEPOB PROJECT AND ITS IMPACT

Preparing Brownfield training products requires three preconditions:

- Skills and experience in Brownfield regeneration;
- Best Brownfield practise and global/EU knowledge;
- Suitable funding source(s).

The funding source identified at that time, which could support preparation of Brownfield training products, was the programme Leonardo da Vinci. This programme was focused on continuing professional education. Brownfields training aimed at practising professionals was a perfectly fitting subject. Furthermore, this programme also demanded an international partnership, which proved to be an ideal solution for the needed international knowhow transfer. A partnership of 9 partners from 5 countries was formed and the project LEBOB – Life long education project on Brownfields [1] was applied for and awarded. European best Brownfield practise and Brownfield regeneration expertise was contributed to the LEPOB project by its British and the German Partners, who were also the initiators of the then emerging European Brownfield network CABERNET [2]. The other partners were the Czech, Silesia and Slovakia Chambers of charted engineers and expert and educational bodies from Poland Slovakia and Czech Republic.

[1] http://fast10.vsb.cz/lepob, (Leonardo da Vinci program)
[2] http://www.cabernet.org.uk (5th RF program)

The key goal of the LEPOB project was to create straight-forward education materials in local languages. Then, the main educational objective was to improve local urban development practices and strengthen local construction professionals understanding of underused urban land – Brownfields. This was achieved by making available and disseminating (throug local professional chambers) transnationally prepared educational and training materials, which were adapted into "country specific" versions and translated into local languages. Materials were produced with a focus, and at a level, which would be accessible to various professions of local construction practitioners. Additionally, the university partners have reused LEPOB outputs for preparation of their first regular Brownfield regeneration courses [3]. The second LEPOB objective was to introduce Brownfields training materials to the other EU NMS. Two "innovation knowhow transfers" were intended in the original LEPOB application - one was for the Balkans and the other was for the Baltic countries.

The LEPOB project alone has reached around 25 000 chartered engineers in Slovakia and in Czech Republic. They were provided with a CD containing the LEPOB Brownfield handbook, in their national language. The professional chambers partners have mailed the CD to all their members. In the Czech Republic, the Brownfield skills development directed at such a large membership of construction professionals proved to be very useful in focussing the ERDF 2017-2013 funding priorities, and especially effective in responses, which the construction professionals were able to perform, while supporting the applicants for these priorities.

This and the other previously mentioned activities have resulted in the Czech Republic becoming the Brownfield knowhow leader amidst the NMS and the ERDF funding availability has substantially raised interests in Brownfield regeneration. In 2006, the new Czech Construction Law has acknowledged the Brownfield issue in spatial planning terms, setting up grounds for Brownfield inventorying and urbanised land use monitoring.

But a real change in land use practices, which would fully address land use sustainability, takes time. Hence, despite substantial improvements in regeneration knowhow increase, in Brownfield redevelopments take-up and in improvements to Brownfield development practices, today in the Czech Republic the agricultural land loss index is higher than in any other EU country. It takes very well focused policies, a suitable legal framework, integrated approaches (vertically and horizontally) supported by stakeholder participation and an efficient land use management system to address the "real" urbanised land use sustainability. Not only the individual Brownfield sites needs to be reused but the governance of the urbanised land as such needs to be improved and sustainable urbanised land management has to be intoduced and practised on local, regional and national level. But this type of knowhow is emerging only a decade later.

5 BRIBAST PROJECT

Building on the LEPOB project's success, the BRIBASTS [4] project (Transfer of innovation - Brownfields awareness in Baltic States) was submitted in 2008 to the same funding source. The partners to BRIBAST were regional educational institutions from Latvia and Lithuania and the project LEPOB Czech and Slovak partners. The focus of the BRIBAST project was to adapt the LEPOB original training materials for local use in local educational institutions in Baltic states. The LEPOB Brownfield handbook was expanded and included extended chapters relevant to the Latvian and Lithuanian realities. The training course was shortened and made more suitable for teaching local undergraduates. The teaching was demonstrated to local trainers. At this time the ex-LEPOB project Czech and Slovak partners have acted as the Brownfield knowhow transfer experts. BRIBAST project was evaluated by the programme to be the best "Inovation transfer project" of the year.

6 BROWNTRANS PROJECT

To fulfil the last part of the project LEPOB goals, a new knowhow transfer project BROWNTRANS (Brownfield Regeneration Know-How Transfer – Lifelong Educational Project) was prepared in 2O1O, focusing on Brownfield knowledge transfer to Bulgaria and Romania. The overall outcome of this project is yet again to accelerate local sustainable urban development skills. This will be achieved by delivering know-

[3] Project LEPOB lead partner, the VŠB Ostrava, teaches regular brownfields courses from 2007
[4] http://fast10.vsb.cz/bribast (Leonardo da Vinci program)

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how and experience in Brownfield regeneration to practising professionals, representatives of municipalities and regions and to students who may once play an important role in local Brownfield regeneration. The specific aim of this project is to facilitate information and experience in Brownfield regeneration to the representatives of Bulgarian and Romanian municipalities and regions. The project will deliver training materials in local language and would also educate local trainers, in other that they are capable to teach aspects of a multi-disciplinary subject like the Brownfield regeneration. In the medium to long-term, the project outcomes would support Romanian and Bulgarian economic, environmental and social development in various activity sectors, and produce benefits for their whole society.

Materials generated by BROWNTRANS Could also serve for self-study of the interested public. The Brownfields handbook is going to be adjusted to contain legislative links in Bulgaria and Romania and would be available in these languages. The Brownfield Handbook and the Brownfield training course are to be published at the project website and shall remain there for several years, even after the project has ended. The training materials will be prepared in a format of e-learning course, which will be modelled on teaching materials from the project BRIBAST, but more emphasis would be placed on urbanised land use management. This is in order to accommodate the newest trends in supporting Brownfield regeneration.

The BRIBAST project will provide a multi-disciplinary background in Brownfield related knowledge, which would enable the Romanian and Bulgarian practising professionals to grasp the breadth of the Brownfield issue. It would also enable them to consider well-founded and integrated solutions. On a personal level, BROWNTRANS training brings to the participants an added value of the acquired knowhow, which would help them in their Brownfield regeneration jobs. On the national or regional scale, increases in Brownfield knowhow would help to address Brownfield regeneration in a more strategic manner and would lead to more sustainable urbanised land use management. Enhanced Brownfield knowhow (similar to the Czech example) is expected to increase the take-up and speed of Brownfield regeneration. That will be profitable for the Bulgarian and Romanian local municipalities, whose urbanised land use would become more sustainable. It would also be profitable for both societies, as it would contribute to more sustainable urban development.

7 COBRAMAN PROJECT

A few years later, in 2008, when the "Brownfields issue" became a more recognised label, the Central Europe programme's project CobraMan [5] has addressed the rising need of local authorities for a competent local Brownfield management (one of the key issues identified by the CABERNET network). This project has pooled experience of 9 partners from 5 countries, jointly working on compiling Brownfield manager courses, on training of Brownfield managers and on Brownfield inventorying techniques. It also created various land management tools, which the Brownfield managers could use. Some, but not all of this project's products are produced in local languages. Brownfield managers training was however available only in English. But the final Brownfields manager´s manual would be translated into local languages.

8 CIRCUSE PROJECT

Later in 2010, the project CircUse [6] has progressed the urbanised land use management know-how even further. CircUse has addressed the urbanised land use management as a cyclical process and advocated the principles of circular land use management. This circular land use concept was a know-how transfer of findings arising from the German research program REFINA. The CircUse project approach has introduced much broader urban land use categories into the urban land management process, which also included Greenfield sites. It promoted integrated approaches, based on wide stakeholder participation. Surveying of land use tools across the project partners countries have shown that the similarities and differences in the applied instruments were not the only factor of an efficient and sustainable land uses. Public awareness also played an important role, as well as optimisation of responsibility distribution and the ability to use available instruments in a creative way, while reflecting the specifics of respective social and natural environment. The main beneficiaries of the CircUse project are again the local authorities (but also various other local stakeholders), for whom the project prepares training products and urban use land management tools.

[5] http://www.cobraman-ce.eu/ , funding source program Central Europe
[6] www.circuse.eu, funding source program Central Europe

9 CONCLUSION

Transnational projects have positively contributed to Brownfield training and learning in the Czech Republic and together with a suitable local intervention and the ERDF funding sources availability were able to speed up Czech Brownfield reuse. There are 5 projects included in this paper, but during the last 10 years, many other Brownfield regeneration focused projects were financed by different EU programs sources and also from various members´ states funding . Many partner organisations have benefited from sharing expertises and learning.

Also, over the last decade, perception of the Brownfield issue as such has developed and shifted from initial soil contamination and soil remediation techniques to Brownfield remediation management (2003). In around 2005, there could be seen a shift from single Brownfield regeneration efforts to more comprehensive and approaches of sustainable Brownfield regeneration (2007). And from 2007, the initial approaches of a thematic Brownfield regeneration have moved more towards the urban and the spatial planning dimension, Brownfield land management and Brownfield manager training. In 2009, integrated Brownfield redevelopment was emphasized and in 2011 the holistic approach to Brownfield reuse was expanded even further, towards urbanised land recycling principles and towards sustainable urbanised land use management.

At all these stages, transnational and also national projects have produced various training and learning materials, focused on different beneficiaries: from specialist remediation engineers to Brownfield owners, Brownfield managers and finally to local and regional governance actors and their stakeholders. The initial materials were prepared mostly in English and some of them were not really suitable for use in the NMS. Since 2004, when these states started to participate more actively in Brownfield and urbanised land use orientated projects, training and learning materials also appeared in local languages. In some cases, the NMS partners were able to steer the training materials development to a standard, which was accessible to and usable by their national audiences.

The transnational knowhow transfer from the CABERNET network partners proved instrumental to the development of Central & Eastern Europe Brownfield projects in period from 2004-2008. Since then, various other initiatives have sprung up (for example the impact of the Central Europe or URBACT programs) which had altered the partnership focus more on Central European neighbouring countries. There are apparent benefits - these countries systems, history and mentality are relatively similar, but there are also disadvantages – the spatial determination of such programmes limits knowhow transfer from the top performing EU regions located between London and Milan to the NMS.

The large impact of the LEPOB project, especially in the Czech Republic, was caused mainly by a right mix of Czech partners and also by the fact that the dissemination partner had a very large membership. This membership was also well motivated to improve its Brownfield knowhow, by the work remediation opportunities arising from the ERDF funding priorities. Such a project impact was not as yet achieved again by any other projects, which are mentioned here. But there may be opportunities in the CircUse project knowhow, directly influencing the revision of Czech National Spatial Policy and there also appears to be a chance of formulating the regional approach to sustainable urbanised land use management.

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CARBOTRAF – A Decision Support System for Reducing CO_2 and Black Carbon Emissions by Adaptive Traffic Management

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1 ABSTRACT

The CARBOTRAF system combines real-time monitoring of traffic and air pollution with simulation models for the the prediction of CO_2 and black carbon emissions in order to provide on-line recommendations for alternative traffic management options. The system will be implemented within the framework of a FP7 (ICT for Transport) project funded by the European Union and will be tested in the cities Graz and Glasgow (http://carbotraf.eu/).

2 INTRODUCTION

Traffic congestion with frequent "stop & go" situations causes substantial CO_2 and black carbon (BC) emissions. Both CO_2 and BC emissions are known to contribute significantly to global warming [AEGPL2012]. Exposure to BC may furthermore have important health effects [EHP2012]. The traffic control measures available today (e.g. re-routing, traffic light control, dynamic speed limits, variable message signs) when driven by information collected in real-time from the road network, are able to support the reduction of emissions of CO_2, BC, as well as urban air pollutants. However, supporting the decision making in the traffic control centers to derive the necessary control actions from the information collected, in order to minimise emission requires the understanding of complex interactions between traffic, emissions and pollution density. This area is still subject of investigations.

3 OBJECTIVES

CARBOTRAF combines real-time monitoring of traffic and air pollution with simulation models for emission prediction in order to deliver on-line recommendations for alternative adaptive traffic management. The project work will focus on two main investigations.

(1) CARBOTRAF will provide combined real-time CO_2 and BC emission analysis for traffic situations and subsequent simulation of local air quality. The first phase of the project will evaluate the effects of different intelligent traffic management technologies (ITS) measures on total greenhouse relevant emissions as well as on ambient air quality of BC, by modelling and simulation of selected traffic scenarios for the test cities. The results will provide valuable information on efficient ITS strategies and will be used to define the optimal implementation in the test cities.

(2) Test implementation and test operation of real-time traffic management with online decision support will be the second phase of the project. Using AIT's smart eye TDS traffic monitoring [AIT1] and openUWEDAT [AIT2] data collection technologies a collection of emission-relevant traffic parameters will be developed. Such parameters can be (in addition to vehicle volume, fleet composition and speed), for example the portion of accelerating vehicles to improve emission estimation. These data, supported by data from existing roadside sensors such as induction loops, will be the input to the online decision support system. The decision support system will be based on IBM's Travel and Transportation Software Solutions [IBM1] and ILOG Optimization [IBM2] solution. It will provide recommendations to the traffic control centers, computed from the acutal and predicted traffic situations and emission scenarios. Test operations will evaluate the performance of the online decision support system and the actual effect of the ITS-aided traffic management on the emissions. It will provide guidelines and recommendations for adaptive traffic management regarding both, technical and operational issues. The CARBOTRAF project has started in Sep. 2011 an will run for three years.

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4 CONCEPTS

4.1 Emission and traffic scenario look-up-table database

After the selection of the test area which is based on the avaiablility and feasibility of implementing ITS measures that are able to reduce overall emissions, microscopic and macroscopic traffic simulations for different scenarios (e.g. weekday morning, weekend, etc.) and selected ITS actions (e.g. incentive for modal change to public transport, traffic light coordination, re-routing, etc.) will be performed. The results will be used to further refine the test area and select the most efficient ITS actions with respect to overall emissions. These traffic scenarios together with the emissions calculated by emission models will be stored in a look-up-table (LUT) database that links the traffic scenarios with the specific overall emission value for that scenario. Together with emission values the impact of the selected ITS measures on air quality, with a special focus on BC concentration, will be also computed and stored in the LUT. These operations are performed prior to the pilot installations and are sketched on the left side of Figure 1.

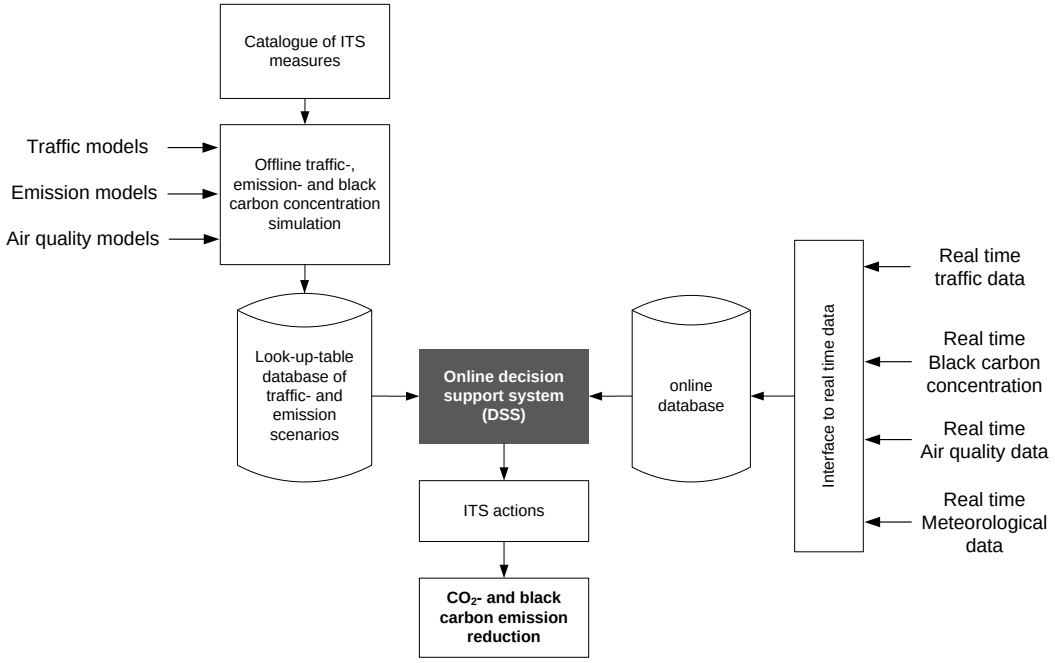

Fig. 1: General architecture of the CARBOTRAF system.

4.2 "Emission-specific" traffic monitoring

Traffic congestion with frequent "stop & go" situations causes substantial increase in emissions (CO_2, black carbon as well as air pollutants) in contrast to free flowing traffic. To derive the necessary control actions from the information collected requires modelling and computing the traffic state depended emission of vehicles. The output of vehicle emission models strongly depend on the acceleration state of the vehicles. Today's traffic monitoring devices typically collect information on traffic volume, fleet composition and average speed. However, there is currently no commercially available traffic monitoring device that is able to collect information in real-time on the composition of the traffic in terms of vehicle acceleration states (accelerating/constant speed/decelerating).

The smart eye TDS traffic data sensor is a fully embedded traffic monitor based on dynamic vision sensor (DVS) technology. The DVS is a CMOS imager chip with very high temporal resolution (better than 1 millisecond) as well as on-chip motion detection and background suppression [LICHT2008]. The pixels of the imager encode motion as time stamped x,y-coordinates in an asynchronous data stream. Thus the DVS efficiently encode the trajectories of the vehicles motion. The current smart eye TDS system monitors traffic on up to four lanes simultaneously and records speed and class individually for each detected vehicle [BAUER2007, GRITSCH2008].

Figure 2 shows data recorded for the concept evaluation of cars entering a roundabout. The still image of the roundabout and the two detection zones defined are depicted on the left of fig.2. Each detection zone extends

about 10 m (equivalent to approximately 40 pixels of the sensor) in the direction of vehicle movement. Example trajectory data are plotted in imager coordinates (x) as a function of time (t). Figure 1 (right) shows examples of about 15 seconds of data of four vehicles trajectories in space-time x,t representation. The high time resolution of the sensor allows extracting the vehicles trajectories with high precision. The trajectories for zone 1 show two vehicles with constant speed (marked "C"), and one vehicle decelerating ("D") and stopping at the entry.

Exploiting this information the individual vehicle data sets provided by the traffic data sensor in real-time are additionally tagged with acceleration information (accelerating/constant speed/decelerating states) to allow inferring the quantity of accelerating vehicles in the vehicle collective. This information will be used in the CARBOTRAF project to support the online calculation of traffic emissions for a test area.

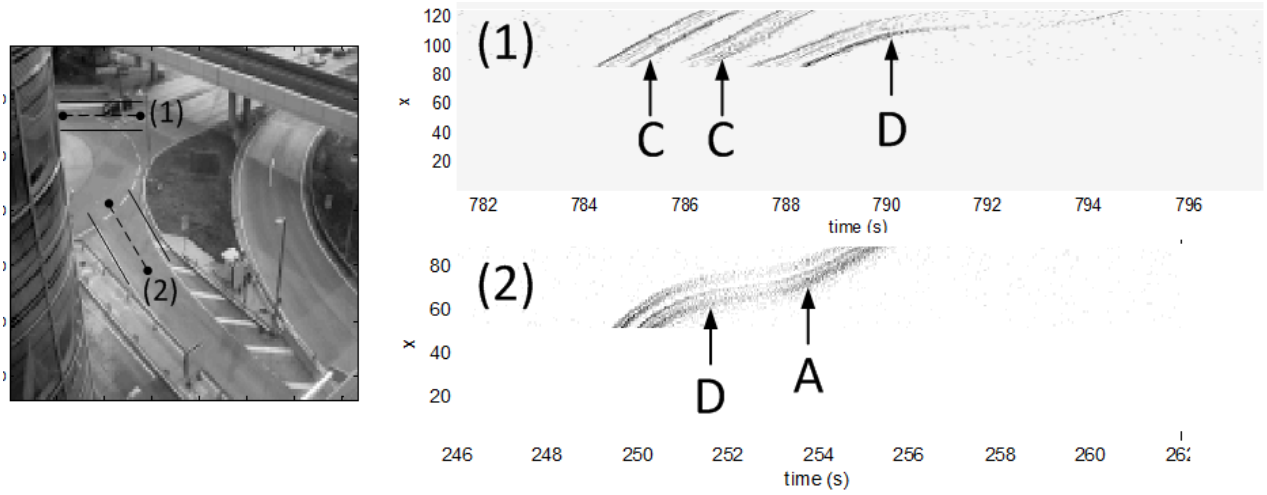

Fig. 2: Acceleration detection by vehicel trajectory analysis with a smart eye TDS traffic sensor. Test data recorded with the sensor at the two entries of a roundabout are shown. Uppercase letters indicate the vehicle acceleration state: "C" constant speed, "D" deleration, "A" acceleration.

4.3 Real time decision support

The decision support system (DSS) based on IBM's Travel and Transportation Software Solutions and ILOG Optimization solution is the heart of the CARBOTRAF system. It will receive real-time data from the sensors deployed in the test area and derives scenario-correlated emission values from the LUT (see fig.1, right). The major steps in the operation of the system are:

Step 1: Real time monitoring of the traffic situation

Traffic monitors (existing devices and additional smart eye TDS with acceleration detection capability installed by the project) measure speed, volume and composition of vehicles and detect emission relevant traffic states (e.g. number of accelerating vehicles). Air quality is also monitored.

Step 2: The traffic situation is predicted by the macroscopic traffic models of the DSS 30-60 minutes into the future.

Step 3: For the current and prediction traffic situations the CO2 and BC emissions are derived from searching the LUT for the scenarios.

Step 4: An improved traffic scenario is selected that is able to satisfy the traffic demand at a reduced total CO_2 & BC emission. Further defined key performance indicators will also be taken into account.

Step 5: ITS action options are displayed to the traffic centre operator who finally deceides on their implemetation („human in the loop").

5 SUMMARY AND OUTLOOK

CARBOTRAF targets to reduce CO_2 and back carbon (BC) emissions by smart traffic management. Pilot operations of the system are planned in Graz and Glasgow. The systems innovative approache links CO_2 /BC- aspects and ITS measures with a focus on a "emission-reduced" traffic rather than a "pure" travel-time optimization.

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The first result that will be available in the project is the handbook of ITS actions for each of the test cities, resulting from traffic models and simulation of emissions for different scenarios for the selected test area. The handbook will be valuable information on optimal ITS strategies. The test operation of the CARBOTRAF system will evaluate the performance of the online Decision Support System and the actual effect of the ITS recommendations on the total CO_2 and BC emissions. The result will be compiled in a handbook for cities regarding diminution of CO_2 and BC. It will provide guidelines, recommendations and "best practice" solutions for emission reduction by adaptive traffic management regarding both, technical and operational issues.

The goals of CARBOTRAF will be reached by a complementary and coherent consortium of 8 European partners including research institutes and universities (AIT, VITO, IMPERIAL COLLEGE LONDON, Österreichisches Forschungs- und Prüfzentrum Arsenal) and companies (IBM, Air Monitors, European Tech. Serv., EBE Solutions) from 4 European Members States. The expertise of these organisations is sorted from the intersecting areas of smart sensors, traffic telematics, air quality, numerical analysis and computational intelligence.

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CentropeSTATISTICS – Working Interactively with Cross-Border Statistic Data

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1 ABSTRACT

The Centrope region is situated at the mutual borders of Austria, the Czech Republic, Hungary, and Slovakia. CentropeMAP is an online geoportal for spatial planning data from this region. It went online in 2005 and was extended by the cross-border statistics database CentropeSTATISTICS in 2010. CentropeSTATISTICS allows its users to create thematic maps and various types of charts on the fly. There is a basic mode with pre-defined maps as well as an expert mode where a lot of layout and classification settings can be defined by the user. The statistics database is continuously expanded in close co-operation with the statistical offices of Hungary, Slovakia, the Czech Republic, Vienna, Lower Austria and Burgenland.

2 INTRODUCTION

2.1 About Centrope

The Central European region Centrope is a cross-border region situated along the mutual boundaries of Austria, the Czech Republic, Hungary, and Slovakia. The Centrope region is not naturally grown – a quarter of a century ago it was still divided by the Iron Curtain –, it is a political and economical construction to help all parts of the region to overcome the unfavourable development during the period of the Cold War when these regions were practically cut off at their edges. So it might not be a surprise that the term "Centrope" is still unknown in common everyday life although a lot of projects and initiatives is running under the patronage of Centrope follwing the motto "An image of tomorrow as a task for today".[1] To enhance the popularity of Centrope an initiative called "MyCentrope" was installed. It collects news and events from the region on its website mycentrope.com and also places advertisements in regional magazines to intensify cultural exchange between the parts of the Centrope region.

2.2 About CentropeMAP

CentropeMAP is a geoportal collecting web map services (WMS) from all parts of the Centrope Region. Its thematic emphasis is on datasets that are of interest for spatial planning and similar professions, comprising multiple data layers from the fields of biota, boundaries, elevation, imagery/base maps, inland waters, planning/cadastre, structure, and transportation. All data is displayed in a cross-border map viewer in a unified map projection although the single datasets are retrieved from distributed servers located all across Centrope.

2.3 About CentropeSTATISTICS

Planners do not need only maps for their work, they also need statistic data to analyse a region. Therefore, the goal of CentropeSTATISTICS is to directly add statistic data to the CentropeMAP geoportal by means of thematic maps. The statistics extension was launched in the year 2010 and features a basic mode with ready-made thematic maps as well as an expert mode: The CentropeSTATISTICS Basic Mode allows to create a couple of thematic maps which have been predefined by the CentropeMAP team. It is mainly for quick queries or for people who do not have much experience in creating thematic maps or charts from statistic tables. The CentropeSTATISTICS Expert Mode gives full access to the whole Centrope cross-border statistics database, you can download these data and set several options while creating your thematic map or chart. The expert mode is meant for planners, statisticians and other professionals who know how to create meaningful thematic maps and charts.

Planungsgemeinschaft Ost (PGO), the initiator of CentropeMAP and CentropeSTATISTICS, is closely working together with the statistical offices of Hungary, Slovakia, the Czech Republic, Vienna, Lower Austria and Burgenland to keep the high quality datasets at municipality level up to date. International

[1] http://www.centrope.com/en/centrope-project/vision-2015 (as of 28 March 2012).

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statistics workshops twice a year help to guide the further development of the cross-border statistics database containing mainly population, migration, and land use data.

2.4 The CentropeMAP Web

CentropeMAP is accessible via internet: http://www.centropemap.org. The CentropeMAP geoportal can be directly accessed at http://map.centropemap.org, and CentropeSTATISTICS can be started from CentropeMAP. All map layers and statistic tables are available without any limitation.

3 A CROSS-BORDER STATISTICS DATABASE WITH AN INTERACTIVE USER INTERFACE

3.1 Getting started

CentropeSTATISTICS starts with an overview of available data. All tables are hierarchically organised in a menu tree on the left side of the screen, details are shown on the right side (see fig. 1).

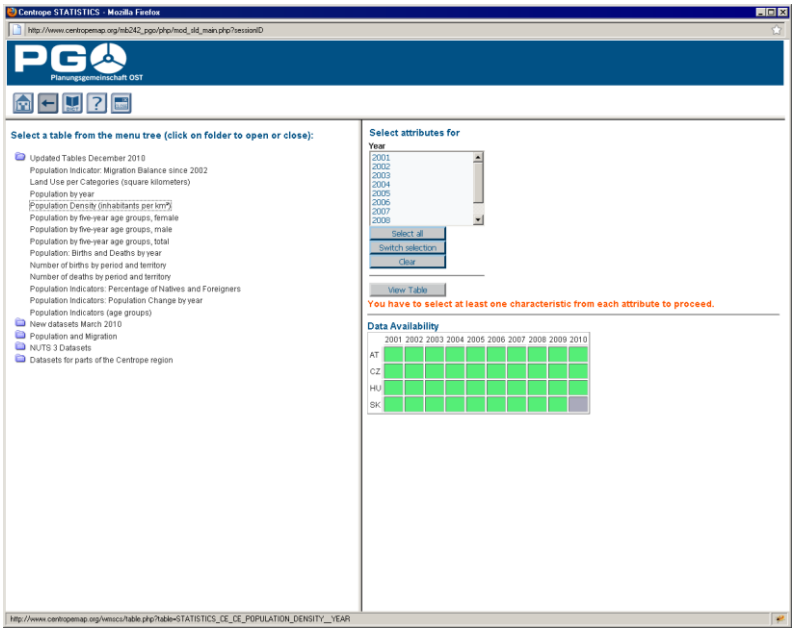

Fig. 1: Table overview.

In the next step, the table is shown (first 30 datasets only so that the download does not take too long). Here the viewer can download the data in CSV or Excel format to use the table locally. When downloading, metadata are automatically included in the download. Apart from simple data download, there are several other possibilities to interactively work with the statistic data provided by CentropeSTATISTICS.

3.2 Creating thematic maps

All table columns suitable for map creation have a “Create map” button on top. Hitting this button allows the user to select various options to design a cloroplethic map which can then be used as overlay in CentropeMAP.

There are several statistical methodes for class definition:

- equal interval: The numeric range of all classes has the same size;
- quantiles: The elements are evenly distributed so that each class contains the same number of elements;
- standard deviation: The class ranges are defined according to the standard deviation of the elements;
- equal area: The elements are distributed in a way that each class covers (approximately) the same area (sum of municipality areas in each class is equal);
- natural breaks (ArcView): The natural breaks algorithm minimises the variance within classes and maximises the variance between classes. This option produces an output similar to the algorithm used in ESRI’s ArcView GIS;

- natural breaks (Jenks): same as above but using the Jenks algorithm which produces slightly different results than the ArcView method;

If there is data with positive and negative values (e. g. population density increase/decrease) and a dichromatic colour ramp is used, special zero handling can be defined:

- no special zero handling: leave everything as it is;
- treat white as zero only: The class including zero is split into two classes, and a separate class having zero as only value is added. Note: The effective number of classes is higher by 2 than the preselected number of classes;
- use white for class incl. 0: preserve class definition, but shift the colour ramp so that white is used for the class including the zero value;
- no white in legend: preserve class definition, but build a colour ramp with no white class.

Of course all class values and all colours can be set manually if something different than the given options is required.

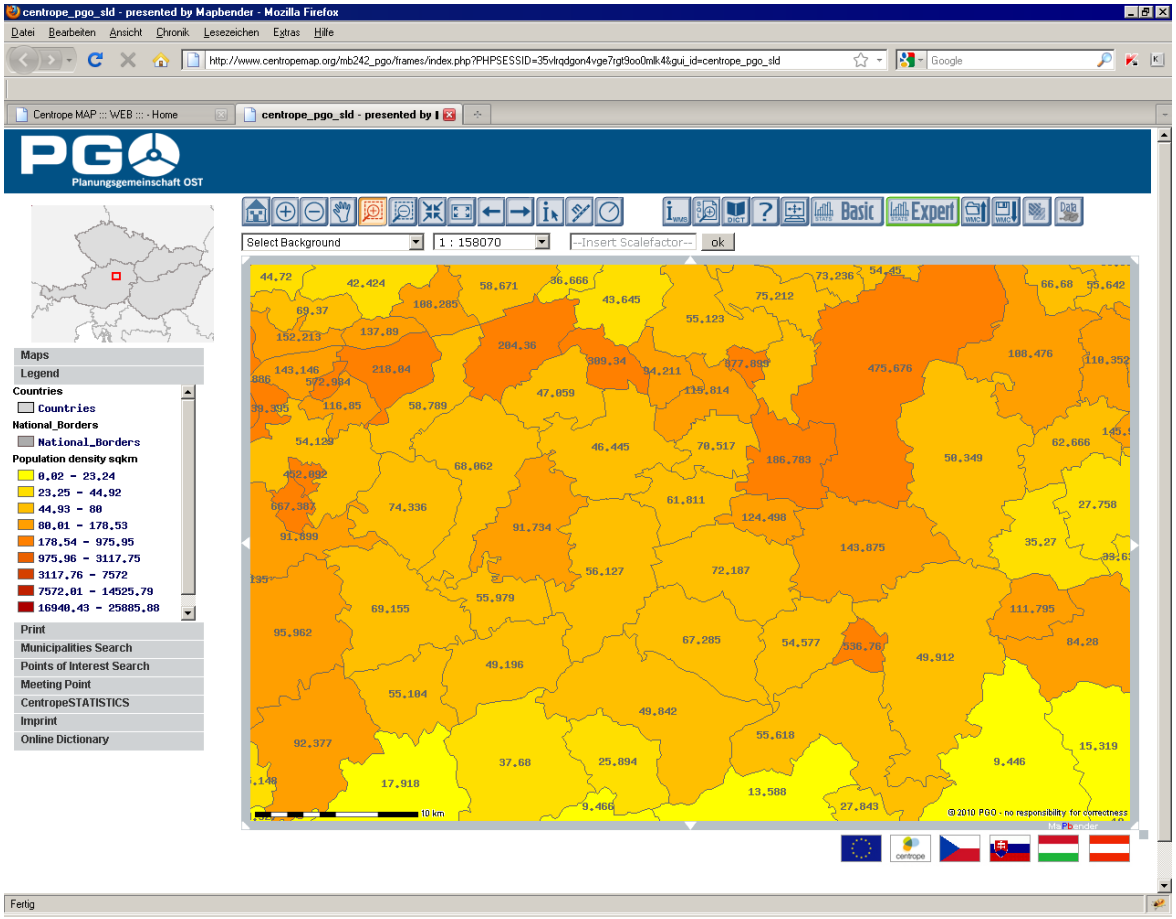

Fig. 2: Thematic map overlay with labels. To see the background layers, transparency can be applied to each theme.

3.3 Creating charts

Like maps, also charts can be created from the table view. In a similar manner also the “Create chart” and/or “Create pie chart” buttons are placed only on top of columns where this option is meaningful. Like with thematic maps, also with charts nearly all design options are configurable and can instantly be applied to the chart which is realised as graphic output (image file).

Depending on the contents, charts can be bar charts (see fig. 3) or pie charts. Bar charts can also be converted into point and/or line charts. Bar, line, and point charts always show a time series of the selected attribute – it is one of the main goals of CentropeSTATISTICS to collect data not only by theme, but also by year to make developments over time visible. The most important datasets are updated every year, others will be made available in decade steps (2011, 2001, 1991, ... – the years of the main census).

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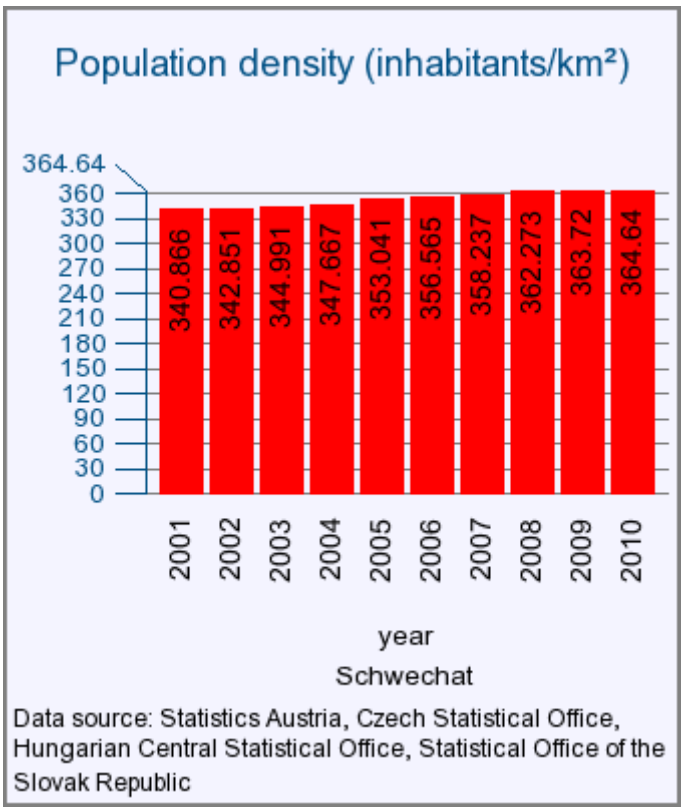

Fig 3: Example bar chart: Population density of Schwechat, Lower Austria, 2001-2010.

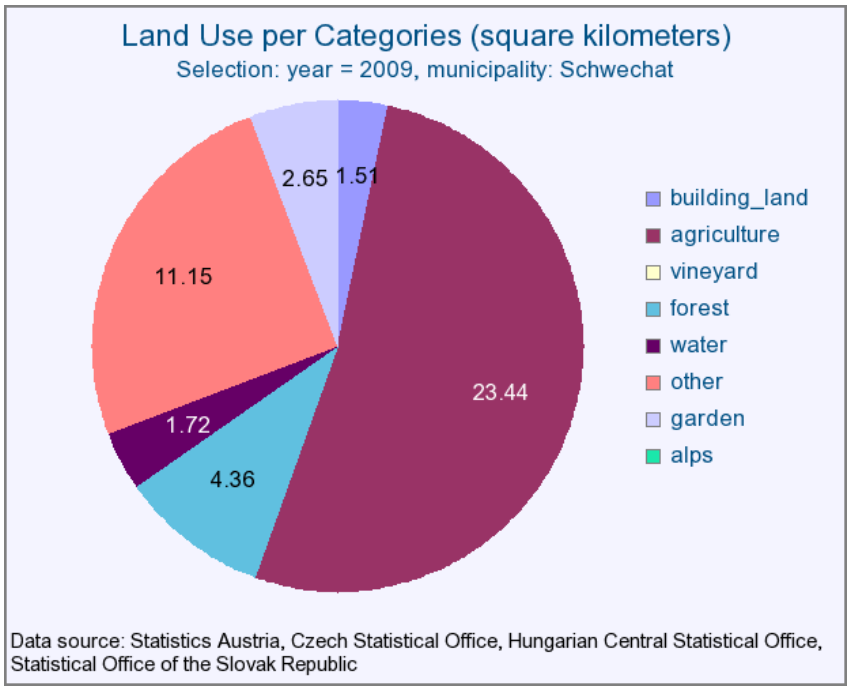

Fig 4: Example pie chart: Land use per categories, Schwechat, 2009.

3.4 Creating custom tables

Since 2011 it is also possible to create custom tables. The user can collect values from different tables and calculate new values on their own. All data in a custom table is treated in terms of geographic intersection so that calculations are done for any area where sufficient data is available. For example, from population time series and area values.

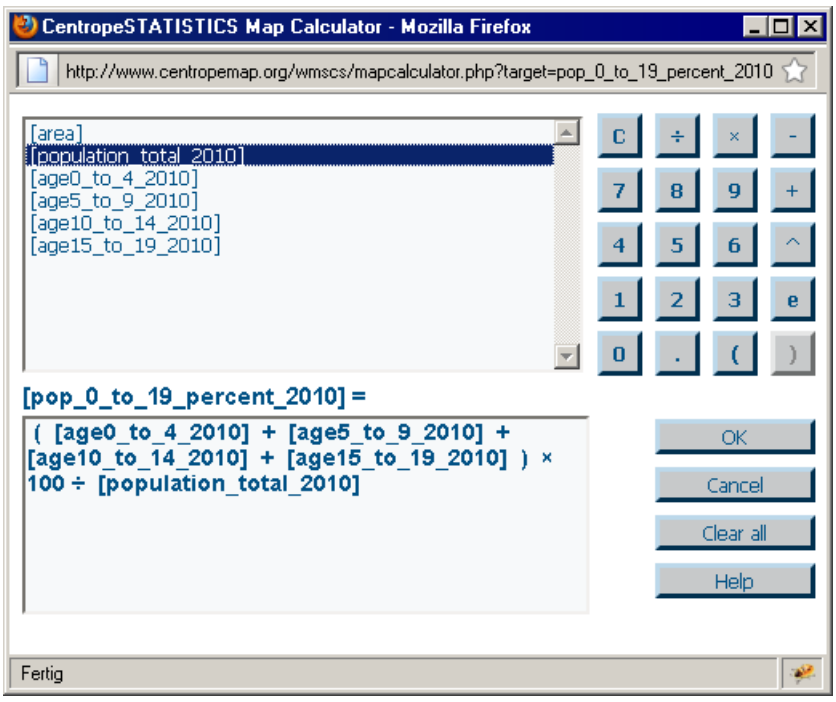

Fig 4: CentropeSTATISTICS map calculator.

The map calculator allows to combine all available attributes with basic arithmetic operations (addition, substraction, multiplication, division, exponentiation. The results are put into a separate column which can also serve as input for thematic map or chart creation.

4 FUTURE PERSPECTIVES AND OUTLOOK

CentropeMAP and CentropeSTATISTICS are growing – slowly, but steadily. Discussions on the extension of the theme range of the CentropeSTATISTICS cross-border statistics database are an issue at each statistics workshop. All incoming datasets have to be checked on their compatibility and comparability with existing data. This is extremely important for statistical data because it has to be verified that datasets from different countries were generated in the same way before they are put together in one table. This is no big deal with population data, but, for example, when dealing with employment or tourism data, some problems arise: Such data are often collected differently – by different institutions, for different dates, following different goals – in each country of the Centrope region, so there has hardly been any possibility to compare data for the whole region. This situation may improve in the future as the statistic offices are more and more following guidelines of the European statistical office (Eurostat). Data delivery from each EU country to Eurostat has already been running for many years; however, these datasets are not on municipality level but on NUTS 3 or NUTS 2 level[2] which limits their use for data interpretation within the range of the Centrope region.

[2] NUTS: Nomenclature of Units for Territorial Statistics. NUTS 3 is district or county level, NUTS 2 is province level. NUTS units need not have an equivalent in existing administrative boundaries of a country.

City on the Edge of Moscow Agglomeration: a Chance for Sustainable Development

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1 ABSTRACT

Moscow is the largest city in Europe, economical, financial, research, educational and transit center of Russia. It attracts a lot of newcomers from the whole country and the neighboring states. While the total population of Russia is slowly decreasing, Moscow has shown 10% growth during 2002-2010 inter-census period.

This hyper-centralized position of Moscow affects the development of rural areas of thousands square kilometers and a hundred of cities and small towns in central Russia. Discussions about so called Moscow agglomeration – metropolitan area are popular in the planning community. However, it is still a problem to determine exactly its size, shape and internal structure.

Obviously, all cities adjacent to Moscow Ring Road may be included in the agglomeration. Almost all of them have been focused on low cost multi-stored housing during last 20 years. Now they look like distant "sleeping districts" of Moscow. Probably cities within a distance of 20-50 km from Moscow boarder may be embraced into the agglomeration too. Most of these cities that are situated on radial rail directions are also seeking a doubtful reputation of extremely distant "sleeping districts" by their housing policy.

Cities situated 70+ kilometers away from Moscow are not so uniform in their development. Some of them show economic stagnation and 1-2% population decrease according to census 2002-2010 data comparing to 6% average growth for the Moscow region. Some others are looking for alternative strategies to find specific place on the edge of agglomeration or going further trying to get rid of the "peripheral" complex and become resilient livable urban centers.

The paper explores three cities situated within the distance up to 110 kilometers away from Moscow looking for planning and strategic opportunities and researching threats for their sustainable development.

City of Egorievsk is 225 years old. In the middle of the XIX century city became a center of textile industry. In the beginning of the XX century it was the third city in the Moscow region. During soviet period Egorievsk was developing engineering industry. Both textile and engineering industries failed after Perestroyka came. During the last 20 years Egorievsk completely transformed its economic base, more than 10 new factories were opened: food and construction materials production are the main industries now. As a result the city demonstrates 5% population growth in 2002-2010 period – amazing result for a the city so far from Moscow. Now it has a good position for sustainable development and smart growth.

Town of Veryia is more than 500 years old. In the XVII century during a short period of time it was the largest city in Moscow region. Now it is the smallest one with almost the same population (5000). It seems that the city is still in the XIX century. Nothing had changed through years. What are the prospects for such an "Island of Quite"? Should it look for changes in the XXI century?

City of Kurovskoe is a typical so called "Mono-industrial town". It was founded near a small textile factory with railway station and became a city due to the soviet industrialization in the late 1930-s. In the 1990-s textile factory was closed as in Egorievsk, but the railroad junction formed one of the main cargo stations in the Moscow region. Should Kurovskoe just exploit its strengths or look for more valuable place on the edge of agglomeration?

2 MOSCOW AGGLOMERATION

2.1 Size and Shape: Different Points of View

Moscow is the largest city in Europe, economical, financial, research, educational and transit center of Russia. While the total population of Russia is slowly decreasing, Moscow has shown 10% growth during 2002-2010 inter-census period. This hyper-centralized position of Moscow affects the development of rural areas of thousands square kilometers and a hundred of cities and small towns in central Russia. Discussions about so called Moscow agglomeration – metropolitan area are popular in the planning community. However, it is still a problem to determine exactly its size, shape and internal structure.

Moscow agglomeration has not any political or administrative legislative base – it just a virtual spatial phenomenon. Some experts deny its existence at all. Other planners and geographers consider that agglomeration concentrates along the main transportation routes not further than 20-30 km from Moscow ring road (MKAD). According to another point of view the agglomeration includes not only Moscow region (40000 sq km) but parts of neighboring Tverskaya, Jaroslavskaya, Kaluzhskaya regions. Extreme theory defines "The Great Moscow from Volga to Oka rivers" as a territory of approximately 300x400 km.

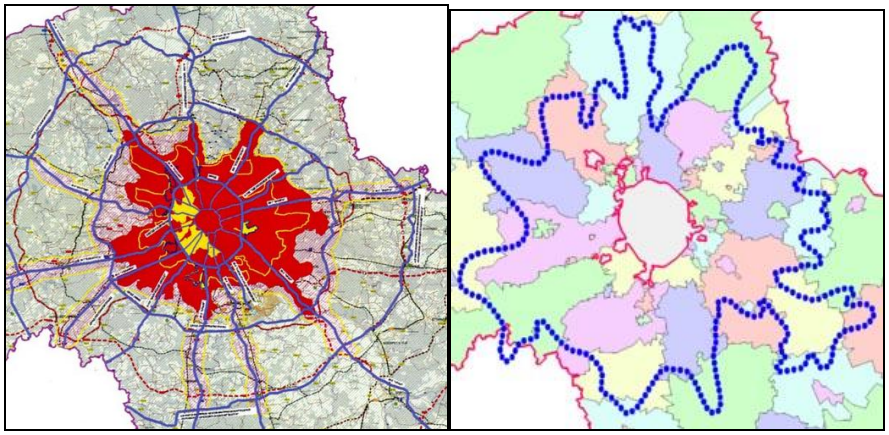

Fig. 1: Different views on Moscow agglomeration.

Regardless different theoretical approaches, all cities in central European Russia more or less are under the influence of Moscow's proximity. They should pay attention to this while thinking over strategic plans and competing for human resources.

2.2 Special Features

Traditionally Moscow agglomeration is compared to London or Paris metropolitan regions. Moscow with Moscow region is similar to Great London and Ille-de France in population size (15-20 million people according to different estimations) and ways of growth – mainly by migration processes from former USSR countries.

Today population quantity in Moscow counts from officially 11,5 million (census 2010) to 13-15 million by various estimations. Moscow region population is 7,5 million. At first glance the metropolitan area seems to be a typical mono-centric agglomeration. However somebody can find special features characteristic only for the Moscow metropolitan area.

Moscow agglomeration ignores sub-urbanization processes unlike Paris or London metropolitan areas. Both psychological and economic reasons have an influence on it. Once become a muscovite the person never would refuse this status. On the other hand Muscovites have considerable discounts for utilities payment; elder people get higher pensions than all over Russia. The retirees prefer to live in Moscow despite low environmental quality.

Sub-urbanization in Moscow agglomeration is substituted by seasonal migration out of the city. Almost all Moscow citizens have the second dwelling somewhere around the city. It may be a small hut or 3-stored estate – in any case it's a place for weekend or vacation living during the summer time.

Moscow and Moscow region both are separate subjects of administrative subdivision in Russia. There is no organizational framework or agreement between two the city and the region aimed for joint development.

2.3 Prospects and trends

Genesis of the Moscow region is an excellent illustration for the urban sprawl processes. Urbanized spaces were widening during the soviet period. The process of sprawl accelerated dramatically during the last 10-15 years. It is very difficult to precisely forecast now the processes of acceleration or stabilization in agglomeration's further development due to the resent president's decision concerning expansion of Moscow itself. Nevertheless somebody may refer to the general centrifugal and centripetal tendencies.

Migration pressure will continues: 15-20 millions ofr young people from Russia and the former soviet republics, still have a dream (or delusion) about career and sweet life in Moscow. Newcomers need housing.

Due to the limited spatial resources inside the city new housing - distant “sleeping districts” - will continue emerging all around Moscow.

Heavy industry, logistics, transit cargo traffic will seek to escape out of Moscow. Probably sub-urbanization processes will go faster due to predictable repeal of privileges for the Moscow citizens. Already now a lot of middle-aged people like to talk about living outside Moscow on pensions.

Obviously the future of the Moscow agglomeration is dynamic and unpredictable.

3 CITIES ON THE EDGE OF AGGLOMERATION

The paper focuses on planning processes and possible strategies in three cities situated on the edge of Moscow metropolitan area: Egorievsk, Kurovskoye and Veryia. These are very different cities in size, population rate, history and economic base. One equal trait for all three – they don’t experience population decrease like most distant cities in the Moscow region.

City	Year founded	Population 1989 census	Population 2002 census	Population 2010 census	Distance from Moscow, km
Egorievsk	1778	72500	68200	70130	108
Kurovskoye	1952	20200	19500	21820	100
Veryia	1371	5900	4900	5370	112

Table 1: General information about cities under consideration.

The pressure of megapolis is not so strong far from Moscow as in the core of agglomeration. The location allow peripherial cities to look for independent strategies, compare alternate visions based on re-mixing or stability and pay more attention to the planning process.

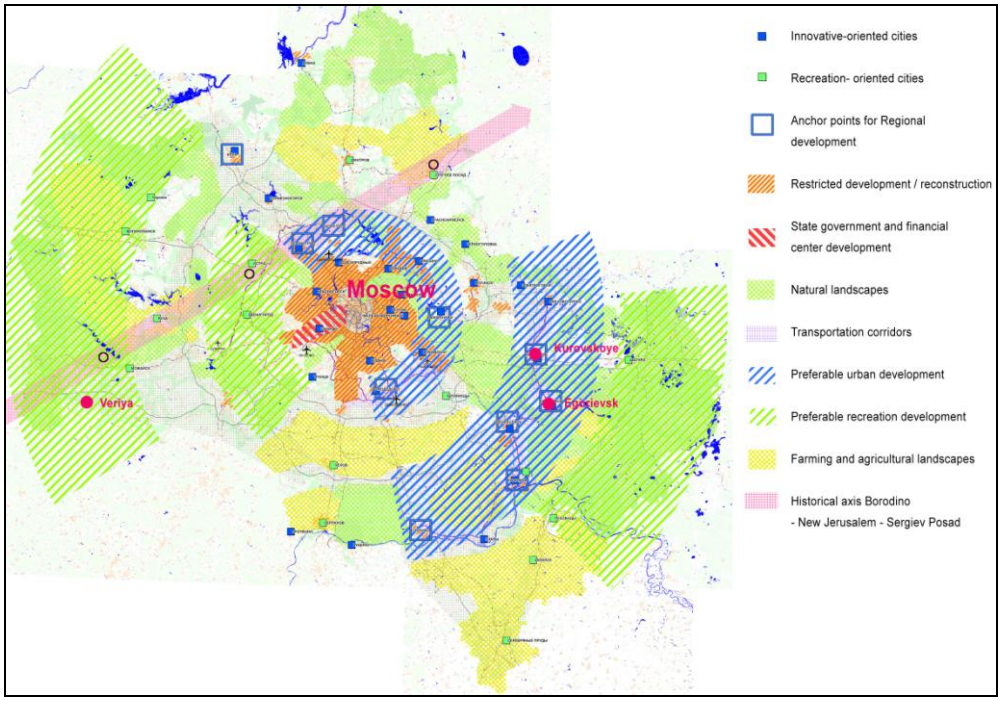

Fig. 2: Principal scheme of Moscow region spatial development.

3.1 Egorievsk

3.1.1 History and Post Soviet Transformation

City of Egorievsk is not so old: it was founded in 1778. Historically it was refuge of Old believers people – a branch of the Orthodox Church that was prosecuted for hundred years. In the middle of the XIX century Egorievsk was a small merchant town surrounded by thick forest with less than 5000 inhabitants.

Textile industry causes the first period of “remixing”: During 50 years population has grown 6 times up to 33000 people, more then 20 factories emerged, but the city community remained small business oriented. In

the beginning of the XX century it was one of the largest cities in the Moscow region formally being a part of the neighboring Ryazan gubernia.

During soviet period engineering industry was developing in Egorievsk. By the late 1980-s the population of the city increased up to 72000 inhabitants. Both textile and engineering industries collapsed after Perestroyka came. 18000 workplaces were lost. Population decreased to 67 000 people.

Egorievsk probably is the only large industrial city in Moscow region which is not situated on transit railways or highways. That is why it is attractive neither for migrants nor for developers of typical multi-stored housing. In the early 1990-s the Egorievsk started to look for new industrial development projects. Careful work with investors allowed the complete transformation of the city's economic base. More than 10 new enterprises were opened. Food and construction materials production became the main branches of industry.

All these years of transition the city was governed by one mayor and the same team of managers. As a result Egorievsk demonstrates 5% population growth in 2002-2010 period – amazing result for the city so far from Moscow. (70000 people – 2010 census).

Economic transformation has no effect on planning processes. The city adopts a policy of reasonable development following the master plan, designed in 1985.

Egorievsk has succeeded in preservation of compact 2-3 storey historical center and in expanding street network. Several housing and industrial development projects were completed. At the same time some planning problems occurred: asymmetry in new housing in the western part of the city and further industrial development in the eastern part, lack of transportation links, critical traffic situation in the historical center, etc.

Abandoned buildings of former textile factories constructed in attractive style of late 1800-s red-brick architecture are bordering the east side of historical center. This brownfield partly includes the valley of the only rive in the city. Industrial buildings are the property of dozens companies. Very few of them have just started slow reconstruction.

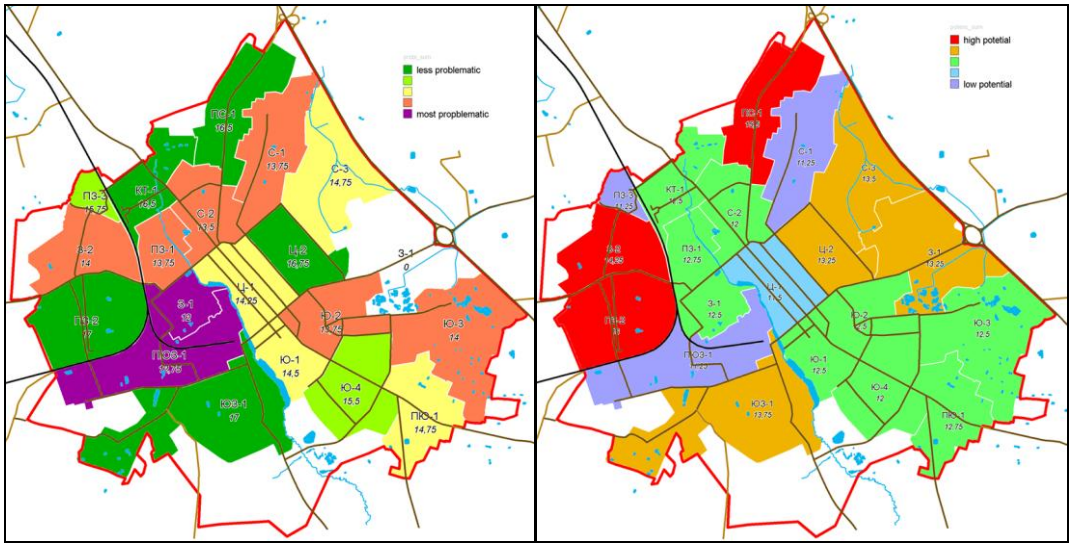

Fig. 3: Egorievsk: the city problems (left) and potential (right); evaluation by planning zones

Generally speaking Egorievsk is one of the most sustainable cities in the Moscow region. There is no need to put efforts on creating city's vision or strategy, as "everything goes well" anyway without a strategy. On the over hand the city has a good starting position for further development and smart growth. But this way needs to be planned and widely discussed in the local community.

3.1.2 Alternative City Strategies

The city may consider some traditional strategies aimed at sustainable growth. Further industrial development or tourism-oriented strategies are the main of them. In both cases the city will face competition with neighbor cities: industrial Voskresensk, Orechovo-Zuevo and historical Kolomna. All of them are larger

then 100 thousand people and have strong advantages in significant positions like energy supply, transit networks or reputation.

Post-industrial innovative strategy that is very popular in today's Russia requests for a new reform of city's economics and society. Innovative competitors are a few so-called "scientific cities" founded all over Moscow region 50-60 years ago for space, nuclear or biology researches. They are not as large as Egorievsk but still keep their intellectual potential and democratically-oriented communities.

3.1.3 Future Vision

All main city strategies in Russia are focused on investors. Cities do all their best to attract large-scale business in goods production or retail. Nobody pays attention to the citizens. Megapolices like Moscow, Perm, Ekaterinburg etc. just have started thinking about public spaces, comfort and livability for their inhabitants, but faces soviet industrial (and post-soviet free-market) inheritance in planning, street networking, "microrayon" housing and traffic.

There is a belief in Russia that small or middle sized cities are limited in their resources for development of modern public spaces and not attractive for creative young people. Is it so? Nobody has verified this statement in practice yet.

Creating a community-oriented city may be a good challenge for Egorievsk to attract creative, intelligent well-off middle class. Here in Russia we have a demand for comfortable urban environment for people who wish to escape from megapolices. Under the circumstances the city should invest more in social services, physical planning and place marketing.

This year Egorievsk is starting to work on its new master plan. According to the current planning legislation in Russia this document officially named "General Plan" is rather an obligation to build a list of social objects and streets than a city development framework.

Probably some kind of planning concept should be accomplished prior to the General Plan adoption. It is necessary to set a strategic vision of city's development for 20-25 years, evaluate planning alternatives. Planning concept should be discussed widely in the local community in order to avoid spatial "west-east" imbalance and keep the preferences of compact shape of the city.

3.2 Kurovskoye

3.2.1 The History

Town of Kurovskoye integrates the history of three completely different settlements. First – the most "historical" settlement was the Guslitsky Transfiguration Monastery – the youngest cloister in the Moscow region built in 1869. It is situated in the western part of the town. Second was a village where a textile factory started its work in the second part of the XIX century. And the third was a small town near the rail station, founded in the beginning of the XX century. These three settlements were united in one town due to the soviet industrialization in the late 1930-s but still are separated by lakes, swamps, railways and streets.

In the 1990-s textile factory in Kurovskoye was closed as the one in Egorievsk, but the railroad junction formed one of the main cargo stations in the Moscow region with locomotive depot. In spite of small industries in the field of construction materials production, woodwork and food production Kurovskoe may be considered as typical so called "mono-industrial town". Railroad infrastructure occupies 1/3 of the town territory. At the same time a new industrial park partly developed by foreign companies (e.g. Michelin, Tegola) is situated 5 kilometers far from Kurovskoe in the village of Davidovo.

Now the population of Kurovskoe is about 22000 people and is notable for a high level of social care. Due to direct railway connection with Moscow (2 hours) up to a half of able-bodied population prefer to work in the center of agglomeration.

3.2.2 Challenges and Prospects

Kurovskoe doesn't look like a city yet. It's rather a pattern of multi-stored housing blocks, private housing and industrial sites with a cascade of ponds and swamps in the very center of the settlement. The General Plan of the town was completed last year. It is focused on traditional priority of housing just mentioning the

significance of developing the central part of the city and need for special projects combining public, business and recreation activities.

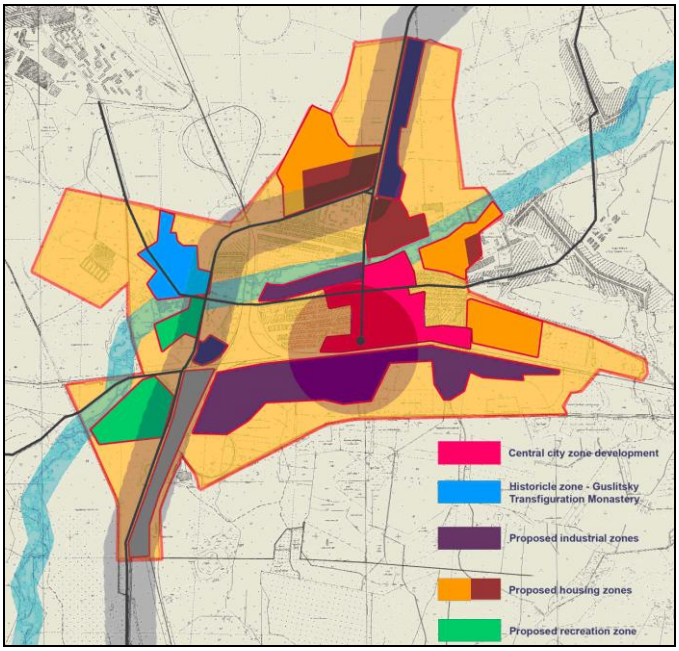

Fig. 5: Kurovskoe: Proposed Structural Scheme

Kurovskoe and Davidovo with its industrial park are different municipalities. They were working on their own plans on the lowest level of coordination. The current General Plan of Kurovskoe pays no attention to the possibility of joint development with neighboring settlements.

Today Kurovskoe faces the necessity of strategic choice – should the town just exploit its strengths as a transportation nodal point or look for a more valuable place on the edge of agglomeration. The potential of logistics development in Kurovskoe is very high. In a few years Moscow will start reconstruction of it's spacious rail cargo fields: all cargo processing will be transferred 50-70 km out of the capital towards the Great Rail Ring. Kurovskoe is a candidate to host this activity. It may offer greenfield sites for warehouse, logistics and industrial development.

Besides that, prioritizing economic aspects may cause a danger of marginalizing the social, cultural and ecological needs of the city. In order to become more livable Kurovskoe should invest much more not only in workplaces and housing but in the urban environment, public spaces and service sector. The city needs any kind of creative measures to push further its development.

3.3 Veryia

3.3.1 The History

Town of Veryia is one of the oldest settlements in the Moscow region. Now it is a typical small town with glorious history in the past. It is situated about 110 kilometers to the west from Moscow far from transit highways and railroads in a less economically developed part of the region.

It hasn't always been like that. Three centuries ago Veryia due to its position on Protva river was in the junction or the trade routes from Russia to Europe and from the north of the country to its new lands in the south. In the XVII century during a short period of prosperity it was the largest city in the Moscow region with population 5941 people (1787). During this period the majority of the churches and public buildings were made of bricks and the town acquired its regular planning form, that remains the same until nowadays.

Fig. 6: Veryia. The bird eye view.

After the Belorussian railway had been constructed in the middle of the 1900-s 27 km to the north from the town, Veryia lost its importance for transportation. No new stimulus for development came with Revolution in 1917. Now it is the smallest town in the Moscow region with population less then 200 years ago – about 5300 people.

3.3.2 The Quiet Town

It seems that the city is still in the XIX century. Nothing has changed through years. According to the statistics there are few small engineering and construction enterprises in Veryia. But they don't seem to be drivers of the town's economics.

The main potential for the city's development lies in its "historicity" and "soulfulness" – features which are so intimate for most Russians. People talk about Veryia with such epithets as "sincere", "quiet", "hospitable" or town "that I want to live in". Together with town's surroundings that are rewarded for the best environmental situation in the whole Moscow region all this attracts a lot of artists, creative people, freelancers, etc. They are not residents but many of them may live in the town (or near it in temporary dwellings - so called "dachas") for months, acquire real estate for living and play a remarkable role in the town's politics, governance and strategy.

Probably Veryia shows more "livability" then most of economically successful cities, which seek for investors, not for community's welfare. From the beginning of the XXI century Veryia is paying attention to its historical image investing in restoration of the churches and public buildings.

Like in Kurovskoe the General Plan of Veryia was completed last year. It pays attention to environmental protection measures, developing transportation, engineering and service facilities, providing recreation-oriented public spaces. At the same time it offers new sites for industrial development and multi-stored housing. Probably the town may try more restricted approach for new civil and industrial construction based not on functional separation but mixing different functions in one quarter or even one building.

3.3.3 Future Vision

What are the prospects for such an "Island of Quite"? Should it look for changes in the XXI century? Unchangeable city in case of Veryia is the same as sustainable, isn't it?

At every epoch somebody can find out two or three hundred wealthy people got tired of megapolis way of life and who appreciate silence and natural landscapes. A few cities in the western part of the Moscow region may offer a good state of historical heritage and environment, combined with better connection to Moscow, better services and more activity in public life then Veryia.

Veryia should define particular thrusts for development in this concurrent environment keeping in mind that „Changes spoil the image". The town can't fully rely on artistic-minded newcomers but should bring up its own creative community based on small services, handicraft industry and artisan production. Typical backwoods – is a good idea for place-marketing. The technologically equipped backwoods with active public life is better!

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4 CONCLUSION

People need different cities. In order to attract citizens some of them should dynamically change, another should ensure stability and quiet. Thanks to location on the edge of Moscow agglomeration the cities discussed above independently can weigh up different opportunities of and visions on their own development.

Currently general priorities on the state level are housing and industrial sites development. Under the circumstances long term local strategies adoption, careful planning of public spaces and transportation nets, paying attention to environmental quality issues and participation processes can do more for urban community rather than construction of new houses and new factories/

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Conceptual Approaches on the Development of the Territory of the Republic Kazakhstan

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1 ABSTRACT

Several major changes in political and economic organization of the country happened during the formation of the sovereignty of the Republic of Kazakhstan. State administrative and territorial units were integrated, while the capital city was moved from Almaty to Astana. The Head of the state has proclaimed long-term development Strategy of the country - Kazakhstan 2030 for realization of which there is a need to modernize a town-planning basis and generate new long-term town-planning policy.

According to the Government program on forced industrial-innovative development of the Republic of Kazakhstan the Agency for construction, housing and utilities of the Republic of Kazakhstan (hereinafter – Agency) has been charged to develop the General Scheme of the organisation of the territory of the Republic of Kazakhstan (hereinafter – the General Scheme). For independent Kazakhstan this kind of planning document at the level of national scale is being developed for the first time. Within the limits of the development of the General Scheme how the country is organised and should be developed will be considered, while taking into account major sustainability goals. The Agency has founded special town-planning institute responsible for the development of the General Scheme - Astana branch of "KazREIECA" RSE (hereinafter – the Institute).

2 INTRODUCTION

2.1 Description

The General Scheme of the organization of the territory of the Republic of Kazakhstan is a planning project containing long-term vision of territorial development and rational organization of the territory of the Republic of Kazakhstan. It takes into account regional and world processes, the role of the regions in social and economic development of the country.

2.2 The purpose and tasks of the development of the General Scheme

The purpose of the development of the General Scheme is an improvement of quality of people's life, sustainable development of Kazakhstan.

The tasks of the development of the General Scheme (according to the Law of the Republic of Kazakhstan "About architectural, town-planning and construction activity in the Republic of Kazakhstan", article 42):

Maintenance of state regulation of the system of population settling down and distribution of industrial forces;

Establishment of the status, appointment and character of the use of territories taking into account the administrative and territorial division of the Republic of Kazakhstan;

Coordination of inter-regional and interbranch state interests under the programs of social and economic development.

2.3 The structure of the General Scheme

Key points covered within the limits of the development of the General Scheme includes the following questions:

Major principles of population settling down and distribution of industrial forces in accordance with positions of strategic and economic planning;

Substantive provisions of rational management of environmental and economic activities, development of industrial, transport, engineering, social and recreational infrastructure of republican level;

Basic measures on improvement of ecological conditions in regions, preservation of territories with minerals, valuable landscape and objects of historical and cultural heritage, etc.

2.4 Expected results from the development of the General Scheme:

The complex planning analysis of the territory of the Republic of Kazakhstan;

Formation of principles of comfortable residing of the population on territories of the country;

Creation of conditions for increased interaction of central and local executive bodies in terms of rational organization of the territory of the Republic of Kazakhstan;

Development of offers on rational use of resources, overcoming of both economic and social disproportions and increase of social and economic interrelations between regions of Kazakhstan;

Formation of a long-term town-planning policy on the basis of the balanced placing of productive forces and population settlement in the Republic of Kazakhstan territory.

3 INITIAL VARIANTS OF THE DEVELOPMENT VECTORS

3.1 Brief description of the internal features of the organisation of the territory of Kazakhstan

Massive work on collection, analysis and evaluation of the territory of the state has been undertaken within the limits of the development of the General Scheme.

The analysis of world experience of strategic spatial organization and internal features of the organization of the territory of Kazakhstan, influencing the choice of further development direction have been studied to define possible development vectors of the territory of the Republic of Kazakhstan.

The territory of the Republic of Kazakhstan is more than 2,7 million square kilometers with population of 16 million people. Low density of population at 6,2 people per square kilometer, as well as non-uniformity of settlements across the regions should be marked.

The considerable part of territories of South, South-East and East Kazakhstan with the area of 450 thousand square kilometers is covered by the zone with high seismic activity of magnitude 7 or larger where about 7 million people live. Thus, 19 cities, including Almaty, where almost 1,6 million people live, is within the most dangerous area with seismicity magnitude 9 or larger.

Climate biological efficiency is 4-5 times lower than in developed countries due to the adverse environmental conditions. It is possible to name all Kazakhstan as risk agriculture zone (the amount of precipitation varies from 200 to 500 mm a year which is considerably lower than the norm), except for southeast region. Mid-annual amount of precipitations in the basic agricultural areas of USA and Great Britain varies from 600 to 2000 mm, in France – from 600 to 1000 mm. Moreover, desertification processes and uncontrolled migration from countryside to the cities are observed.

A number of experts asserts that Kazakhstan is threatened by total power deficiency, especially in the Southern region. Necessity of power saving demands new, more effective studies of general layouts of the cities and settlement systems as a whole. One of ways of power saving is to increase the general compactness and intensify use of the territory, optimize its functional zoning, etc.

3.2 Brief description of the best international planning practices suitable for Kazakhstan

Spontaneous migratory processes the state should take under control. In USA and Italy, for example, organized migratory processes (tax privileges, favorable investment climate etc.) became a push for economic development of territories.

Similar countries to some signs with Kazakhstan, such as Canada and Australia have concentrated their efforts on narrow environmentally favorable territories. “Urbanization axis of Canada” is the strip, across the border of the USA, occupying the space of 170 thousand sq km where more than a half of population of the country concentrated at the distance of 1200 km. As a result Canada as huge as Russia with the considerably less population thanks to the reasonable organization of the territory gives repeatedly bigger gross product per capita in comparison with Russia or Kazakhstan.

It is necessary to bring territorial structure of the economy in accordance with market structure, to concentrate efforts to the economic complexes which have high enough potential for quality manufacture.

3.3 Preliminary brief analysis of possible development concepts of the territory Kazakhstan

Analyzing the territory of Kazakhstan, the central part, is basically presented by focal settlement systems influenced by extracting character of manufacture. The general decline of manufacture, outflow of the population and discomfortable climate are observed. The central zone with little use for high-grade life, but having high resource potential, is mostly suitable for rotational development method.

Top “northern belt” stretches from East Kazakhstan to Uralsk city where industrially-developed centers of the country are located. Lower so-called «southern belt» has favorable environmental conditions.

Proceeding from the aforementioned preconditions, examples of world planning practice and, taking into account that in the basis of the spatial organization the Forecast scheme of territorial-spatial development of the country until 2020 (hereinafter – the Forecast scheme) is placed, which is comparable to an offered vector of the development of Kazakhstan, the following conceptual model of the organization of the territory the of Republic of Kazakhstan is produced.

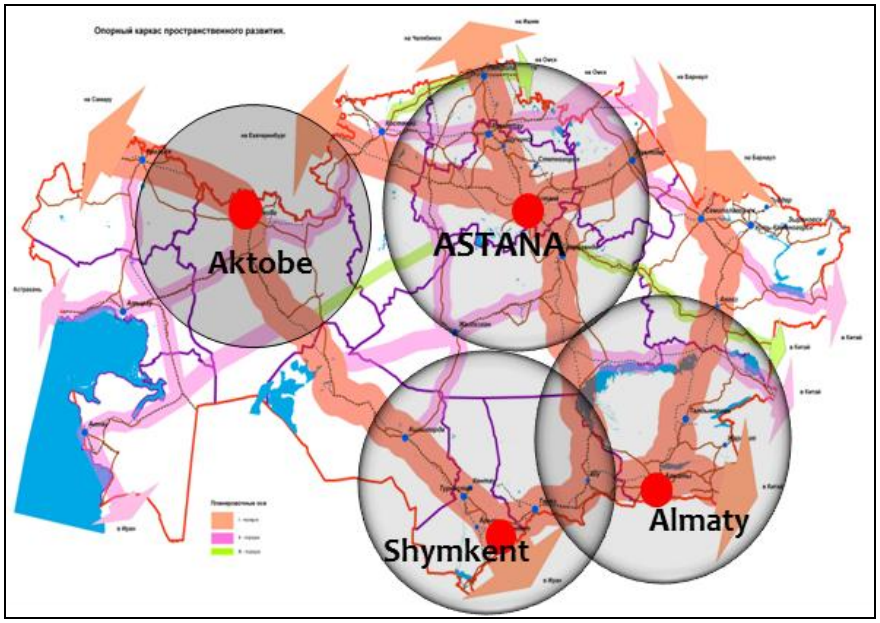

Fig. 1: Development vector according to the Forecast Scheme.

Key "base points" in the Forecast scheme, are offered to be the cities of Almaty, Astana, Shymkent and Aktobe which organically correspond to the considered structure: cities of Almaty and Shymkent are located in so-called “southern belt”, and the cities of Astanas and Aktobe – in “industrial belt” (Fig.1).

Taking into account specialization of the belts, it is necessary to develop intensively corresponding spheres of the national economy in these zones.

In a “southern belt” there is a need to develop agriculture with a full cycle of manufacture from cultivation and storage before processing and release of finished goods. For the given region there is a need to develop such spheres as tourism, public health services, sport, study, science and certain industries.

In “northern belt” development accents should be transferred on intensive industrial development of territories. Planned manufactures should be located as close as possible to “development points” and consider specialization of the territory. Taking into account the neighbourhood of the given region with the adjacent states – Russia in the north and China in the east, it is necessary for the Kazakhstan to develop those manufactures and technologies which allows participation in planned rapid development of Siberia, Far East and Xinjiang Uyghur Autonomous Region.

Agriculture specialization should be guided by environmental conditions of the region, costs reduction and increase of the productivity of manufacture. It is necessary organize the development of engineering-transport infrastructure of the belts to optimize communications and logistics with subcentres which can become regional centers.

Existing urban settlements are subject to radical reconstruction and optimization to the sizes optimal for accommodation settlement and reductions of municipal costs.There is a need in the given process to differentiate each large industrial center, taking into account industrial, social and economic situation.

Strengthening of the border territories can become another development vector for the Republic of Kazakhstan since over 80% of all population of Kazakhstan lives there. During the analysis of the border territories, it is necessary to allocate 4 groups (Fig.2) of resources influencing the organization and preconditions of their development:

At the level of natural resources these are:

Transboundary water, conditions and desertification.

At level of demographic resources these are:

Transboundary migration and the innovative environment.

At level of infrastructural resources these are:

Transport and border object infrastructure.

At level of economic resources these are:

Transboundary economic integration and trade.

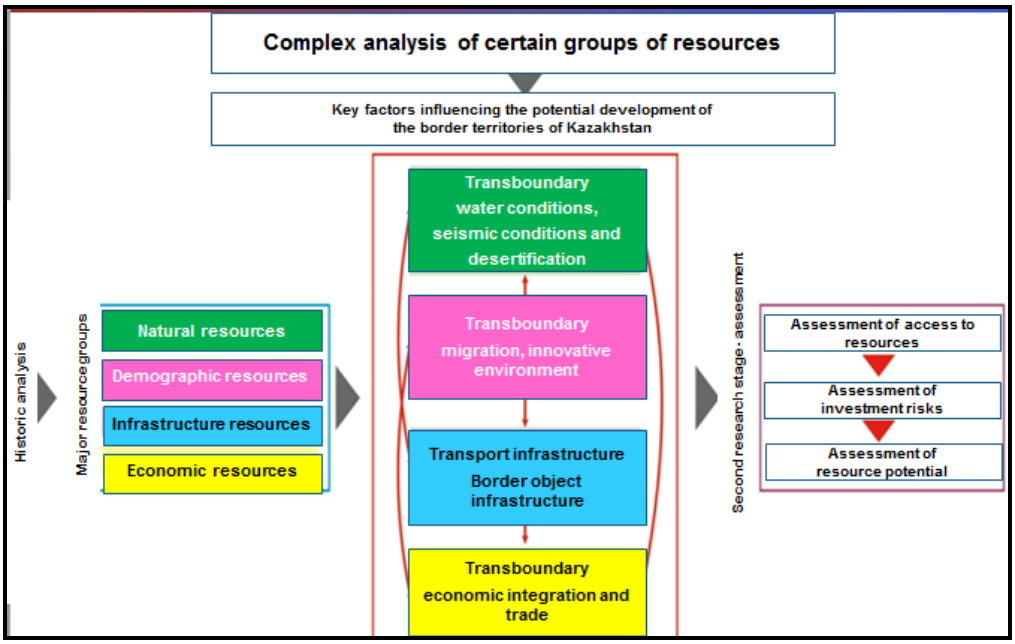

Fig. 2: Complex analysis of certain groups of resources influencing the development choice of the border territories of Kazakhstan.

4 CONCLUSION

Offered development variants of strengthening of the border territories and also active development of "southern" and "northern" belts can become one of the vectors of the organization of the territory of Kazakhstan. After fuller analysis of the initial data, development of different planning variants there can be specifications in the offered concept, and, probably, new conceptual approaches to the organization and development of the territory of the country will be developed. Sustainable and rational organization and development of the territory should become basic principles at the definition of development vector of the country.

Planning development stage of the General Scheme on formation of variants of the organization of territory of Kazakhstan will be undertaken in 2012, including:

Improvements of a demographic situation and regulation of migratory processes, an urbanization and a suburbanization;

Perfection and development of the settlement systems;

Perspective development of productive forces;

Transport-communication and engineering infrastructure;

Improvement of ecological condition of the territory of Kazakhstan and another.

Massive work needs to be undertaken on a way to achievement of effective organization of territory of the country, sustainable development of the entire Kazakhstan. Town-planning science in the world has already developed enormous experience and our task is to shift this positive world practice adapted for the conditions of our country, on the Kazakhstan soil.

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Cooperation between AAL-related Research and Caregiving for Seniors in the Municipality of Schwechat

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1 ABSTRACT

The demographic changes in the developed countries, especially the growing number of elderly citizens, are causing opportunities and big challenges to societies. The need of care and support of seniors is growing fast, also the changes within our ICT based information society increase the gap between the younger generation ("digital natives") and the older generation ("digital immigrants"). Ambient Assisted Living (AAL) offers an approach to meet these challenges. AAL covers different areas, especially ICT based solutions for improving care for elderly persons and also improves access to ICT based services for the large number of "digital immigrants" in terms of e-inclusion.

For research in the field of AAL it is very important to involve actively members of the target groups, which are seniors as primary users, care givers, nurses and relatives as secondary user group and private and public stakeholders as tertiary target group. In the urban area of Schwechat / Austria a collaboration between research teams and all groups of end users was established as a base for performing applied research and development of AAL-products, services and solutions.

Starting with the initial situation and local, national and international basic conditions this contribution describes objectives, methods, outcomes and lessons learned of this cooparative approach.

2 THE SITUATION OF ELDERLY PEOPLE LIVING IN SCHWECHAT

Elderly persons being serviced by mobile care taking organisations have been interviewd about their living situations [Meissl et al. 2007]. The result of these interviews as well as outcomes of consultance conversations with seniors and their family members shows that more than 90% of concerned persons have the whish to stay at their own home even at an old age and they believe that there dwelling situations is suitable; they have problems facing barriers outside their home like stairs at doctor's offices, in shops, etc.

A large group of elderly persons living at their own whome are supported for doing the household and for shopping by their loved ones.73% of the interviewed persons stated to have personel contact to their children or grandchildren on a daily base. Single living seniors and their affiliates are mainly concerned by the following possible disresses:

Fall downs followed by a situation which does not allow to use a telephone or an alarming device

Danger of fire due to not switching of an oven, etc.

Becoming isolated due to building's conditions, eg. a missing elevator leads to dependency on other persons and to loose own autonomy.

3 THE AAL LIVING LAB SCHWECHAT – COOPERATION BETWEEN CARE AND RESEARCH

3.1 History

The municipality of Schwechat, Austria, has initiated several programmes, subsumed under an umbrella called eSchwechat.at to bring forward ICT research and development as well as the concrete usage of ICT in daily life in order to allow people of the community to participate in the e-society, to gain benefits provided by novleous ICT-solutions and to close the digital gap between the younger and the elder generation

One element and outcome of this initiative is the CEIT RALTEC research institute dedicated to ICT-based research and development of ICT-solutions to support and improve the life of older people according to the ideas of AAL. In order to follow the basic principle of user-centred design by active involvmement of

potential end users the AAL Living Lab Schwechat (LL) was was establishd and became a member of the European Network of Living Labs [ENoLL] in 2008.

Since 1996 the municipality of Schwechat operates the Senior Center ("Seniorenzetrum") as a sheltered housing considering elderly peoples pursuit of an autonomous living. The residents can arrange their life to their personal needs in an environment responding to the special cirumstances and needs of getting older. A number of different assisistive technological solutions are in use and are well accepted by the elderly residents. In the field of support services and care for the elderly it is important to think and plan oriented towards the future in order to fulfill the requierments of the next generation by applying technology based approaches. This is seen by the management if the Senior Center Schwechat as a challenge to be actively involved iton the development of new services, solutions and products, to bring own practical experiences and to test and evaluate prototypes of assistive solutions. [Panek P. 2011],[Senior Centre].

3.2 Key Actors and Stakeholders in the LL Schwechat

Besides CEIT RALTEC and the Senior Center Schwechat the following entities play a significant role in the AAL Living Lab Schwechat:

- Advisory board of senior citizens ("Seniorenbeirat"): Its mission is to collect and forward requests from senior citizens in Schwechat, to discuss important topics in the context of senior care in Schwechat, and to organize and coordinate leisure activities for senior citizens.. The members of the advisory board often contribute significantly in their role as multipliers to identify further persons interested in joining workshops and field trial activities in the LL
- Cooperation Platform: Regular meetings between representatives of the Senior Center, mobile care providing institutions and CEIT Raltec to share information, to discuss topics of care provision in the local context and to plan and implement joint projects
- Municipality of Schwechat (SW): Tthe local government authorities are very interested in new technologies supporting the autonomous living of the older population [Hlauschek, et al. 2009].
- SME and industry: involved via local association "Wirtschaftsplattform Schwechat" and through the research consortia, carrying out user-centric work in the LL

3.3 Methods applied

User centric methods often applied are focus groups with older adults [Oberzaucher, et al. 2010], [Panek, et al. 2008], interviews with users and carers [Werner, et al. 2011], [Panek, et al. 2007], workshop meetings with users and care experts for requirement gathering via low fidelity prototypes and for presentation of results, different types of evaluation activities (from lab tests to field trials) [Zagler, et al. 2009], [Schumacher, et al. 2007], [Bergvall-Kåreborn, et al. 2010], [Wilson, et al. 2008]. An iterative approach is used in nearly all cases

4 PROJECTS CARRIED OUT

The projects carried out are focused on the research and development of new systems for empowering older adults to live a life as independently as possible.

IAP-Video phone for elederly people: within this industry funded project a touch screen based video phone for older persons was developped and evaluated together with a group of eldely people [Oberzaucher, et al. 2009].

eHome: CEIT RALTEC and 3 Austrian partner developped an assistive smart home solutiuon for safe and comfortable living of single living seniors. The solution was field tested in more than 10 private appartemts in the area around Schwechat [Diermaier, et al. 2008], [Werner, et al. 2011], [Mayer, et al. 2011]

LLM (Long Lasting Memories): CEIT RALTEC, the municipality of Schwechat and 10 European partners enhanced eHome by adding components for physical and cognitive training for seniors. The solution was tested at the senior's centre and at private premises of elderly citizens in Schwechat. Additionaly the LLM-system was validated in 4 different European counries [Konstantidis et alt.2010].

vitaliSHOE: CEIT RALTEC, acting as project leader, developped in cooperation with Austrian industry and rsearch institutions a mobile gait analysis and fall prevention solution. Senior's and care givers of Schwechat have been evolved as active partners [Oberzaucher, et al. 2010].

MyTablet: a usability study of state of the art tablet PCs has been performed by active inclusion of seniors living in Schwechat [MyTablet]

KSERA: this assistive robotic solution developped by 4 European research and indsutry partners is currently validated at the premises of the Senior Center Schwechat by elderly citizens supported by reaerch staff of CEIT RALTEC.

AAL Demo Appartment

In 2009 "AAL demo-apartment" in the Senior Center [Demo-Apartment] was set-up. This project was initiated and organised by the team of the Senior Center supported by the municipality, CEIT RALTEC, mobile care providers and enterprises. A dedicated flat was equipped with already available assistive technology and offers the possibility to test technical aids and provide hands-on experience in real life settings for seniors as well as family and staff. Many companies have followed the invitation to support the project and have provided products for free. The demo-apartment can be visited by anyone interested and explanations are given by professional technical engineers and experienced nursing staff. The flat is also used to provide some insight in upcoming future systems by exhibiting some selected research prototypes [Werner, et al. 2011] and to gather feedback on those prototypes from the visitors of the demo flat [Panek, et al. 2011]. This project is good example of cooperation of a public body (municipality of Schwechat), care giving and a research institute getting a useful result for every day's life

5 INITIAL RESULTS AND LESSONS LEARNED

Issues which came up during the above listed projects are discussed below and provide some concrete examples of the research context in which they became known:

- **Speaking the same language:** ICT researchers and users not necessarily speak "the same language" which can cause non trivial communication problems [Panek 2007]. Some expressions might either not be understood by people who are not familiar with modern ICT or even scare them off.
- **Person of trust:** For sorting out problems it was found to be of high value to have social worker / care persons on board who are well familiar with the test persons and can communicate with them on a meta level (with regard to the project level). The eHome project [Werner, et al. 2011] [Mayer, et al. 2011] for example is a very sensitive project as the researchers get a very detailed insight into the living situation of the person and his/her daily activities.
- **Recruiting users:** First users were recruited with the help Senior Center and advisory board. After initial successful projects, it also turned out that involved users helped us by recruiting other persons they knew as additional new users for upcoming research activities. This is obviously a very positive indicator. On the other hand, being successful in establishing an active group of older adults participating in research activities brings up a new issue: persons who are closely connected to these activities might be biased e.g. when giving their comments and opinions about prototypes to be evaluated.
- **Time and efforts needed:** Ambient Assisted Living (AAL) and assistive technology supporting older adults are very relevant topics for European society. User-oriented research and technical development in these areas do need a significantly high amount of time and resources in order to come up with innovations which are mature enough to enable sustainable improvements regarding quality of life of older persons and carers (cf. our "demo apartment" project).
- **Other issues:** lack of time with the mobile care providers, positive feedback from involved users asking us and our LL partners for status updates, progress and next steps to which they can contribute. In some specific cases, it is difficult or may not even be possible to evaluate research prototypes with the real target user group (e.g. persons with mild dementia and/or persons prone to fall frequently cannot test pure research prototypes with not yet guaranteed performance levels due to ethical, practical and legal reasons).

6 CONCLUSION AND OUTLOOK

After nearly six years of cooperation of the municipality of Schwechat and CEIT RALTEC, the results are very promising for research as well as for the care giver's and the municipalitie's activities. A user club of older adults engaged in researcj activities could be established, an informal structure of regular meetings between core partners and regular meetings of other partners (mobile care providers, senior's advisory board, senior's centre) proved to meet the needs. Several projects could be completed successfully; involved partners are satisfied and very active in continuing with this endeavour. This cooperation is a good base for establishing national and international contacts and working cooperation for future R&D projects.

After the successful set-up of the AAL demo apartment the fruitful cooperation of municipality and research is continuously going on. Outcomes of user-centred research projects are going to be applied in the field within new approaches of Schwechat to support the life of their older citizens. Just before publication of this article the detailed planning for a multigenerational residential settlement ("Siedlung Frauenfeld") within the municipalitie's area started. CEIT RALTEC is currently bringing in practical experiences gained within research projects accounting for barrierfree design issues, intermediate inputs for planning high-tech assistive solutions, etc.

To arrive at a conclusion it can be stated that the concrete pragmatic approach of cooperation between local care giving and research chosen in Schwechat has proven to be a good choice.

7 ACKNOWLEDGEMENTS

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Development of Managed Real Estate–International Case Studies on Principles and Success Factors

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1 ABSTRACT

New types of large mixed-use developments of properties run by specialist operating companies prove in many western European countries their potential to attract purchasing power, create jobs and income for the local population beside other desired positive external effects. These new types of mixed-use developments are a response to the continuous rapid social, economic, environmental and cultural changes which today´s modern cities are facing. The case-study research of twenty-five successful developments of managed real estate with new types of mixed-use, also defined as managed facilities, between Barcelona and Berlin clearly highlights the principles, processes and success factors involved as well as the risks which need to be considered–representing a first step towards understanding and managing real estate development as an open dynamic system and hopefully towards more and new types of these desired developments. The project was funded by Deutsches Seminar für Städtebau und Wirtschaft (DSSW) in Berlin.

2 INTRODUCTION

Real estate development with respect to the social, economic and ecological effects is definitely a complex task and from a research point of view still unexplored in many ways - especially regarding special purpose and managed real estate development the theoretical background is lacking. Managed real estate (see fig. 1), will also be defined as "managed Facilities" and will be called accordingly in the following. From an investor's point of view managed facilities fall into category of "high risk" [1] (Bienert, 2005, p.8-9). The need to explore these risks and to establish methods for an appropriate risk management is also evident from a practical point of view. Finally, these types of developments are socially relevant and contribute to the development of organized synergies between different types of uses which make cities or parts of cities more sustainable. Looking at existent mixed-use developments in the outer skirts of the city of Vienna, where different types of mixed-use have been placed randomly and in an unplanned manner, the necessity for organized, managed real estate becomes obvious.

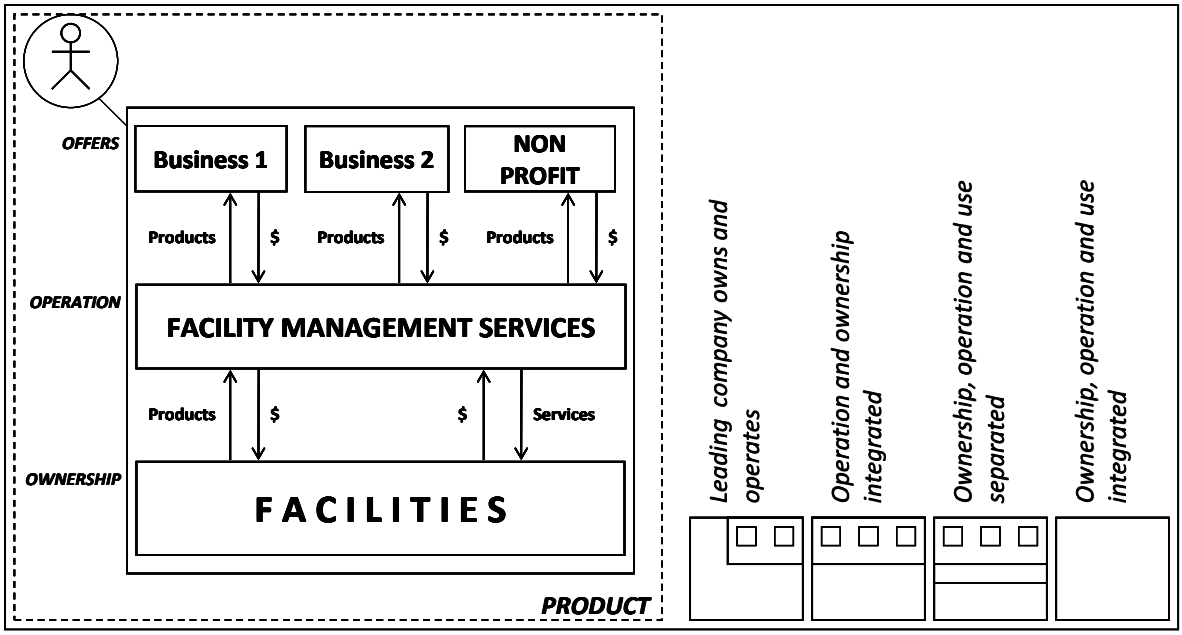

Figure 1: Model of Managed Facilities

Experience, especially in eastern Germany, show: large real estate developments run by operating companies–e.g. shopping centres–are highly accepted by the customers. On the other hand in city centres,

[1] Bienert, S. (2005). Bewertung von Spezialimmobilien : Risiken, Benchmarks und Methoden. Wiesbaden, Gabler.

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where landlords only desire to maximise rents and the establishment of appropriate "city management" structures fails, customers find an unsatisfying mix of offers and uses, landlords end up with a bad performance of their properties and purchase power migrates to other regions - a typical prisoner's dilemma [2]. Besides this well know phenomenon new types of managed facilities with new types of mixed-uses emerge especially in Western Europe. They initiate or support e.g. business clusters of creative industries and create positive effects on the local and regional development. A private company, for example, revitalizes with a network of tenants around the topic "arts" the Baumwollspinnerei in Leipzig - a huge former industrial site. The Klassikstadt in Frankfurt offers everything for the lifestyle of fans of vintage cars–and thus initiates the transition of a problematic part of the city. In Berlin an intermediate organisation founded by women provides a business incubator: the "Weiberwirtschaft". The objective of the organisation is to support enterprises managed by women and to enable them to profit from the synergies between these enterprises. The municipality in Barcelona revitalises its traditional market halls with a new mix of shops and improved infrastructure especially regarding the logistics infrastructure–and thus preserving an important aspect of urban culture. These new types of managed mixed-use developments with their positive effects on the regional development still occur far too seldom. Theoretical knowledge and expert knowledge are missing. Especially the problem regarding the assessment and management of risks leads to difficulties in financing and attracting institutional investors required for this kind of development.

3 TARGET AND FRAMEWORK OF THE RESEARCH

Within a time frame two years, the Chair for Real Estate Development at Vienna University of Technology has conducted explorative research on more than 25 cases of managed facilities in order to explore the generic principles and processes of these developments. The analysis focused on different types of mixed-use, with different types of developers (private, public and intermediate) in towns with different numbers of inhabitants. The main targets of our research were to enable more developers to work in this domain, to boost investments in managed mix-use facilities and to enhance the financing, through more knowledge on the risks involved and through making the risks manageable.

Most of the analysed cases could be defined as corporate real estate, neglecting the fact, that they also represent public infrastructure. They could also be seen as special-purpose real estate [3] focussing on the functions of the building, e.g. Entertainment Centre. The authors propose the term "Managed Facilities" with special regard to the managing entity ensuring the business success of the mixed-uses, e.g. cinema operation and catering, by providing much more than a coherent plan for the uses. All Developments could accordingly be called "Facilities Developments".

The research focussed mainly on "successful" cases. The developments reach their primary goals–even though the goals might be different in every case - and create positive external effects, e.g.:

- they are economically sustainable
- they revitalize problematic parts of the cities
- they create positive desired or external effects on the local development, like income and employment
- they maintain purchase power in the region
- they contribute to the profile of the region
- they use and strengthen the potential of the region and reduce deficits

4 RESEARCH QUESTIONS AND METHODOLOGY

The explorative studies concerning the real estate development principles, processes, actors and success-factors of the cases analysed were developed by an interdisciplinary team at the Chair for Real Estate Development. Within the analysis, the focus was mainly on the following research questions:

- Do the developments need certain preconditions, concerning the site, municipality e.g.?

[2] Poundstone, W. (1993). Prisoner's dilemma : John von Neumann, game theory and the puzzle of the bomb, Oxford University Press.
[3] Bienert, S. (2005). Bewertung von Spezialimmobilien : Risiken, Benchmarks und Methoden. Wiesbaden, Gabler.

- Do certain players regarding their organisational or individual capabilities ensure successful developments?
- Do certain constellations of players lead to successful developments?
- Do certain processes lead to successful developments?
- Which are the success factors and the critical factors for the development of managed facilities?
- What do architects contribute to the successful outcome of a project?
- What is the role of the state and how importance is financial or other support of the government?

Due to the fact that to the author's knowledge theoretical background on managed mixed-use facilities is missing the research was designed as explorative case study. "A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between object of study and context are not clearly evident. It copes with the technically distinctive situation in which there will be many more variables of interest than data points.[4]" (Yin, 2003, p.13-14)

The research team decided to analyse a variety of cases in order to come to generic conclusions and to explore if a common ground connecting all different cases can be found. The selection process for the cases ensured the variety of the cases concerning the following factors:

- inhabitants of the municipality
- public, private and intermediate initiators
- concept of use, respectively mixed-use
- support of small- and middle-sized businesses (SMEs)
- inclusion and development of historic substance of building structure
- single type of project vs. repeatable type of development

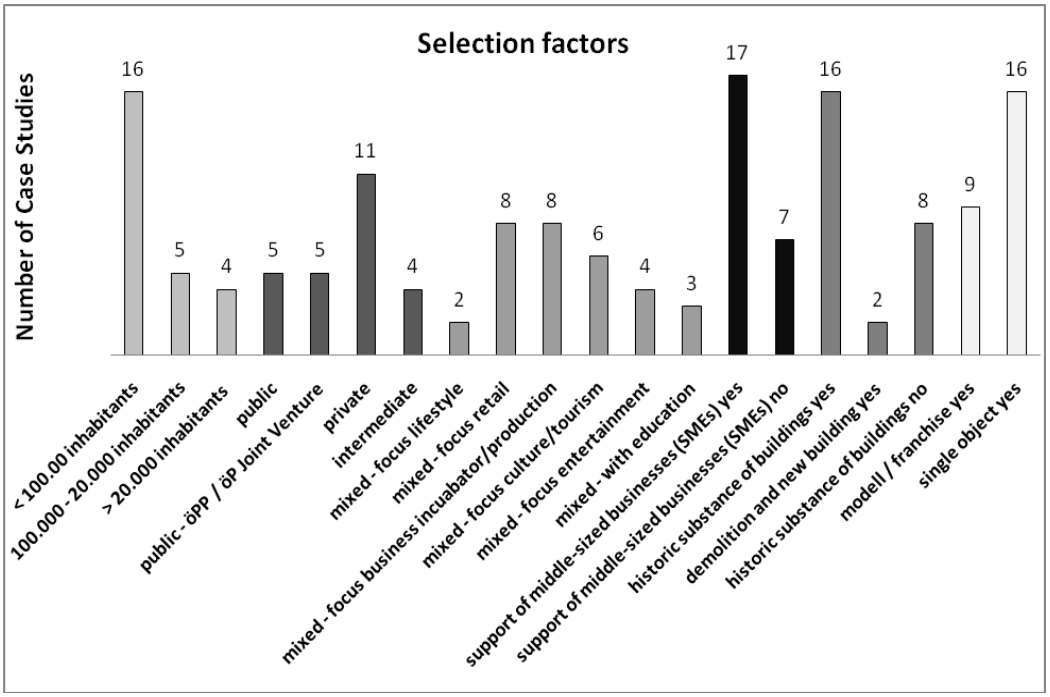

Figure 2: variety of the selected cases

For this analysis the authors designed a special investigation scheme based on theories concerning case study methodology [5], but also regarding aspects of systems theory, predominantly referring to the science of systems that resulted from Bertalanffy's [6] General System Theory (GST) and Ulrich and Probst [7], who

[4] Yin, R. K. (2003). Case study research : design and methods. Thousand Oaks, California, Sage Publications.
[5] Dul, J. and T. Hak (2008). Case study methodology in business research. Oxford ; Boston, MA, Butterworth-Heinemann.
[6] Bertalanffy, L. v. (1984). General system theory: foundations, development, applications ; . New York, NY, Braziller.

further explored systems theory in the area. The main assumption is that we are not able to understand techno-social systems–like projects–by analyzing the single entities in an isolated way; we have to understand the relationship between the entities and the context of the techno-social system to be able to understand its behavior–its contribution to the outcome of a project.

The case studies were carried out in five parts:

Part 1–characteristics of the project

The first part considered the "real-life" context of the project, the different constraints, especially:

- type of city
- number of inhabitants
- unemployment rate
- demographic dynamic
- economic data like purchase power

In addition the project itself was also characterised e.g. by:

- type of development
- type of use / mixed-use
- target group
- USP
- initial situation
- trigger of the project
- positive/negative effects

These data were collected through publications concerning the project and by narrative interviews with the developers involved or other key players.

Part 2 - players and their relationships

The players were distinguished in private, public and intermediate and characterised by:

- role within the project
- resources relevant to the project
- activities and outcome of the activities within the project
- time of involvement within the project
- targets and interests

Lastly the relationships between the players within the projects were analysed and represented graphically. Due to the fact, that the relationships of the entities within a project are heterogeneous they were named respecting their qualitative aspects: owners, awarding permission, providing service etc.

These analyses were carried out via narrative interviews with the developers involved or other key players.

Part 3–processes

In Part 3 of the research project the development processes were analysed–again by narrative interviews.

The processes were characterised by:

- constellation of players
- course of action
- time dimension

[7] Ulrich, H. and G. J. B. Probst (1995). Anleitung zum ganzheitlichen Denken und Handeln Ulrich, H. and G. J. B. Probst (1995). Anleitung zum ganzheitlichen Denken und Handeln ein Brevier für Führungskräfte. Bern ; Wien [u.a.], Haupt.

- instruments
- results

If possible the interrelation with other processes was named.

Part 4–special aspects of the development due to its purpose

This part of the evaluation respected the fact that the development of buildings with a special purposes may cause the need for:

- individual or organisational competences for this type of development
- necessary milestone for success
- deal structures
- miscellaneous

Part 5–success factors / critical factors

This part of the research considered the risks of the development–risks understood as chance and danger and distinguished in that way–again carried out by narrative interviews with the developers involved or other key players.

The results of the evaluations lead to conclusions i.e. answers to the research questions and assignment regarding the behaviour of the management of future managed facility projects - outlined briefly in the following. The conclusions were verified by analyses of cases of unsuccessful developments and with experts.

5 RESULTS

The approx. 25 case studies analysed have shown the following results:

5.1 General framework

- *Successful development of managed facilities is possible almost everywhere.*

Success–defined as the sustainable achievement of planned private, public or intermediate sector goals–is not per se linked to aspects such as the purchasing power or the existing image of a location, but: projects need to be customized for each and every location and situation from recognizing the potential of that specific location to knowing the constellations of the stakeholders (players) involved, and thus need to be tailor-made. Projects are required to purposefully include the conditions already available and present at the location. Small scale projects have to utilize the chances; large projects might even be able to reduce deficits of a site or area.

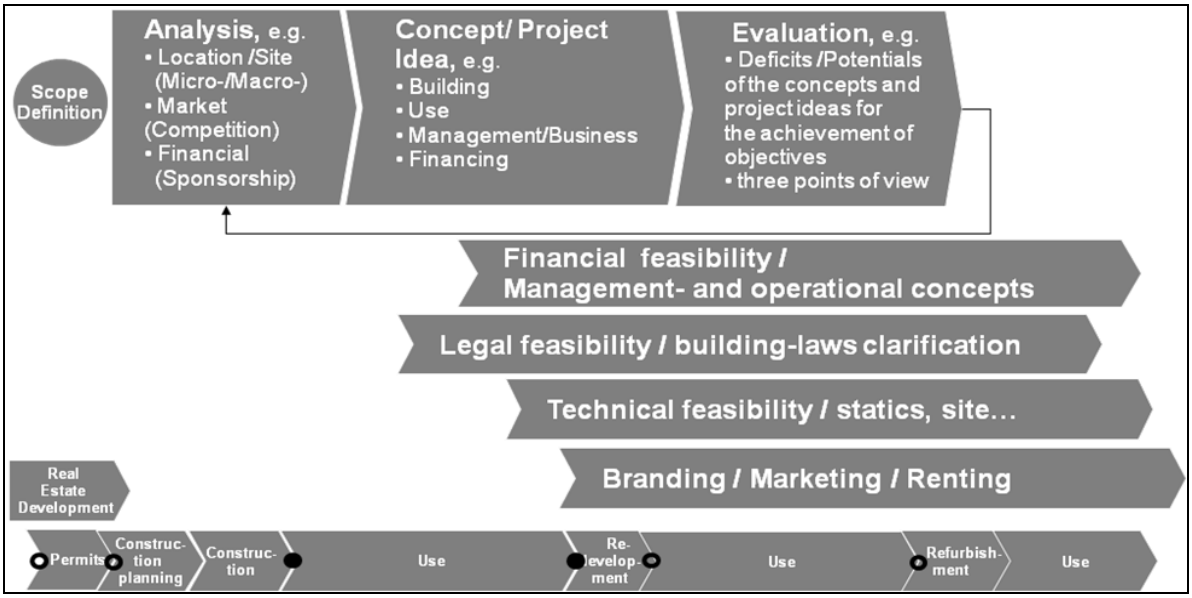

Figure 3: Process-model

5.2 Processes of Real Estate Development

- *The development of managed facilities in a narrow sense is not a chronological process, but a repetitive (iterative) process characterized by the steps analysed, concept (design) and assessment/evaluation, with the possibility of exit or entry into the next phase after every iterative cycle.*[8]

Consequently, successful facility development in the narrow sense can be seen as a cyclic process of optimization - in this case of public or business infrastructure.

The case studies have clearly shown two things: The grounds for a successful project are laid within the frames of the facility development in the narrow sense. A project failure though, is also possible at every other point in time.

5.3 Success factors, respectively critical factors

- *In numerous developments of managed facilities one person delivers business know-how–normally concerning the business the infrastructure is developed for - that leads to a competitive advantage of the facility and good business conditions for the tenants or in the case of public infrastructure to positive social effects.*

Success in corporate real estate development is linked to the business success of the tenant(s) or operator. Know-how and also innovation concerning the business of the tenant(s), concerning the infrastructure a certain business needs and concerning possible synergetic effects with other businesses seems to be a scarce resource concerning the development of managed mixed-use real facilities. In most of the cases it leaded to a competitive advantage of the development and of the tenants, e.g. within the project Cinecitta in Nürnberg (cinema and catering) business know-how and innovation concern different aspects:

- procurement of the projectors
- procurement of the film rights
- film projection
- ticket control
- ground floor plan
- catering concept

Business know-how is an asset and a critical factor, due to the fact that it is rarely explicit or freely available. The early inclusion of necessary management know-how concerning the business processes the facility is built for, should not be confused with an early and exclusive contracting of a company for the operational management.

- *The "completeness of competencies" concerning the development of managed facilities is a main success factor.*

All of the cases have confirmed that the completeness of necessary competences or knowledge is essential. Project developed through networks without compentencies in the real estate or construction domain, show with significant frequency a lack of legal or constructional know-how that endangers the achievement of the project goals–e.g. within the building of "Weiberwirtschaft" in Berlin, contaminations were found after the tenants had moved in and there was no liability of the former owner agreed in the contracts etc. Projects are jeopardized if even one "capability" is absent.

- *A sufficient equity position (capital base) of developers of managed facilities is essential for the project´s success.*

The explored cases have revealed, that in sixty percent of the cases, developers of managed facilities had problems with finding capital i.e. they didn't have a sufficient equity base and had difficulties in attracting investors, especially institutional investors. This greatly jeopardizes the initiation or the development of their project. In cases where the developers had a sufficient equity base i.e. they were able to invest the necessary

[8] Real Estate Development Model, by Univ. Prof. Dietmar Wiegand, TU Wien und Karl Giger, Red KG

capital without being required to rely on institutional investors, the developers had a competitive advantage and factor that highly contributes to their project´s success.

Managed facilities are often categorized as "high risk" by financiers e.g. due to difficult third-party uses. Therefore a first successful letting i.e. accommodating part of a business or comparable measures are important to yield trust. In the numerous explored case studies, private parties have confidence in project success much earlier than institutional investors.

5.4 Stakeholders

- *Managed facilities are not per se developed more successfully by a specific group of stakeholders– here a distinction needs to be made between the types of managed infrastructure.*

Basically, stakeholders (players), who have little or no knowledge about the business (or the activities) for which the infrastructure is being developed, should consult and include competent parties. Stakeholders (players) on the other hand have quite different qualities: e.g. networks need time to learn to work together; in this case a small scale project at the beginning is recommended.

- *Public stakeholders and public sponsorship are no guarantee for positive socio-economic or spatial effects, but valuable "incentives" and "helpers".*

Most of the Explored Case Studies have some kind of a public sponsorship, which differs in its variety and amount. The amount of the sponsorship is less relevant though, than its point of use (catalyst function) and the benefit it creates - among other things also due to the fact that the sponsorship is connected to co-ordinated project goals, which are in accordance with public interest.

5.5 Architecture

- *The architecture itself delivers an important contribution to a successful development of managed facilities, although very project-specific and in different forms.*

A business incubator for women, such as the "Weiberwirtschaft" in Berlin, needs small and flexible spatial structures, in order to support and enable the growth and shrinking of businesses. Entertainment centres can be developed as brands, but even without branding they always need a good and functional logistics concept. In the case of "Klassikstadt Frankfurt", where customers and fans of vintage cars, who are in love with design, history and technology also expect an ambient reflecting history and design.

6 CONCLUSION AND OUTLOOK

In conclusion, the explored cases have shown that development of managed facilities is

- possible even in economically weaker regions, but need to be tailor-made
- in an early phase a cyclic process of optimization and not a step by step process is required

In managed facility developments:

- the know-how concerning the business the facility is built for is essential and leads to competitive advantages [9]
- the equity base is essential
- the involvement of the public sector doesn´t necessarily lead to success, but it helps
- architecture is essential but in completely different forms

The explorative case studies have also clearly revealed, that the existent theories, methods and processes-models of real estate development, established primarily from a point of view of investment-bankers, concerning properties which combine build substance and services as so-called "facilities" of public or private infrastructure, have to be "re-thought" and newly written.

In conclusion it can be said that the development of managed mixed-use real estate uses regional potential or in the case of large developments with public funding reduces existing regional deficits.

[9] Probst, G. J. B. (2000). Kompetenz-Management : wie Individuen und Organisationen Kompetenz entwickeln. Wiesbaden, Gabler.

We propose that mixed-use within the managed facilities can also be defined as a kind of cluster [10] (see also Maskell), where the single businesses existing "under one roof" are concentrated as a vertical, diagonal or horizontal cluster, depending on the kind of organizational and legal structure (see also figure 1).

Three types of clustering are defined in today´s literature [11]:

(1) Horizontal: co-location of competitors, same level of value creation, e.g. same types of businesses are co-operating with each other;

(2) Vertical: co-location of companies of different and successive value chains, e.g. as in the case of Klassikstadt, different businesses, but belonging to one value chain–cars;

(3) Diagonal: businesses are working together, but creating different products and services, which are seen by the consumer as one product.

The conclusions of the case studies can be read like a check-list:

- my project uses the regional potential or changes deficits with the support of public funding
- mix of uses / cluster is the best possibility in the given context
- business know-how is in the project guaranteeing competitive advantages [12]
- capabilities are compete

The explorative studies are a starting point for future research. We need to further develop theories and models concerning the network or business clusters creating benefits for the operator and the customer. Methods for risk management and methods to measure and control the external effects of managed mixed-use development need to be established. State support needs to be made transparent and linked to positive effects. Finally the measurement of external effects of real estate developments on the region could be redesigned and become extended to other properties part of urban policies.

Conclusively it can also be stated, that planned managed mixed-use real estate contributes to a "smart" urban development, by organizing and exploring synergies between different types of uses which are necessary, needed, suitable or attractive on specific locations or certain parts of the city, which leads to the assumption that planned managed mixed-use developments are more sustainable and resilient in today´s rapid urbanisation.

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Enhancing the Social Inclusion of Seniors by Using Tablets as a Main Gateway to the World Wide Web

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1 ABSTRACT

Internet access has become such an important requirement for our daily lives that the United Nations proposed to give it a status of a human right in 2011. Still Internet usage in Europe varies strongly depending on regional aspects, age and qualification. Elderly people are among the user group that is affected most by the digital divide because of technical, social and economical barriers. This paper covers the question whether the current generation of tablets has the potential to reduce these barriers, especially for older users. Two main studies were undertaken to evaluate usability and acceptance of a chosen tablet and to investigate longer-term effects of tablet usage. The results of the studies show high satisfaction and acceptance rates among the target group and suggest a stronger focus on senior specific applications for tablets as well as initiatives to target the higher information demand regarding tablets in special and technological solutions in general of the older user group.

2 INTRODUCTION

Internet access and usage has become a very important part of our daily lives. Although nearly 100% of Europe's population between 14 and 30 make use of Internet based services regularly, access for the older generation above 65 is still limited to a comparatively small group of only 30% according to studies of GFK Austria [1] and the Initiative D21 in Germany [2]. The resulting digital divide excludes especially older people from parts of social life. The most prominent reasons for the digital divide are high technological, economical and social barriers that hit especially people with a low affinity to technical solutions. Among these barriers are according to [3,4]:

- High acquisition and maintenance cost especially in rural areas where Internet availability is low,
- Strong Respect for new technical solutions because of low personal experience and fear of dependence on technical support of technically versed people such as younger relatives,
- High complexity and hence low learnability of technical user interfaces, especially when it comes to personal computers

2.1 myTablet–the project

MyTablet is a research project that was undertaken in 2011 by the Austrian non-profit research institute CEIT RALTEC and got nationally funded by the "Internet Privatstiftung Austria (IPA)". The project's goal was a scientific evaluation of a current tablet computer concerning the suitability as a device to support older people to access the Internet. This idea is based on the hypothesis that tablets are easy to use for seniors since they contain a touch based user interface, which offers less functionality and hence less complexity in comparison to user interfaces of commonly used operating systems. Furthermore tablets lower the acquisition costs since they eliminate the need for a wired infrastructure at home.

2.2 Regional aspects of the mytablet project

Access to the World Wide Web is rare among older people living in cities and the problem aggreviates in rural areas when physical access to network structure is limited. Tablets could be a solution to lower the digital divide since they could tackle several aspects at once:

- providing physical access by using wireless broadband, which is, in comparison to access via the local land line, largely available also in rural areas. (see also [5])
- reducing the technology entry thresholds by providing an appropriate user interface also for unexperienced users such as older adults and people of neal-illiterate social classes.

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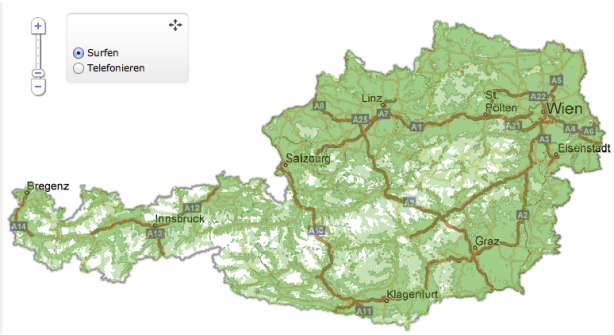

Fig. 1: 3G coverage of the leading Austrian 3G provider (green = up to 40mbit)

Tablets provide a wide range of applications that target to enhance the mobility of users, Apple's "Appstore" for example holds two categories called "navigation" and "travelling" that together provide the users with functionalities such as car navigation, ticketing for public transport, car parking aids and ticketing, city travel guides, etc. The easy availability of those functionalities can lead to a better information distribution also among older users.

3 EVALUATION OF A TABLET

Two main usability trials were conducted. Within a first short-term trial, where eleven older people took part, the usability and acceptance of a chosen tablet was evaluated. To evaluate whether or not the so gathered results can be maintained over a longer period of time, field trials were carried out with four of the eleven test subjects. In these trials the test participants received a tablet for the duration of one month each with the condition to document the usage.

3.1 Usability Study–short-term trial

The main goal of the short-term usability study was to rate the usability together with seniors and evaluate, which functionalities can be used intuitively or after only a short introduction on the device.

Central research questions were:

- How do the trial participants experience the usability of the tablet's user interface in particular and the usability of the device in general?
- Are basic and common functionalities such as web browsing and e-mailing easily learnable; how much explanation and introduction on the tablet is necessary?
- What are general pros and cons on this technology (in comparison to usual PCs or Laptops) in the eyes of the older target group?

3.1.1 Description of trial participants

Eleven seniors (four male, seven female) with an average age of 71 years took part in this first trial. Younger people (age < 60) and technically experienced ones (by means of a questionnaire on technical affinity) have been excluded from the study.

The final group of trial participants included six people without knowledge about PCs or web services at all and five people with basic experience in working with a PC.

3.1.2 Test setting

As test setting a preconfigured and, as far as possible, especially to the needs of the target group customized iPad v1 from Apple was chosen because of the high availability on the market.

The tablet featured a reduced set of nine very common and basic applications offering functionalities such as:

- web browsing
- email client
- Google maps application
- YouTube–video portal

- Access to the online store of a big Austrian food store chain
- Picture viewer
- Bookmarks to websites for weather information, news and Google search

The following figure shows an image of the test setting during the usability study.

Fig. 2: Trial participant and test setting during the usability study

3.1.3 Test flow

Single user interviews were used during the usability trial with each user in sessions taking up to two hours. The trial was split into three parts:

(1) Introduction with explanation about the project and hands-on tutorial on the tablet for approximately 30 minutes

(2) Main part including tasks that were executed by the test user while using the „thinking-aloud“ method [6,7] and obtrusive observation [10] by the research team.

(3) Final qualitative questionnaires regarding the subjective usability, acceptance and satisfaction of the user as well as general feedback about the used tablet.

During the main part the trial participant had to fulfil certain tasks embedded in the framework of possible real-life scenarios. Each task was composed of several consecutive steps that needed to be completed correctly in order to fulfil the task. The execution of these test tasks was observed and evaluated by the researcher team and generated the main results of the first trials. Among the tasks were typical strategies used to obtain information such as „undertaking a web research using Google“ or „reading of a received mail“ or „gaining information about the weather forecast“ using a specific weather application.

3.2 Field Trial–long-term trial

Validation of the gathered results of the short-term trial and gaining information about the long-term use and satisfaction regarding the tablet device were the main reasons of the field trial.

3.2.1 Description of trial participants

Four users of the usability study where randomly chosen for the user group of the long-term trial. Users with even only basic experience where excluded from the list, since the focus was laid on inexperienced users. Finally four women living in Schwechat and Vienna and aged in average 69 years took part.

3.2.2 Test setting

In order to allow the users to experiment with the functionalities of the tablet, the test setting was altered after the usability trials. In addition to the applications installed for the usability trials, around 30 applications were evaluated and chosen that matched the interest of the test participants.

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Fig. 3: main screens of the user interface during the field trial

The field trials were conducted either in Vienna or in Schwechat, Austria.

3.2.3 Test flow

After an additional lesson on the usage of the device for a duration of two hours, each test user received an Apple iPad v2 for the total duration of 1 month. During this time the users did document their tablet usage in a diary and had the possibility to contact a project team member in case of problems with the device or questions regarding the project.

4 RESULTS

The results shown in the following chapters are a summary of information and experiences gained during the short-term usability and the long-term field trial and can be split up into results gained during the tests by interpretation of the users' behaviour and results gathered by retrospective analysis of questionnaires.

4.1 Evaluation of the general usability

If asked about the general usability, all users of during the short-term tests and the long-term trials concluded that they find the tablet would be „easy to use". Problems were found in the fact that applications are provided by various developers resulting in a heterogeneous user experience across the applications. This issue was also raised earlier by Raluca Budiu and Jakob Nielsen in [11]. Nevertheless, during the final interviews all users declined the statement „it was too time consuming to learn the different functionalities".

Some users showed an initial fear in using the tablet caused likely by a general high respect regarding the usage of new technology, but that feeling vanished during the first hours of usage, which helped them to explore new functionality on their own. Most users stressed out that the tablet is not intimidating to them since it does not look like a complex machine and particularly liked that it is possible to return to the (well known) main screen by simply pressing the only button on the device at any given time.

English language is not commonly understood by older people and can not be completely avoided during the use of tablets even if the local language of the device is set to the native language, since many terms used in the World Wide Web and IT in general are Anglicisms not well known among German speaking seniors.

All trials were conducted using the UMTS capability of the device, which provided a satisfying connection to the test participants; all of the users declined the question that the device seems to react too slow. One participant particularly remarked the positive point that the tablet also works at her secondary residence in lower Austria and liked to travel with the tablet.

4.2 Evaluation on the ease of learning

It took around 40 minutes of training prior to the first trial until the research team felt confident that the participant is able to understand and fulfil simple tasks on the device such as looking up the weather using an provided „app" or checking the emails on its own. Another hour of training was given to the four test users selected for the field trials until the test participant felt confident to use the device without help alone. During the field trial all together nine meetings of roughly one hours duration were conducted to provide additional help. Four of these meetings (one per test participant) were pre-planned and conducted after the first two weeks of usage; the other five meetings were needed to answer specific questions that arose during the usage.

During the final interviews novice users mentioned that the usage needs some experience, but they were confident that they are able to learn how to use the tablet if given enough time. To learn new functionality (apps) of the tablet in self-study was rated as easy by two of the four participants of the field-trial, one was unsure, one found it rather difficult. One of the most central found problems was the difference in usability between applications that results in the need to learn and understand each new application again.

4.3 Evaluation of usage patterns

To evaluate the usage of single applications the test participants were asked to fill out a diary on a daily basis regarding their usage behaviour. Most prominently used during the trials were games and riddles for brain fitness followed by information services such as Google search and weather forecasts.

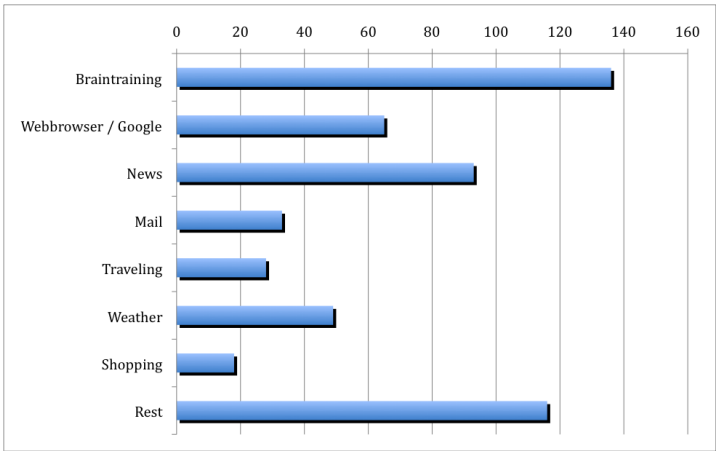

Fig. 4: usage statistics of the applications used

83 test days were included in the evaluation; by using several applications a day, values higher than 83 could be reached. The assumption that the level of usage will decline over the test periods because of losing initial interest based solely on the novelty of the device could not be validated. In contrary, the users tended to use the tablet slightly more often and for a longer time duration since during the field trials they experienced new functionalities they can use.

5 CONCLUSIONS & OUTLOOK

The results of the undertaken usability studies showed that tablets really can lower some of the barriers of accessing the Internet and hence make it easier to use online services independently for people who are inexperienced in using the Internet. The most essential advantage of tablets over common PCs seems to be the non-technical look and feel accompanied by the simple touch based navigation of the devices, which lowers the barrier to adopt the new technology.

During and after the trials all participants stated that they had a positive impression of the tablet used; during the final interviews some said that they now feel more confident in using technical solutions in general.

Barriers were found that can not be overcome by using a tablet. For this study the device had to be preconfigured and technical support was given during the field-trials. This initial set up and occasional support during the usage is needed and needs to be given by a friend, a relative, a carer or an institution.

5.1 Acknowledgements

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Evaluation Performance Comparison of Surveying and Mapping Systems for Updating the City Geospatial Progress

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1 ABSTRACT

The update of current geospatial data progress at the city scale is utilizing the normal data collection techniques such as GPS, Total Station and level equipments. Due to limitation and complexity of using these techniques on the city scale, where it needs a proper geodetic network to establish a mesh of control points prior to precisely conduct any physical data collection. On the other hand, the needed resources are also huge to run these techniques on the city scale and in daily bases; where the accuracy of the data will be affected and not consistent due to large number of involved resources performing different quality.

The development of new methodologies and using new techniques are needed to facilitate the daily update of the city geospatial development progress to precisely allocate the location of services to significantly enhance the overall maintenance and operation performance.

The technical comparison between the most common surveying technologies provides a more obvious performance understanding for each technology. Each technology has been evaluated based on several efficiency factors; each efficiency factor measure's the technology performance in that particular factor.

2 BACKGROUND

Bernardini et al., (2002) mentioned that in most situations, a single scan will not produce a complete model of the subject. Multiple scans, even hundreds, from many different directions are usually required to obtain information about all sides of the subject. Curless (2000) argues the variety of technologies for smartly acquiring the shape of a 3D object. Schmidt et al., (2007) mentioned that the GNSS-receivers are becoming more and more efficient, smaller in size, weight and price which results in the fact that GNSS-receivers are nowadays a mass product. Wanyun (2010) says as of 2010, the United States NAVSTAR Global Positioning System (GPS) is the only fully operational GNSS.

The Russian GLONASS is a GNSS in the process of being restored to full operation (21 of 24 satellites are operational). Schwarz et al., (2007) discuss a process which was mainly driven by the need of highway infrastructure mapping and transportation corridor inventories. Cameras, along with navigation and positioning sensors, e.g., GPS, and inertial devices such as IMU, were integrated and mounted on a mobile vehicle for mapping purposes. Objects can be directly measured and mapped from images that have been georeferenced using navigation and positioning sensors. Zhang et al., (2003) discuss the latest development and evolution of surveying and mobile mapping technologies that opens new avenues for the acquisition, update, fast and online processing of data. Jeong et al., (2006) provide an effective base for the management of information on construction and repair of highway and its auxiliary facilities. Cracknell et al., (2007) emphasis that the non-metallic objects, such as rain and rocks produce weaker reflections and some materials may produce no detectable reflection at all, meaning some objects or features are effectively invisible at radar frequencies. Ying Cao et al., (2009) investigate an interoperable framework to disseminate earth Science data to different application domains. The proposed framework can manage different Earth science data products and raster snapshots over time through the use of relevant metadata information. Liu Yong et al., (2007) evaluate the effectiveness of radar data processing, it is necessary to have an evaluation System of Radar Emulation. According to the requirement of the real-time, accurate and vivid display of the radar data processing efficiency in modern battle field emulation also discussed. Omar Munyaneza et al., (2009) discussed the required time of satellite radar altimetry in order to measure the time required for a pulse to travel from the satellite antenna to the earth's surface and back to the satellite receiver.

3 INTRODUCTION

The conducted research is oriented to implement one of the smart Geospatial updating for some of the smart city components. The implementation of the research focus on updating of polyethylene city infrastructure networks using laser scanning technologies from the surveying and data collection perspective. The research has investigated a new perspective of the laser scanners which is the mobile (mounted on top of vehicle)

scanner integrated with complete navigation and orientation platforms. This chapter is discussing an evaluation of geospatial technical comparison between RTK GPS, Total Station, GNSS reference station, static laser scanning, mobile laser scanning and aerial photographs in terms of collecting the spatial data. The geospatial technology achieved the best evaluation performance is subject to more deep analysis and investigation for developing a mathematical model to detect the daily progress of the polyethylene city infrastructure networks.

The conducted research is oriented to implement one of the smart Geospatial updating for some of the smart city components. The implementation of the research focus on updating of polyethylene city infrastructure networks using laser scanning technologies from the surveying and data collection perspective. The research has investigated a new perspective of the laser scanners which is the mobile (mounted on top of vehicle) scanner integrated with complete navigation and orientation platforms. This chapter is discussing an evaluation of geospatial technical comparison between RTK GPS, Total Station, GNSS reference station, static laser scanning, mobile laser scanning and aerial photographs in terms of collecting the spatial data. The geospatial technology achieved the best evaluation performance is subject to more deep analysis and investigation for developing a mathematical model to detect the daily progress of the polyethylene city infrastructure networks.

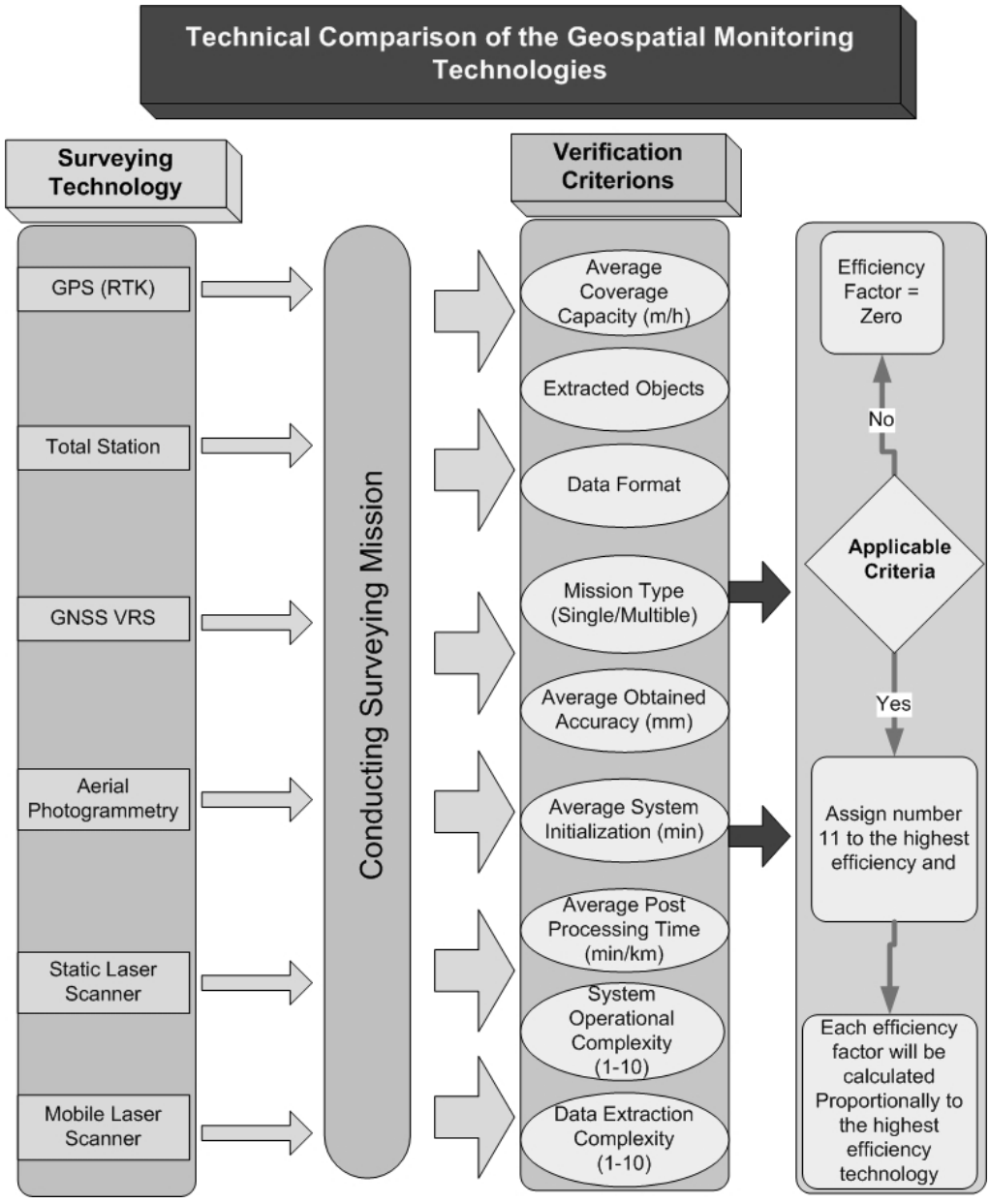

Fig 1: Technical comparison of the geospatial updating technologies.

In the sense of GIS and geospatial applications, the research has conducted two surveyed sites in UAE, Dubai in order to reflect/monitor two kind of utility infrastructure networks. The validation area is about 300 m width and 2 km length, where it is currently in the infrastructure development. Currently the deep utility networks such water transmission, electrical transmission, district cooling; sewer and storm water are still ongoing. The research is to utilize the mobile laser scanning in several missions to survey the several pipe diameters for both distribution and transmission networks in order to check the practicality of implementing the new smart geospatial updating technique.

4 TECHNICAL COMPARISON BETWEEN THE GEOSPATIAL UPDATING TECHNOLOGIES

The research conducted a technical comparison between the common geospatial updating technologies in order to evaluate efficiency factor for each geospatial updating technology. The technical comparison methodology has been designed based on identifying most of functionalities and capabilities adopted in each technology. The average coverage capacity, extracted objects, data format, mission type, average obtained accuracy, average system initialization, average post processing time, system operational complexity, data extraction complexity are the investigated functionalities, where each function has an efficiency factor. Each surveying technology will be subject to mission data collection and data extraction, where some of surveying technologies are not applicable with all efficiency factors. Taking into consideration that some of criterions cannot be precisely measured like measuring the system complexity, accordingly these criterions will be estimated.

5 EVALUATION OF RTK GPS AND MOBILE LASER SCANNING NAVIGATIONAL GPS

A geospatial technical comparison has been conducted between RTK GPS observations and mobile laser scanning navigational GPS observations. The RTK rover antenna has been mounted on top of the car besides the mobile laser scanning GPS unite. The RTK GPS observations have been conciliated with the RTK GPS base station during the post processing. The mobile laser scanning navigational GPS observations have been conciliated with the observations collected from the GNSS reference station. The combination of the navigational GPS and the GNSS reference station observations is generating more enhanced accuracy. In order to compare the obtained accuracy for each technique, the matching in easting and northing is needed, where there is an acceptable tolerance (10 cm) in the horizontal location. The matching in horizontal location is the base for comparing the vertical accuracy, where each technique is measuring the same Z value with respect to technique level of accuracy. Fig 2 shows the matched and directions not matched horizontal locations for both RTK GPS and mobile laser scanning GPS observations. The matched observations (points having the same XY coordinates) used to compare the obtained Z values. Each not matched point has a shift in certain direction, the reference point of the shift directions are the RTK GPS points.

The collected XYZ points from RTK GPS system and mobile laser GPS system having slightly different accuracy level. The RTK GPS points have been adjusted based on the base station, where the mobile laser scanning GPS points have been adjusted based on the combination of GNSS corrections while conducting the post processing. The adjustment of the RTK GPS points implemented on the fly using the radio link. The GNSS reference station is having more observations in less epochs for more satellites (GPS & GLONASS) than collected in the GPS base station. The difference in number of observations between GNSS reference station and GPS base station generates difference in observations accuracy.

The vertical positioning (Z values) is the base of building up an accurate 3D models for the modeling the collected city infrastructure polyethylene pipelines and other features. The research investigates the Z differences and considers it as a base for evaluating the positional accuracy between the RTK GPS observations and the mobile laser scanning GPS observations. Prior conducting the vertical positioning comparison, the horizontal positioning for the two points (RTK GPS point and mobile laser GPS point) must be matched. The points matching cannot be obtained without resolving the accuracy discrepancies; the accuracy discrepancies could be generated in X direction or in Y direction. The elimination of the discrepancies is difficult to be modeled for each direction separately; where it can be combined in one complex number and conduct the linear matching accordingly. The generation of complex number is must be rounded with respect to the accuracy for RTK GPS observations accuracy and mobile laser scanning GPS observations accuracy in order to avoid the improper miss matching. The observations rounding for X direction and Y direction for RTK GPS and mobile laser scanning GPS is 10 cm. The rounding is calculated

based on the average horizontal positioning RMS generated in the RTK GPS; where the GNSS has 3 cm average RMS accuracy. Due to the tolerance in the horizontal location and the need of conducting a high accuracy assessment; the collected observations needs some filtrations before conducting the matching and rounding activities.

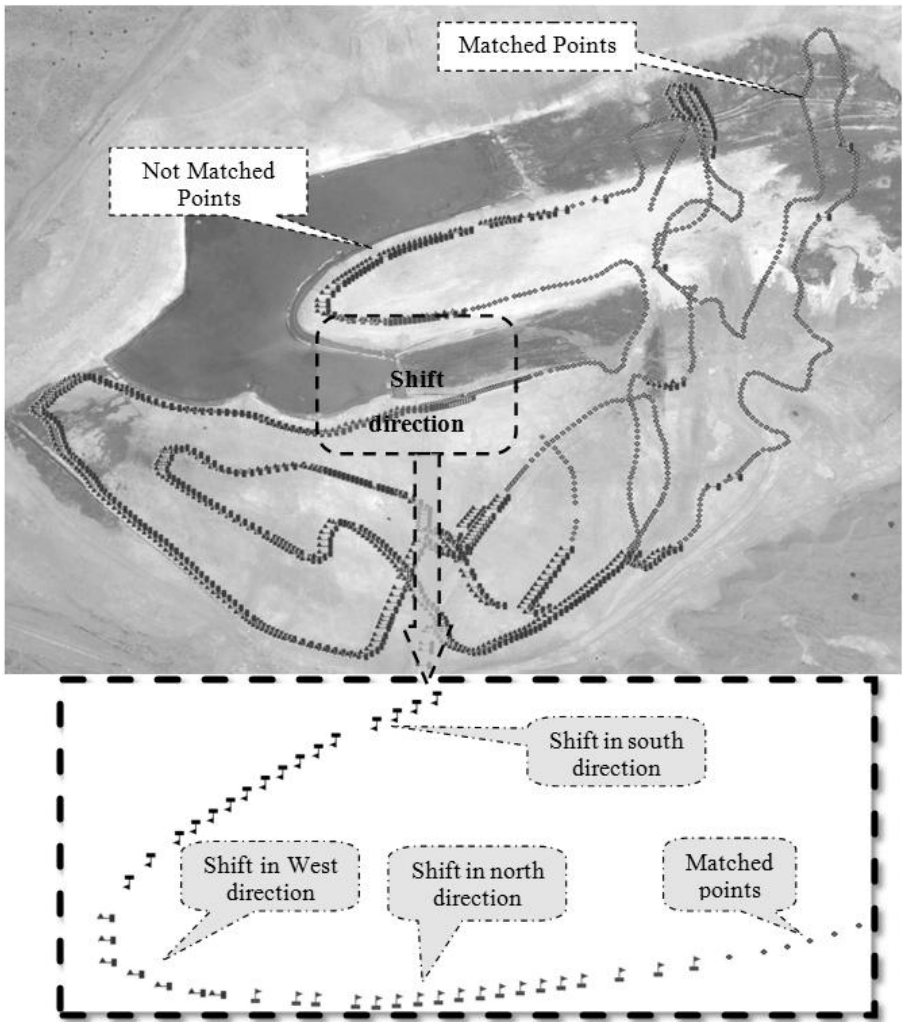

Fig 2: Matched and directions of not matched RTK GPS points with mobile laser scanning GPS.

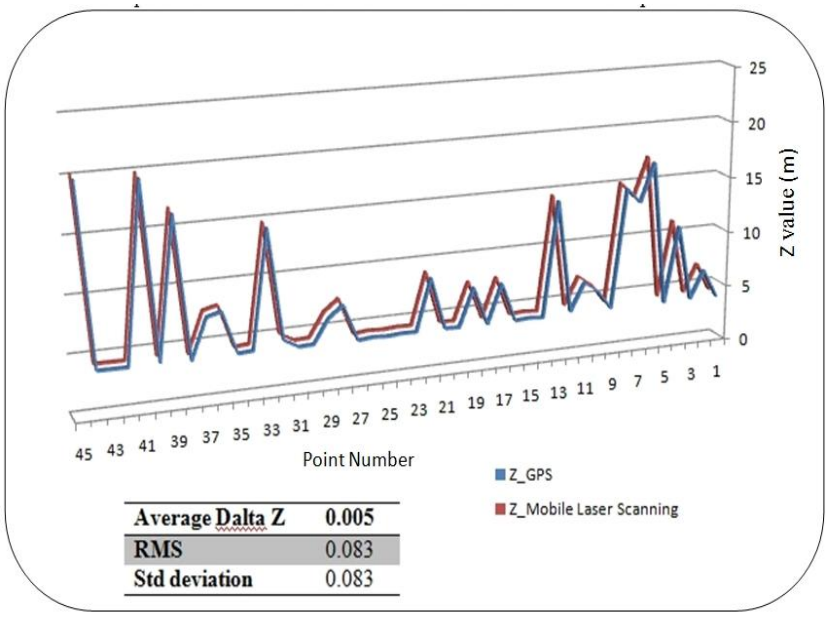

Fig 3: RTK GPS and mobile laser scanning accuracy assessment.

The relation between each two points, since each point has approximate matching in XY and Z; then the linear filtering will produce better accuracy assessment. The linear filtering can be achieved by producing complex numbers by concatenating X and Y in one complex number for both RTK GPS points and the mobile laser (GPS points). The complex number is generated based on the rounded XY coordinates (10 cm) for the RTK GPS and mobile laser scanning GPS. The matched horizontal coordinates are subject to compare the Z values; where the horizontal positioning is known and accordingly the variation in vertical positioning for the RTK GPS and mobile laser scanning GPS can be investigated and modeled. After utilizing complex numbers matching, the matched filed observations for both RTK GPS and mobile laser GPS are about 528 matched points where 604 not matched. Fig 3 shows the accuracy assessment of the first 45 points, where the root mean square has been calculated for the all Z values for the matched points.

6 EVALUATION OF STATIC LASER SCANNING

The evaluation of static laser scanning specially in the terms of obtained accuracy, coverage capacity, system initialization, objects extraction, data format and mission type has been concluded based on conduction of two static laser scanning missions. The two static laser scanning missions conducted different type of scanners; one mission using Lieca scan station 2 and the other using Trimble GX standard scanner. The reason of using different types of scanners is to evaluate the capacity of static laser scanning independently. The area of interest is about 0.126586 Sq km, where the best RMS value is 4.8 cm and the lowest operation time is 4 hours; Table 1 presenting the summary of results for each scanner type.

Trimble Scanner (GX Standard)	
Area	0.126586 Sq km
RMS	20 cm
Stations	6
Points Collected	576,069
Time (hr)	6
Leica SCAN STATION2	
Area	0.126586 Sq km
RMS	4.8 cm
Stations	4
Points Collected	4,265,519
Time (hr)	4

Table 1: Results summary for each type of scanner.

The static laser scanning needs known control point prior conducting the mission in order to georeference the collected point cloud data. The accuracy validation process implemented using known locations inside the scanned areas, while these known locations (sharp angles of some features like stones) are observed using precise GPS surveying technique (2 to 5 cm). After conducting the scanning and post process the observed point cloud data prior generating the 3D surface model, the coordinates of the known points (XYZ) compared with the coordinates extracted from the generated 3D surface. The difference in horizontal and vertical coordinates considered to evaluate the positional accuracy of the static laser scanning. The collected point cloud data using static laser scanning utilized to build up the 3D surface model. In order to have the same area for comparative purposes; the boundary of the area has been identified by set of surrounding known control points.

7 EVALUATION OF AERIAL PHOTOGRAPHS

The evaluation of aerial photogrammetry in the terms of obtained accuracy, coverage capacity, system initialization, objects extraction, data format and mission type has been concluded based on conduction an aerial photogrammetry mission. The mission is conducted in the same area of interest where the static laser scanning missions conducted in order to precisely compare the system initialization, coverage capacity and obtained accuracy among other technologies. Three aerial photogrammetry missions conducted in the same area but in different areas overages in order to conclude better evaluation especially in the sense of coverage capacity, operation time and obtained accuracy. The research conducted short, medium and long term missions for better validation. The area of short term mission is about 12.44 Sq km, where the RMS value is 30 cm; the area of medium term mission is about 43.9 Sq km, where the RMS value is 18 cm. The area of the

long term mission is about 27.32 Sq km, where the RMS value is about 28 cm. the average obtained RMS is about 25 cm, where the average area coverage per kilometer is about 10 km/hr, refer to Table 2.

Mission	*Area coverage (km^2)*	*time (hrs)*		*Area (km^2/hr)*	*RMS (cm)*
1	12.44	1.3	10	30	
2	43.9	5	9	18	
3	27.32	2.5	11	28	
		Average	10	25	

Table 2: Summary of aerial photogrammetry missions.

The coverage capacity, obtained accuracy, system initialization, objects extraction, data format, post processing time and mission type technical comparisons are based on physical verification and observations. Due to the importance effect of the system operational complexity and data extraction complexity; the evaluation emerged based on qualified surveyors and engineers experience.

8 RESULTS OF THE GEOSPATAIL TECHNICAL COMAPRISON AND OVERALL EVALUATION

The final rating is shows the performance of using the mobile laser scanning technology in general field survey activities especially on the city scale data collection and progress updating. The positive rating of the mobile laser scanning technology is strongly supporting the utilization of this technology in city infrastructure updating; where new methodology and mission planning is required to utilize the best capabilities in the sense of geospatial updating. The research considers the laser scanning technology as a main platform for reflecting the physical geospatial city activities conducted on the city infrastructure networks. The aim of using the city infrastructure as a base of the overall geospatial city updating and surveying is the high interaction between the city infrastructure networks and the overall city operations including the utility services.

The average operational coverage capacity efficiency factor is measuring the technology site data capturing productivity. The coverage capacity is also indicating practicality and usability of the technology from the users. The best average operational coverage capacity efficiency factor was achieved by using aerial photogrammetry; where the efficiency factor is 11 (most efficient utilization). The worst average operational coverage capacity efficiency factor was achieved using total station technique; where the efficiency factor is 0.6 (lowest efficient utilization, only 5.5%). However, dynamic laser scanning efficiency factor was the second best average operational coverage capacity efficiency factor.

The object extraction efficiency factor is also measuring performance of the overall data production. The object extraction is related to the data format and the data completeness within the same mission. The good coverage efficiency drives better data completeness within the same mission and accordingly better data extraction. The best objects extraction efficiency factor was achieved by using dynamic laser scanning and static laser scanning; where the efficiency factor for both techniques are 10 (91% utilization). The aerial photogrammetry is also provides very good efficiency factor. The worst objects extraction efficiency factor was achieved also using total station technique; where the efficiency factor is 1 (9% utilization). However, GNSS VRS and GS RTK techniques are also provide bad objects extraction efficiency factors.

The data formatting efficiency factor is measuring the level of integration between the systems. The vector data format can be easily and more performed in the sense of data integration, import and export functionalities. Raster data format needs more editing and extraction efforts to enhance the data extraction/production activities. The best data formatting efficiency factor was achieved by using all surveying techniques (dynamic laser scanning, static laser scanning, GNSS VRS, total station and GPS RTK) except aerial photogrammetry; where the efficiency factor is 11 (100% utilization). The reason of bad data formatting efficiency factor for aerial photogrammetry is the resulted raster data format; where the efficiency factor is 4 (36.4% utilization).

The mission type (single/multiple) is measuring the capability of the surveying technique in conducting more data capturing planes for different purposes in the same mission. The best mission type efficiency factor was

achieved by using dynamic laser scanning and static laser scanning; where the efficiency factor is 11 (100% utilization). Aerial photogrammetry provides very good mission type efficiency factor; where the factor is 7 (36.6% utilization). The worst mission type efficiency factor was achieved using GNSS VRS, total station and GPS RTK techniques; where the efficiency factor is 2 (18% utilization). However, aerial photogrammetry efficiency factor was the second best average operational coverage capacity efficiency factor.

The obtained accuracy efficiency factor is key performance indicator for the overall surveying operations. The accuracy is highly dependent on the surveying application, technique and the expected resulted production. With respect to data capturing and data production for city infrastructure networks; the accuracy level shall be in centimeter level; where the majority of distribution networks are less than 15 cm diameter. The best average operational obtained accuracy efficiency factor was achieved by using dynamic laser scanning, static laser scanning and total station; where the efficiency factor is 11. The worst average operational obtained accuracy efficiency factor was achieved using aerial photogrammetry; where the efficiency factor is 3.3 (30% utilization). However, GNSS VRS and GPS RTK factors were provided an acceptable efficiency.

The system initialization is measuring the time consuming for making the system up and running and ready to surveying. The initialization efficiency factor is affecting the overall system performance. The best average operational system initialization efficiency factor was achieved by using GNSS VRS; where the efficiency factor is 11. The worst average operational system initialization efficiency factor was achieved using aerial photogrammetry, static laser scanning, dynamic laser scanning and GPS RTK techniques; where the efficiency factor is 1.2 (10.9% utilization), 1.8 (16.4% utilization), 2.4 (21.8% utilization) and 2.4 (21.8% utilization) respectively. However, total station efficiency factor provided an acceptable efficiency factor.

The post processing efficiency factor is mainly measuring the geometrical corrections, color balancing (for image production) and overall data production. The post processing can be exempted if the real time correction functionality is available. The research is debating the utilization of post processing correction using the GNSS VRS data. The best average post processing time consumption efficiency factor was achieved by using GNSS VRS and GPS RTK technologies; where the efficiency factor is 11. The worst average post processing efficiency factor was achieved using aerial photogrammetry technique; where the efficiency factor is 1.2 (10.9% utilization). However, total station, dynamic laser scanning and static laser scanning efficiency factors provided very good post processing efficiency factors. The system operational complexity efficiency factor is measuring the usability of the system from the end user and it needs high level of resources qualifications. The high complex system requires more qualified resources; where it needs more operational support, training and cost. The best system operational complexity efficiency factor achieved using dynamic laser scanning and GNSS VRS technologies; where the efficiency factor is 11. The worst system operational complexity efficiency factor was achieved using aerial photogrammetry technique; where the efficiency factor is 6.1 (55.5% utilization). However, GPS RTK, static laser scanning and total station efficiency factors provided high efficiency factors.

The data extraction complexity is very important factor; where it measures the performance of the data production. The data extraction complexity can be recognized for only the multiple mission type; where the single mission type having only single data production which in most cases having automatic or semi-automatic extraction tools. The multiple mission type having varies types of features and each feature is subject to be extracted. The data extraction complexity is mainly related to data format in the sense of vector or raster data format. The best data extraction complexity efficiency factor was achieved by using dynamic laser scanning; where the efficiency factor is 11. The lowest data extraction complexity efficiency factor achieved using aerial photogrammetry technique; where the efficiency factor is 6.1 (55.5% utilization). However, static laser scanning efficiency factor was the second best data extraction complexity efficiency factor. The overall efficiency factors evaluation concluded by gathering and averaging all efficiency factors for each surveying technology. The overall efficiency factors are measuring the each surveying technology from general perspective considering the nine technical factors. The highest efficiency factor achieved using dynamic laser scanning; where the efficiency factor is 7.6 (69.1% utilization). The lowest overall efficiency factor achieved using total station technique; where the efficiency factor is 4.8 (43.6% utilization). However, GNSS VRS, static laser scanning, aerial photogrammetry efficiency factors provide good overall efficiency factors.

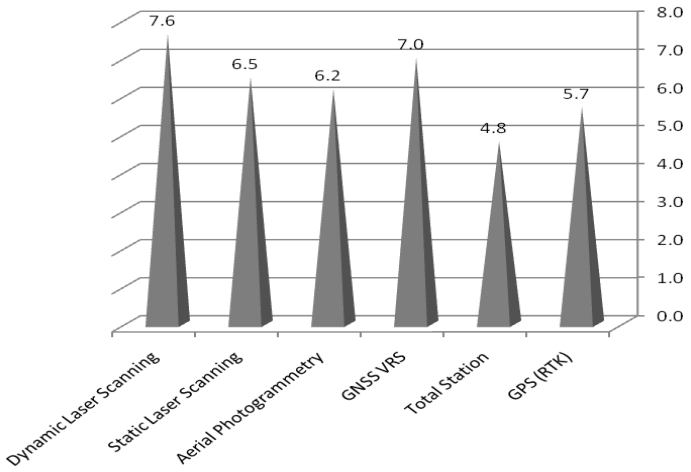

Fig 4: Overall efficiency factors evaluation.

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Feedback for Urban Planning and Solutions

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1 ABSTRACT

As the objects of urban planning have the inhabitants or visitors as a target groups, it is often sought to get some input into the planning process by the target group.

This paper discusses the possibilities of using psychometric, internet based, assessment tool to evaluate the attitudes of people towards different aspects of the urban planning and solutions and the people's preferences toward them in urban environment as an alternative to the most often used questionnaires. These used to be costly in the "paper" times. Today, there are other issues, like the ICT barrier (be it age, connectivity or other resource).

The paper is based on a pilot study which has been run in 2008 at one of the many housing estates in Czech republic, that have grown through the ages of the communist rule and are in general a good example, where the urban planning can go to extremes, when searching for a price/m2 solution.

The pilot study proved, that it is possible to get relevant feedback, further more, opened more issues that are addressable in such projects and are not so easy to be solved by conventional questionnaires.

2 INTRODUCTION TO THE PROJECT

In 2008 the Ministry of regional development opened a call for architectural solution to further development of the housing estate – Karviná, Hranice. A project had been started by Ing. Arch Eva Špačková (Špaček projekt s.r.o., www.spacekprojekt.cz).

As the requirements of the project were to include the sociological study before starting to design, it has been decided to run a questionnaire, and in parallel, to use an internet based psychometrical methodology to gather basic information on the attitudes of the inhabitants of the housing estate towards its present status quo and also towards general requirements to living environment.

The main tasks of the survey at that time were to find out, what are the needs of the inhabitants related to their living environment, and the survey was oriented in two directions:

- to find out the key benefits of the present urban solution and their possible improvements;
- to find out the key risks that the inhabitants are perceiving within their neighbourhood.

At the same time, the survey should validate the possibility using the internet based psychometrical diagnostics, that is of:

- receiving feedback from large amounts of people in short time;
- minimising "role playing" when answering questions from the questionnaires which means receiving a better value of the results.

It was decided to use a internet based survey methodology because it binds both requirements together.

(a) the results are available instantly either at the time of the survey (as a preliminary results) or right after the end of the survey.

(b) survey respondents are presented with words (one after another) each surrounded by the same eight colour balls, out of which they select three. This process eliminates the "role playing" within the responses, as the respondents do not have any clue of what the "correct" answer (reaction) is and so they "just select colours".

The other reasons were (1) the ratio of resources needed to the richness of the results, for the questionnaire has always to be printed out, handed out in large numbers and have the process of gathering it back for evaluation (2) the individual psychometric values that are provided as the results of the survey, which can easily be used to match project main targets.

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3 INTRODUCTION TO THE METHODOLOGY

This chapter discusses the internet based psychometric diagnostics methodology, which was used for the survey. The methodology is based upon words and colours.

In general, when composing a questionnaire for a survey such as in the discussed project, there are many questions being alike.

Do you agree, that the most important problem to solve in your neighbourhood is ….

Do you agree, that the mos important inprovement to your neighbourhood could be …

Are you satisfied with living in …

Do you plan to move to a different address …

The used methodology, instead of requiring the user to think about the replies to all of the questions, records instead „only“ selections of three colours (out of eight) chosen by the participant of the survey when being presented a single word.

The selection then repeats for 60 basic words, which include words such as Me, I want, I must, Reward, Weather, Partner, Energy, People, Nature, … These „basic“ words, which are used also in other application fields of the internet based psychometric diagnostics are then accompanied by next „topic“ words, up to a total of 120.

The topic words always represent the focus of the survey. Words used in this survey are discussed in greater detail in chapter 3.2.1.

3.1 Colours

Have been used in history in large scale and are still being used for diagnostic purposes.

In modern times, Max Lüscher and his studies proved, that human perception of colors is affected by human emotions.

Current usage of colours in diagnostics:

- Lüscher institute (http://en.wikipedia.org/wiki/Max_L%C3%BCscher);
- Colour Association, o.p.s. (www.camethod.com);
- Balance management (www.balancemanagement.com);
- DAP Services (www.dap-services.com).

3.2 The usage of colours in the diagnostics

The coloured circles (since 2007 shaded to provide a full spectrum of the different shades of each colour) are now a protected (Alicante) result of the 25 years of research, which was targeted to have an input from the respondent that would be maximally independent on the differences in displaying colours on different types of displays and also to match human individual colour preferences.

Also, for the accuracy of the diagnostics process, the colour circle rotates during the diagnostics process, as for the respondent not to get used to “clicking always in the same positions”.

Instead of word, pictures, photographs or even animations can be placed in the middle of the circle. The ability of the diagnostic test to record and then evaluate associations in the human brain expressed by selecting colour circles remains unchanged in all cases. DAP Services is running marketing surveys for companies, that want to know, how will their target groups perceive certain types of packaging or even the design of the goods.

3.3 Words, associations

Associations were studied and used

http://en.wikipedia.org/wiki/Association_(psychology)

http://en.wikipedia.org/wiki/Free_association_(psychology)

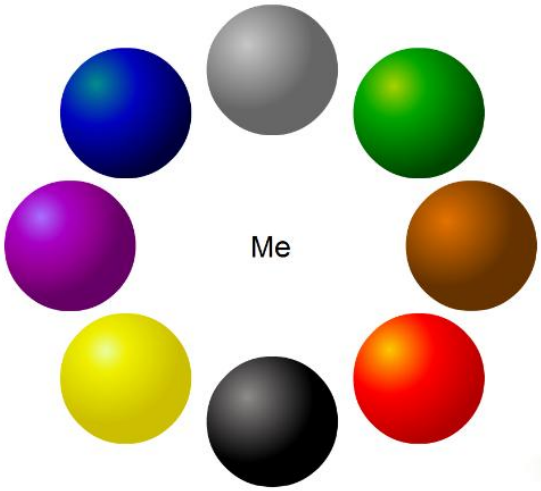

Fig. 1: Colors used within the survey.

3.4 Words used within the survey

This chapter presents the individual words that we have used within the survey and discusses the reasons for including the words in the survey.

Mostly the "topic" words are listed here. The standard words are in bold and underlined.

Words	***Factor***	***Notes***
Me, Anonymity, Guests, Neighbourhood, **Society**, Dog, Youth, **Loneliness**, Privacy, Mothers with children, **People**, Strangers	Communities	We wanted to find out, what are the relations of the individuals towards communities.
Street, Walkway, Internet, Pedestrian zone, Road, Roadway, City centre, Paveway, Path, Orientation,	Communications	These are communication words
Park, Town square, Parking possibilities, Garden, School, Playground, Services, Kindergarten, **Nature**, Market place, Coffee shop, Library, City/Town, Spa park, Mothers' club, Youngsters' club, Seniors' club, Car, Music club,	Facilities	
Sport, Dance, Games, Walking, Cycling, Barbecue, Picknick, Playing, Party, Resting, Cleaning services, Activity, **Movement**,	Activities	
Accident, Noise, **Risk**, Criminality, Litter,	Unwanted	
Art, Statues, Safety, Parking fees, Beauty, **Change**, **Information**, Ownership, Peace, **Health**, Freedom, Country	Other	

Table 1: Words used within the survey.

From the table there is to be seen a clear concept of selecting words, that at best match attitudes to the daily life of the housing estate inhabitants.

Some of the words might seem a bit awkward in the context of such survey, but the table includes only a simple translation of the words, not the transformation of the associations, which would be needed to conduct a similar study in different languages.

For example, the associations to the czech version of the word "Movement" (pohyb) have nothing to do with social movements, it associates only the movement in the physical sense of the word.

3.5 Respondent´s processes at the time of survey

To give the reader a closer understanding of how such a survey is being run from the point of the respondent, we have described shortly in this chapter some details about how-to (participate as a respondent):

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At the time of survey, the user is directed to a web page. The link usually reflects the actual project (as with the current REAL CORP evaluation: www.dap-services.com/projects/real-corp2012). This leads to a page that collects the age and gender of the respondent.

After entering the age (selecting year of birth), and gender, the respondent is asked to provide his own colour preferences by clicking on all eight provided coloured balls. After the initial color selection, the respondents then choose three colors for each displayed word (see Fig.1). At the end of the survey, sociological data are entered and before that, once again the respondent selects all eight colors.

The duration of the survey for the respondent is about 20 minutes.

3.6 Motivation of the respondents

Internet questionnaires usually have a 2%-3% return rate. This drawback can be adressed by our methodology in the following way: as the psychometric survey includes the „standard“ words among the „topic“ words, it is possible to use the existing database (of over 350.000 respondents) to provide a personal feedback to the respondent, regarding to his own psychometrical measurements.

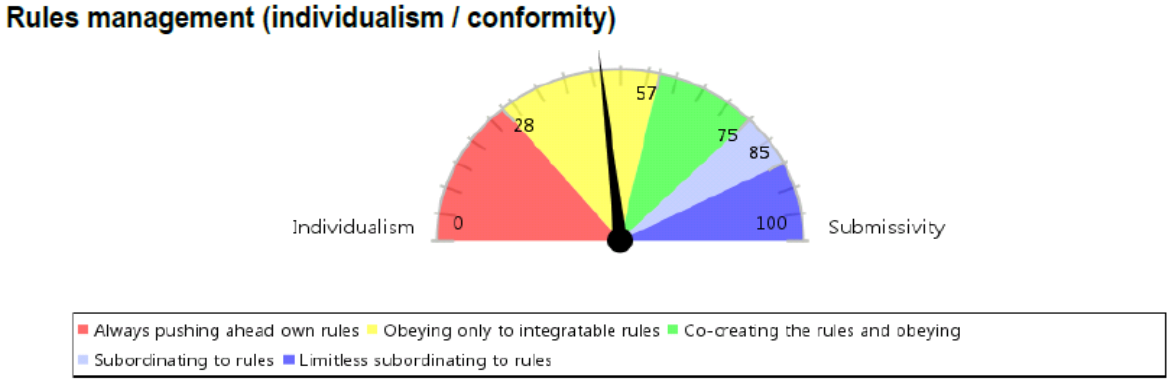

Fig. 2: Example of result: Rules management.

For example the following values can be returned to the respondents:

It is also a benefit for the survey, when the motivation of the respondents is addressed by providing by this personal results, because the organizer of the survey can then receive a validated array of e-mail addresses of the respondents.

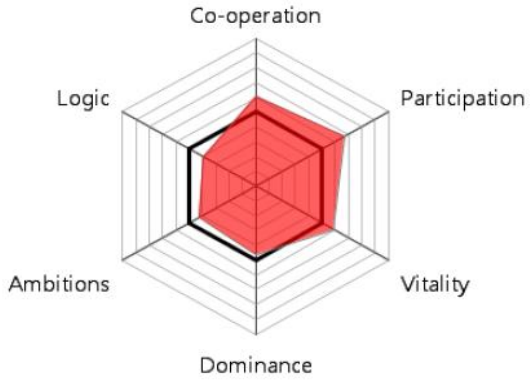

Fig. 3: Example of result: Constructive behavioural types.

3.7 Evaluation

The color reactions of the respondents to the words are then evaluated based on two factors. (a) correlations, (b) colors. The evaluation process is currently beíng patented and is part of the company internal know-how.

As a result

- the words can be identified and related to attitudal groups;
- there can be correlation networks identified among the words.

In this project, high correlations were measured for the following words, which we have grouped to form factors within positive and negative attitudes.

4 INTERPRETATION OF THE RESULTS

Each measured result can be interpreted in the context of the current project.

In this project we have interpreted the results in the main identified factors as follows.

4.1 Positive attitudes

Positive attitudes were identified as those scoring high in correlations to the following association chain:

I want + I may + I can + Reality + I reward myself

which can be interpreted as respondents „real wish that will bring self-reward“. This correlation chain was identified in a statistically relevant amount of responds.

Summary of positive attitudes interpretation

The respondents value possibilities for safe and various movement activities, accessibility to information and neighbourhood that will be pleasant and will not allow for harmful agressivity.

Detailed positive attitudes interpretation

For positive attitudes the following words/association chains scored high in their colour selections correlations:

(A) Movement + Walking + Health + Fun + Rest + Peace

This can be interpreted as the needs of the respondents concerning their surroundings. They require a restful pacefull zone with no limits on movements, where health „improvement“ can take place, and at the same time the place should allow to host social events (an opposite to Loneliness).

(B) Internet + Children mothers' club + Library + School + Mothers' leave

This can be interpreted as the needs of the respondents concerning further education and of the mothers who are at home with their kids concerning the available infrastructure services.

(C) Orientation + Ease of finding one's way out

This can be interpreted as the need of the respondents to have a good knowledge within the housing estate in relatio mainly to safety (pavements, roads, parking places), getting information, local activities, as well as from the risk point of view (places with potential agressivity).

4.2 Negative attitudes

Negative attitudes were identified as those scoring high in correlations to the following association chain:

I do not want + Risk

For negative attitudes the following words/association chains have scored high in their colour selections correlations:

(A) Criminality + Risk

The respondents want to live in a safe place and perceive their neighbourhood as not being safe and free from criminality.

(B) Noise + I do not want (+ kindergarten, playground, park, guests)

This can be interpreted that noise should not be in associated places (see brackets above), and where the guests are.

(C) Litter + I do not want (+ park, playground, walkway)

This adresses the negative attitudes of respondents to litter in the associated places (see brackets above).

(D) I do not want + I see + town + street + accident + car

The respondents do not wish to be endangered by the traffic in the streets.

(E) Garden + Country + Services + Town square

The respondents wish to have better access to own gardening possibilities, better access to services associated to country (fresh food, food markets).

5 CONCLUSION

Using internet based psychometrical diagnostics has been proven as being functional in providing feedback for urban planning and solutions.

In general it can be used wherever the infrastructure allows for an internet connection (even though there are tablets, which are able to save the results of the diagnostics locally and send it for procession as soon as they connect).

The key factor of internet based survey – the motivation to undertake the survey can be in this case supported by providing a personal feedback for the respondent at the same time (as a reward for completing the diagnostics). If the respondent agrees to receive such a personalised psychometrical result (see chapter 3.6) there is also his e-mail address recorded for future reference.

For the cases, where information technology gap should be the core of the problem, there still are to be used questionnaires.

Positives

- in developed countries with accessible internet infrastructure and narrow (or none) human/ICT barrier, quite a large amounts of data can be gathered, mostly using today's social networking tools to run some form of a contest with an ipad2/3 as the main prize;
- the results can be computed and generated throughout the survey and the process of input can be easily monitored; are available instantly on demand, as they are generated from the database based on the actual status of the data;
- the respondents have very little (next to none) possibilities to see what results are there to be produced which makes it for them even easier to run the diagnostics (having the freedom “not to think” while letting the associations appear in their minds and letting literarely their hands to choose the colours.

Negatives

- there still is some work on the interpretations, they are not yet fully end-user readable;
- ICT gap/barrier does not allow for use in some cases.

5.1 Future possibilities

We are in active search for a strategic partner (for each major world language) that would like to use the methodology to form a language specific product, that would have at least two forms, one more open to perform more research-oriented surveys, and one, configurable, but more closed, that could be used widely to support the urban planning and development.

To see how our reports can look like, check out our partners site at www.balancemanagement.com.

Most probably, within a year or two, there will be a feedback solution based on the discussed methodology, that can be easily used and is such a low cost that it gradually becomes a usual way of gathering feedback in this case.

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From 5 to 10 %. The Challenge to Double Vienna's Modal Share of Cycling

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1 ABSTRACT

Cycling plays a crucial role in the mobility strategy of the City of Vienna. On the basis of the executive agreement of the city government of 11 November 2010, the ambitious objective lies in doubling the share of cycling in the city by 2015 (from 5.5% to 10%, 2011 already 6%). Therefore cycling is given high political priority today and in the future and enjoys strong structural and organisational backing by the City Administration.

The dynamic development of cycling in Vienna is noticeable at all levels. On the streets but also in newspapers and magazines, it is obvious that a bicycle culture has evolved in Vienna.

Vienna needs highly developed cycling routes that permit comfortable travelling through the city and into the city. The more cyclists are on the streets the more pressure lies on infrastructure with a high quality. The city has to upgrade its infrastructure on an ongoing basis. A parallel step has to be the promotion of cycling to convince Vienna's population of the many positive arguments that advocate cycling. One highlight of this extended campaign is a special concentration of measures during the "Bicycle Year 2013". Above all, the Velo-city, the premier international conference on cycling, will be held in Vienna on 11th-14th June 2013. This conference is to endow Vienna's cycling activities with additional dynamism and should act as a driver for the implementation of planned measures.

This paper is a compendium of Vienna's bid to the Velo-city conference in 2013 supplemented by further information and data on cycling development and cycling cultures in the city.

2 DEVELOPLEMT OF CYCLING IN VIENNA

2.1 Dates and figures

Vienna looks back on a very long tradition of leisure cycling. Over the past 15 to 20 years, bicycles have become increasingly popular as an everyday means of transport; however, for a long time the share of cycling in the modal split of Vienna was constant at around 3%. A marked upswing in cycling was recorded since 2006. The share of cycling rose to 5.0% in 2010 and now 6.0% in 2011, which corresponds to a relative share increase by about 50%. There are notable seasonal fluctuations: during the "cycling season" from April to October, the share of cycling in the city's modal split is approximately 6.6% and even over 9% in the inner districts. Conversely, the average counts for January usually are only about 15% to 20% of those for June. The counts for 2011 presented another notable increase in bicycle use.

In the 1960s and 1970s, the rise in prosperity and the rapid growth of car ownership led to a strong focus on car-friendly urban planning in Vienna; bicycles were exiled from the streetscape. While the footpath network and public transport system were substantially upgraded, cycling was not promoted: the cycle way network was reduced from 23 kilometres in 1970 to eleven kilometres in 1977. Most cycle ways had to cede their space to ever-growing car traffic. Starting in the 1980s, this trend was reversed. The future cycle way network was to ensure that streets would be recovered for pedestrians and cyclists, rendering them more vibrant and appealing. As a consequence, the cycle way network was extended to 168 kilometres by 1986. As a first phase, "sub-networks in recreational and suburban zones as well as along the Danube and Danube Canal, including main connecting cycle ways" were built.

In 1993, the Vienna City Council adopted new guidelines for the Vienna Transport Concept, aiming at an increase of bicycles in Vienna's overall modal split to 6% of all trips. A key prerequisite for this was the creation of a main cycle way network in 1994. For the first time, the use of bicycles for shopping or trips from and to school and work was promoted. A campaign for cycle parking facilities in public space ("Vienna Rack", "Wiener Bügel") launched in 1985 was systematically continued. Vienna Underground passengers were allowed to take their bicycles along. Due to the dynamic development of cycling, the main cycle way network was revised in 2000, with a special focus on closing gaps in the network and fine-tuning organisational measures. This concept laid the basis for the measures planned for the next years. In the early

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1990s, Vienna's cycle way network was only 190 kilometres long – yet by 2012, it had been expanded to more than 1,200 kilometres.

2.2 A change in transport policies

On the basis of the executive agreement of the city government of 11 November 2010, the ambitious objective lies in doubling the share of cycling in the city by 2015 (from 5.5% to 10%). In the meantime Vienna has reached 6.0% of all trips. Cycling is given a high political priority today and in the future and has a new strong structural and organisational backing in the City Administration.

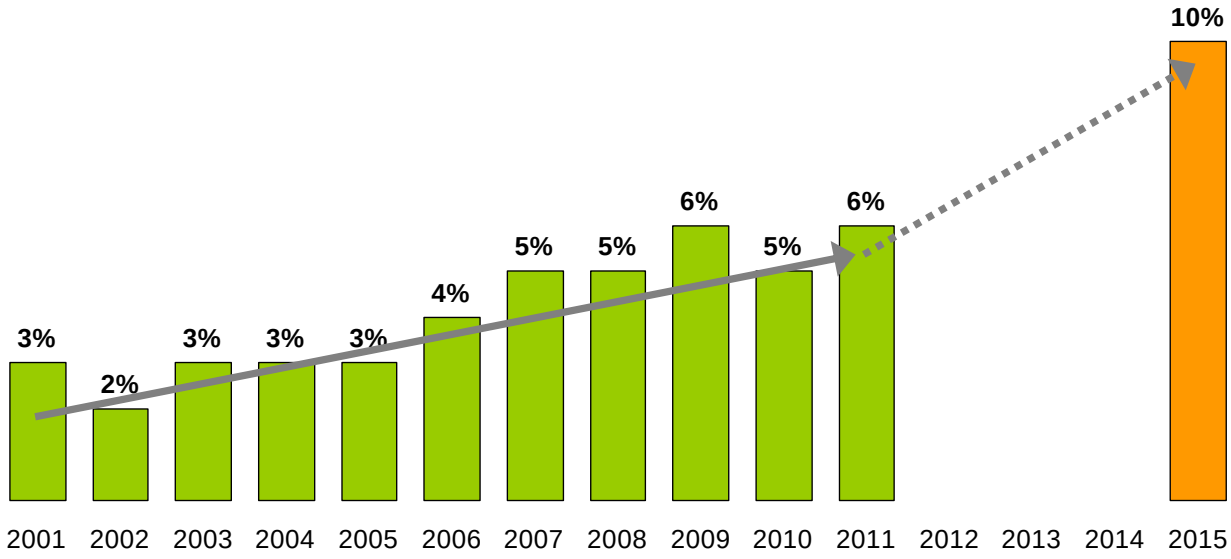

Fig. 2: Development of the share of cycling in Vienna's Modal Split

2.3 A changing bicycle culture

A look at Vienna's streets shows clearly that a bicycle culture has evolved. There are more and more cyclists – men and women of any age – in everyday traffic. Even lifestyle magazines and dailies feature cycling as an interesting topic on their covers; many shop displays use bicycles as decoration elements. Riding a bicycle is not only an alternative to a car, it has become a civil society movement within urban development, urban cultures and urban lifestyles – even in Vienna. Cyclists are reclaiming public space and changing urban images – faster than expected. From the creation of freaky bikes, bike kitchen and critical mass movements, cargo bikes, cycle chique and messenger culture the whole range of urban bike culture and bicycle enthusiasm is becoming a part of urban development and neighbourhood activism.

Fig. 1: Cycling in Vienna, photos by Martin Friedl, Michael Szeiler

Fig. 1: Shoe shop display and an optician using the bicycle as advertising theme, photos by Andrea Weninger, Matthias Schmidt

2.4 Challenges for cycling in Vienna

Vienna is characterised by a number of specific traits that entail specific challenges for bicycle traffic:

- Traditionally, Vienna boasts a very high (by international standards) modal split share of public transport, which currently has attained 36% (2011). The Vienna Underground network was and still will be expanded, accompanied by ongoing improvements of the tram and bus service. As a result, public transport is prioritised in public space design and at traffic lights.
- The historic core and the districts inside the Gürtel boulevard are highly condensed. This entails narrow streets and a great number of buildings from the Gründerzeit era – these residential buildings offer very little space for storing bicycles.
- Cars are mostly parked on the street. Due to relatively narrow streets, many of them are one-way. Opening one-way streets to bicycles (contraflow cycling) was established in Vienna quite some time ago and constitutes a key measure to render cycling more attractive.

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- Because of the often narrow streets and manifold forms of use of the streetscape (public transport on its own lanes, public transport stops, sidewalks, car parking), the space available for cycle ways is limited. Plans therefore need to ponder the interests of all road users very carefully.
- Not all parts of Vienna are flat. Elevations must be overcome as well; this may discourage people to take up cycling on a daily basis.

These traits of the city have led to the formulation of numerous special and individual solutions to encourage cycling (e.g. contraflow cycling, ambitious programme to step up parking facilities, etc.) under complex frame conditions.

3 GETTING MORE PEOPLE ON THEIR BIKES

The improvement of the cycling infrastructure must be stepped up. Vienna needs highly developed cycling routes that permit comfortable travelling through the city and into the city. The more cyclists pedal on the streets the more pressure lies on infrastructure with high quality. The city has to upgrade its infrastructure on an ongoing basis; this will be complemented by projects as the housing estates Bike City and Car-free Development but also by the opening of more and more one-way streets to contraflow cycling. Other important projects include "bicycle-friendly streets", the upgrading of main routes like the Ring-Rund-Radweg with peak user volumes of more than 7,000 cyclists/day and of course further enlargement of cycle parking facilities in public space (over 30,000 slots at the moment) and new solutions for the combination of cycling and public transport. Cyclists need more cycle parking facilities and garages, especially at railway stations.

A parallel step has to be the promotion of cycling to convince Vienna's population of the many positive arguments that advocate cycling. Bicycle culture has to be fostered, so that bicycles will become an everyday means of transport of a lot more Viennese.

Many infrastructure measures and PR activities will be implemented in 2012 and 2013 to generate a positive spin for this issue. One highlight of this extended campaign is a special concentration of measures during the "Bicycle Year 2013", which is to create internal and external dynamism to motivate and mobilise all relevant stakeholders. The cycling season starts with the Bike Festival and the RadpaRADe in spring, a lot of cultural and cycling events will be presented during the year 2013. Starting in April 2012, the new FahrRADhaus (bicycle house) will address all questions related to urban cycling: a one-stop shop provides information, cycle training, flea markets, services and deals with suggestions to cycling in Vienna.

The Bike to Work campaign "Radelt zur Arbeit" [1] generates an initiative for specific target groups: information, incentives, testimonials, etc. demonstrate the potential advantages of integrating cycling into corporate mobility. In addition, a number of leading companies were to be motivated to become more bicycle-friendly. In 2011 the campaign sucessfully involved 4,000 workers from 700 participating Viennese companies to highlight the potential of bicycle use for enterprises.

Above all the Velo-city, the major international conference on cycling, will be held in Vienna on 11th-14th June 2013. This conference is to endow Vienna's cycling activities with additional dynamism and should act as a driver for the implementation of planned measures.

4 VELO-CITY VIENNA 2013: THE SOUND OF CYCLING – URBAN BICYCLE CULTURES

The Velo-city is the European Cyclists' Federation's (ECF) series of conferences is the premier international planning conference on cycling. [2] The Velo-city is to encourage cycling as part of daily transport. The conference series started in 1980 in Bremen followed by Barcelona, Munich, Brussels, Copenhagen, Seville etc. and Vancouver in 2012. Velo-city conferences have more than 1,000 delegates from all over the world.

The conference attracts delegates involved in transport planning and consulting, policy and promotion of cycling programs. Planners, engineers, architects, non-governmental organisations, academic researchers, physicians, environmentalists, business and industry representatives will share their knowlede on the cycling issue.

[1] http://www.radeltzurarbeit.at/
[2] http://www.ecf.com/projects/velo-city-2/

Fig. 3: The Velo-city Conference will take place in Vienna from June 11 to 14, 2013

The motto of the Velo-city conference in Vienna is "The Sound of Cycling – Urban Cycling Cultures". As in other European metropolises, different bicycle cultures have emerged in Vienna: urban chic, retro, neo-eco, minimal, new racing sports, family cycling, ... All these styles of spatial utilisation have their own rhythm and contribute towards the variety of ecofriendly traffic. In this way, they change and enrich the sound of the city.

With respect to culture and bicycle culture, the thematic focuses of the conference will reflect international trends and developments in the field of cycling. More information will be online in July 2012 on the website www.velo-city2013.com.

Fig. 3: Velo-city in Copenhagen 2010, photo by Troels Heien

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Geosimulation of Urban Housing Market Conditions: A Preliminary Investigation

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1 ABSTRACT

A key objective of this contribution is to evaluate the suitability to geosimulate housing market conditions. Systems for geosimulation, such as multi agent systems (MAS) or cellular automata (CA) exhibit various lacks when it comes to usability, data handling, data availability, visualization of simulation results and, not least important, GIS-MAS/CA coupling. This contribution evaluates different systems for geosimulation to identify lacks and to define an appropriate system for the geosimulation of urban housing market conditions. Systems considered include UrbanSim, REGISTA (Reality Emulating Geographical Information System for Territorial Analysis), MAGI (Multi Agent Geosimulation Infrastructure), Agent analyst and OBEUS (Object Based Environment for Urban Simulation). Prior to the evaluation a generic conceptional process framework for a housing rent appraisal simulation as an organizational geosimulation framework for housing market analysis is set up. This framework contains process components such as visual interpretation and descriptive statistics of housing market data, generation of spatially interpolated surfaces and intersection with (socioeconomic) ancillary data. The preliminary study serves as groundwork for the creation of a prototype simulation in the test area of the German city of Potsdam.

2 INTRODUCTION

The focus of this paper is the design of a conceptional framework for a housing rent appraisal simulation. A further focus lies on the the evaluation of different modeling toolsets for the purpose of modeling conditions in housing rental markets. In recent years the term geosimulation was used as a fuzzy phrase under which a whole range of new spatial simulation approaches has been subsumed. Torrens and Benenson (Torrens & Benenson 2004), the developers of the Geographic Automata System concept, consider geosimulation as "urban geosimulation". Spatially-related automata are the basis for their concept of geosimulation. The difference to conventional urban simulations are the constitutional "elements"of geosimulation, e.g. human individuals and infrastructure entities. The interactions between complex and dynamic phenomena in urban systems are modeled.

Urban simulation models in a traditional sense represent urban units in different scales of aggregation (e.g. census tracts, administrative boundaries etc.); geosimulation models are based on spatially non modifiable objects e.g. homes or households. This view of geosimulation already adresses one of the problems of geosimulation approaches, the acquisition of spatial data at the highest possible scale. Most popular tools in geosimulation are automata, mostly cellular automata (CA), and agent-based modeling approaches as multiagent systems (MAS). In the first volumeof their book series "Geosimulation" Koch & Mandl (Koch & Mandl, 2011) give some recent applications of geosimulation in the field of urban development, land-use change, gentrification etc.

3 CONCEPTIONAL PROCESS FRAMEWORK FOR A HOUSING RENT APPRAISAL SIMULATION

In general, existing housing market models are real estate appraisal models and concentrate on modeling effects on the housing price but not on housing rent. In this presentation an adaption of existing models to simulate effects on housing market rents in "core cities" of urban areas, following the nomenclature of the German Federal Institute of Urban- Construction and Regional Science, is suggested (BBSR 2011). Common approaches of real estate appraisal models are hedonic approaches where the bundle of the overall housing price is broken down in different prices, often using ordinary least square estimation methods (OLS) (Liu, 2011). Further methods are the application of moving window regression analysis, GWR (Geographically weighted regression analysis) and moving window kriging (Montero et al., 2011).

The goal is to adapt a model to the aim of housing rental appraisal and to integrate the adaption into a geosimulation process framework. The hereby suggested conceptional simulation process framework (figure

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1) consist of six modular components. The process starts with a data acquisition and preprocessing component following and extending a process chain for a GIS-based housing market analysis suggested by Schernthanner & Asche (Schernthanner & Asche, 2010). This analysis includes the visual data interpretation, descriptive statistics and the rent appraisal of the current market situation via methods coming from geostatistics (Kriging, GWR). Next comes submarket creation by means of polynomial declustering, followed by the core component, a multiagent based geosimulation of rental market conditions and a final forecasting/prognosis component based on the result of different simulation scenarios concludes the framework. While the process components from data acquisition to the rent appraisal of the current market situation have been evaluated (highlighted green in figure 1), prototype development for the simulation components is on the way. Core component is a multi agent simulation (MAS). The MAS component incorporates agents representing virtual tenants interacting in urban real estate submarkets. The agent's interactions allow conclusions to dynamics in rental trends based on their interactions. The process framework serves as simplified assumption of the complex dynamics in rental markets and their influence on the formation of apartment rents in core cities (see figure 2).

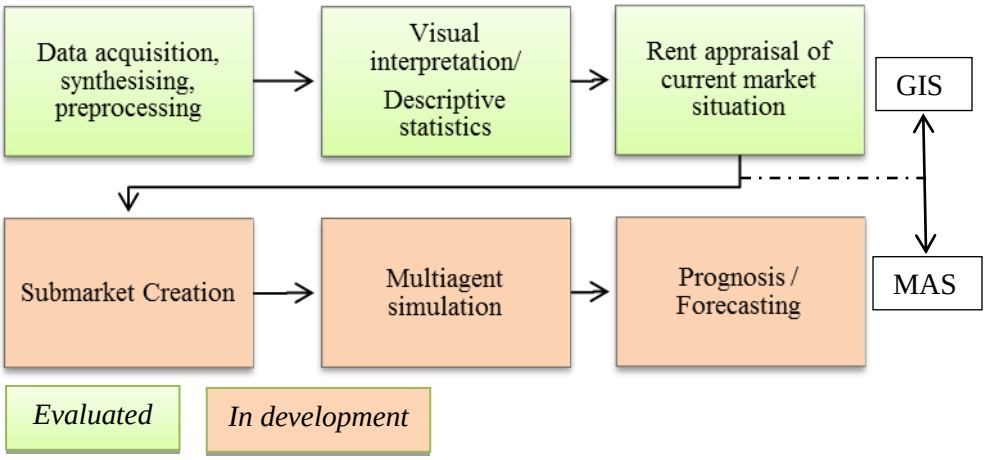

Fig. 1: Conceptional process framework for a housing rent appraisal simulation.

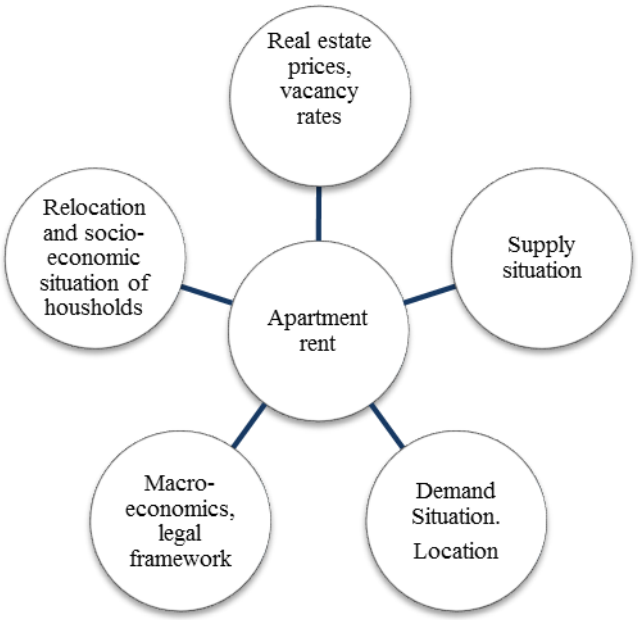

Fig. 2: Influence factors on the formation of apartment rents (own representation based on Waddell, 2011).

4 METHODOLOGY OF A TWO STEP EVALUATION PROCESS

Choosing an appropriate modeling system is a comprehensive task. The intended audience to use geosimulation modeling systems are expert groups made of specialists in the field of spatial planning, urban planning, GIS etc. Ideally a modeler possesses perfect knowledge about the geosimulation system to use, in

practice the complexity of geosimulation systems show that this assumption does not fit to real world conditions. Therefore different researchers suggested different criteria to evaluate simulation systems previously to the actual geosimulation process (Smith et al., 2007). The evaluation of simulation systems is important groundwork for setting up a prototype simulation following the designed framework. The evaluation process consists of two steps. First a criteria-based search process is done searching for geosimulation software. Criteria have been taken from guidelines suggested by Smith et al. (Smith et al., 2007) and have been adopted and extended to suit to the suggested geosimulation framework. Second step is a simplified form of a cost benefit analysis as performed by e.g. Krüger (Krüger, 2006), Schernthanner & Tyrallova (Schernthanner & Tyrallová, 2010), based on the principles of cost-benefit analysis introduced by Zangemeister (Zangemeister, 1973). Criteria simulation software has to possess to fulfill a certain function were scored in a 5 point scale according to their relevance to achieve a certain target, by summing the overall scores a cost benefit is calculated for each geosimultion system. Scoring is a subjective process based on the performer's knowledge. Nevertheless general recommendations for the use of geosimulation software can be derived aligned to the goal of the simulation of housing markets. Nine criteria have been scored in the evaluation process, 45 points is the highest possible score, meaning that a simulation system is perfectly suitable for the suggested simulation framework.

4.1 Evaluated Criteria

The criteria have been divided in three general criteria simulation software systems had to possess; these criteria have been used for the search process. Geosimulation systems had to be of the CA and/or MAS type and had to have any kind of GIS coupling. Further divisions have been the criteria that have been evaluated by a cost benefit analysis:

- License: Open Source, Closed source, Shareware, Freeware or Unknown.
- Import Export functions.
- Help system: Documentation, "How-to", and Community.
- Degree of maintenance: is the system actual, out date.
- Programming: Scripting / Objectbased, necessary programming knowledge.
- User interface: GUI and/or command line.
- Results: Visualization.
- Complexity of data requirements: Minimum to maximum data requirements.
- Availability of real estate models (model templates).

Scores range from 0 points (criteria not suitable for) to 5 (perfectly suitable). In addition, the software system training time was examined based on experience found in literature and own tries resulting in training time assumptions.

4.2 Simulation software systems

The following software systems have been identified for further evaluation: UrbanSim, REGISTA (Reality Emulating Geographical Information System for Territorial Analysis), MAGI (Multi Agent Geosimulation Infrastructure), Agent analyst and OBEUS (Object Based Environment for Urban Simulation). Beside the evaluated systems several other systems exist, e.g. MASON or Netlogo. Castle et al. (Castle et. al., 2007) give a good overview over existing software for geosimulation.

UrbanSim/OPUS (Open platform for urban simulation) is a modular open source simulation software system for the analysis of urban development in the context of urban planning. Software development was initiated in the 1990s by Paul Waddell (Waddell, 2010) at the University of Berkley. Real estate demand and supply models exist but so far only indirect effects of infrastructure changes on the attractiveness of residential areas can be measured by the simulation software (Liu, 2011). REGISTA (Reality Emulating Geographical Information System for Territorial Analysis) is a CA-GIS concept presented by Blecic et al. (Blecic et al., 2009) . Blecic et al. developed a CA-modeling toolbox with tight GIS coupling to uDIG an open source desktop GIS. Blecic et al. (Blecic & Cecchini, 2008) also developed MAGI (Multi-Agent Geosimulation Infrastructure), an agent-based simulation software with tight GIS coupling. Agent Analyst is an extension of

ESRI ArcGIS developed by the U.S. Argonne National Laboratory's Center for Complex Adaptive Agent Systems Simulation in collaboration with ESRI (Environmental Research Institute). The software is a middleware coupling ArcGIS capabilities with Repast, an open source multi agent system, allowing users to run Repast models within ArcGIS . Repast itself is a free open source simulation toolkit, implementations of the Repast framework for housing applications already exist e.g. done by Jordan (Jordan, 2011). OBEUS (Object based environment for urban simulation) has a special status as it aims to implement the Geographic Automata System (GAS) paradigm described by Torrens and Benenson (Torrens & Benenson 2004) combining MAS with CA. OBEUS was developed as part of a unfinished PhD project by Vlad Kharbash (Benenson & Kharbash, 2005).

5 RESULTS AND CONCLUSION

A cursory examination might find that several promising modeling systems exist for the implementation of the suggested modeling framework. Lacks not recognized at the first glance could be identified in the evaluation process. Most projects seem to be in a permanent experimental status within an academic domain, few operational models exist. The learning curve for all the systems is steep and all the evaluated systems lack a satisfying visualization of simulation results. UrbanSim receives the highest score (33) but the training time that has to be calculated to set up a basic model and the enormous amounts of high scale geodata (e.g. socioeconomic data at household level) that has to be acquired to set up a basic model disqualifies UrbanSim for prototype development for one single person. Patterson and Bierlaire (Patterson & Bierlaire 2008) give an detailed description in the time that has to be spent to set up an UrbanSim model, they categorize the learning phases to understand UrbanSim into a familiarization phase during 0,5 person-months, an implementation phase lasting 1,5-2 person-months and an evaluation phase lasting 0,5-1 person-months, Nguyen-Luang (Nguyen-Luang, 2008) even claims that an interdisciplinary team of 4 people and a period of 4 years for a successful operational implementation of UrbanSim is necessary (Nguyen-Luang, 2008). REGISTA, although a promising approach, is not available; evaluation has been done only based on literature review, due to this fact the reached score of 23 can´t be compared with the other tested systems as the system can´t be accessed for prototype creation. MAGI (28) developed by the same research group as REGISTA (Blecic & Cecchini, 2008) unites MAS and GIS under one graphical user interface, biggest problem of MAGI is, that the software seems to be without maintenance since the first version published in 2007. Agent Analyst (18) also is without maintenance, Mathur (Mathur, 2007) even states: "I feel that the Agent Analyst was developed as an experimental product and has since then been without patronage or support". OBEUS has not been evaluated by scores, because the simulation system is not accessible.

In assumption that a big research team consisting of about 4 persons can set up a prototype, UrbanSim would be the software of choice for prototype creation. Repast (without Agent Analyst) and Magi are the authors' first choices for prototype development.

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I-Scope–Interoperable Smart City Services through an Open Platform for Urban Ecosystems

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1 ABSTRACT

The latest generation of 3D Urban Information Models (UIM), created from accurate urban-scale geospatial information, can be used to create smart web services based on geometric, semantic, morphological and structural information at urban scale level. UIM can be used by local governments to:

- Improve decision-making on issues related to urban planning, city management, environmental protection and energy consumption based on urban pattern and its morphology.
- Promote inclusion among various users groups (e.g. elder or diversely able citizens) through services that account for barriers at city level.
- Involve citizens at wider scale by collecting geo-referenced information based on location-based services at urban scale.

Based on interoperable 3D UIMs, i-SCOPE delivers an open platform on top of which it develops, within different domains, three 'smart city' services. These will be piloted and validated, within a number of EU cities that will be actively engaged throughout the project lifecycle. The services will address:

- Improved inclusion and personal mobility of aging and diversely able citizens through an accurate city-level disable-friendly personal routing service that accounts for detailed urban layout, features and barriers.
- Optimization of energy consumption through a service for accurate assessment of solar energy potential at building level.
- Environmental monitoring through a real-time environmental noise mapping service, by leveraging citizen's involvement will who act as distributed sensors city-wide measuring noise levels through their mobile phones.

All smart services will be based on already available technologies which will be integrated, deployed and made publicly available from a "3D smart EU cities" portal. Potential trust, privacy and data security risks and vulnerabilities, i.e. due to localisation of people, are integral part of the project and will be explicitly addressed.

2 INTRODUCTION

The term "smart city" has been introduced as a liveableness qualifier for urban environments, where advanced technology, tipically based on web-services and web-applications, are made available to the community through latest communication infrastructures (integrating both wired and wireless technologies) delivering "smart" functionalities that can simplify citizens' life or facilitate take-up of new business models by companies, in the context of houses, offices and public places. The scope of smart cities has been further extended through the introduction of advanced mobility management solutions, dealing with both transport infrastructures and information/monitoring systems. Last, but certainly not least, smart city services are being developed to address environmental monitoring and energy efficiency issues. This is affecting not only the energy retail market, where utilities can benefit from smart grid technologies, but also the building construction sector, where the design of low-environmental impact buildings can significantly benefit from more efficient services optimising heating, air-conditioning or power consumption.

The European Commission, within the so-called Digital Agenda, is paying significant attention to smart cities, as technologies associated to smart cities can bring to an improved knowledge-based economy, to better social inclusion and, in more general term, to a more livable environment. The technological and societal evolution required by the concept itself of smart city can act a flywheel that can help Europe

maintain a leading position at the global stage. Several research programmes, initiatives, projects and pilots, are being promoted within Europe and beyond.

The overall ambition is not only new technological but, most notably, societal in that smart cities will have to change the way people interact with others and with the urban environment itself. This is why i-SCOPE (Interoperable Smart City services through an Open Platform for urban Ecosystems), the project presented within this paper, has -among its founding principles- the integration betweemn the "real" city with its "virtual" counterpart, made of ubiquitous and pervasive services for improved mobility, inclusion, energy efficiency. Such a co-existence of real and virtual cities is hyielding a new articulated ecosystem, where citizens' life are closely integrated with urban-level IT services, giving birth to what is often referred to as the "hybrid city".

Moreover, in i-SCOPE different issues, transcending the mere technological domain, are being tackled, including apsects dealing with social and environmental issues. Indeed in i-SCOPE each technological solution is not considered as an achievement "per se", but it engineered following an open-innovation, user-driven approach, with the ultimate goal of promoting a so-called "humane city".

The rapid technological evolution, which is characterizing all the disciplines involved within the wide concept of smart cities, becomes a key factor to trigger true user-driven innovation. For this reason, i-SCOPE is making a substantial effort to maximise user-driven innovation by involving, from the earliest stages of the project, citizens, public officers, high-tech entrepreneurs, administrators, decision-makers. This way an bottom-up research process based on open the innovation system, is being promoted within three key research domains: 1) inclusive routing, to facilitate personal mobility of diversely-abled citizens; 2) solar impact analysis, to promote energy savvy planning policies; 3) crowdsourced environmental monitoring, to be able to use citizens and mobile IT technologies (i.e. smartphones) as distributed sensors of environmental information.

3 OBJECTIVES

The objectives of i-SCOPE are manifold. First of all i-SCOPE will eliver an open-source toolkit based on 3D Urban Information Models (UIMs), developed according to the principles of service-oriented architecture, and based on use of open standards from the Open Geospatial Consortium (OGC). The toolkit will be released as open source solution ready to be deployed by city administrations. The toolkit will include services capable to create 3D urban models from raw data such as surface models (e.g. LIDAR), terrain models and building floor plans according to the OGC standard CityGML.

The toolkit will include smart services that will be used to:

- Improve decision-making in planning processes and policy design at city-regions management levels, with regard to issues related to energy efficiency and noise levels, based on urban pattern and its morphology.
- Promote inclusion and mobility of differently-abled people and elderly users through guiding technologies, based on use of mobile IT devices (e.g. smartphones) that can help them overcome barriers at city level and that support them during their daily urban trips.
- Involve citizens at wider scale in the collection of real-time location-based information at urban scale with particular attention being paid to mapping of noise. It should be noted that the third domains has clear policy implications in that creating technology capable to deliver real-time noise mapping can help city achieve the requirements of the Environmental Noise Directive (END) (2002/49/EC). The Directive, which clearly expresses the importance of the participation of all involved citizens, among other obligations, enforces Member States to provide strategic noise maps on a regular basis (5 years) as of 2012, for major roads, railways, airports and agglomerations (>250k inhabitants), using harmonised noise indicators. These maps can be used to assess the number of people annoyed and sleep-disturbed respectively throughout Europe, to address issues emerged during each assessment period, and to create action plans for said target areas. The approach pursued by i-SCOPE is in line with Article 9 of the Directive which states that citizens must be provided with clear and accessible noise maps, disclosing areas exceeding value limits.

The aforementioned smart city services will be tested within a variety of real network ecosystems available in the cities involved in the project, ranging from city-wide sensor networks (as in the case of the city of Velletri, Italy), to large scale regional optic fibre networks (in the case of Trento and Lazio Region, Italy), to mobile location based services.

Due to the nature of the technology being developed, which heavily relies on location based services and tracking of the users' position, i-SCOPE will pay significant attention to the development of trustable, secure privacy schemes to ensure the highest level of protection of users' information. This is necessary since such a set of real-time, location-based mobility services poses significant security and privacy issues (due to traceability of people's location, actions, travel plans etc). The i-SCOPE project shall ensure that the privacy of users is respected whilst providing protection of the data at the core of the system and the interaction of users with that data in line with the data protection laws.

Furthermore i-SCOPE aims at providing a significant contribution to standards in the domain of smart city services, through contribution to extension and wider adoption of the OGC standard CityGML as key enabling open standard for 3D smart city services. With specific regard to this, i-SCOPE has the following goals:

- Promoting establishment of a common "Urban Information Model" (UIM) based on CityGML within a network of cities in Europe of relevant critical mass, and to create specific applications on top of these UIMs. It is worth noting that the outcomes of the project will neither be isolated nor stand-alone. In contrast, the adoption of a common standard (i.e. CityGML) ensures that applications realized in City A can be transferred and utilized in City B. This represents an important asset of the project and an essential factor to facilitate cooperation within the cities.
- Accelerate the uptake of CityGML as the reference standard to support simulation at urban and regional level, by integrating or extending existing open platforms in several EU cities. In practice this will done by making combined use of existing mobile technologies, location based services, sensor networks, high performance networks and 3D technologies and by integrating them into a comprehensive software suite that can deliver novel services to tourists, local residents, businesses and and public administrations.
- Extend the core CityGML open standard, through a formal submission to the OGC consortium, to define specific CityGML Application Domain Extensions (ADE) relevant to the pilots selected, specifically in the domain of inclusive routing, solar energy assessment and noise mapping.
- Promotion of a number of targeted awareness activities to accelerate the uptake of CityGML as the reference standard to support urban-scale smart services, sustainable planning and simulations.

4 THE PROJECT DESCRIPTION

4.1 Issue proposed and target users

i-SCOPE delivers an open source toolkit for 3D smart city services based on 3D Urban Information Models (UIM), created from accurate urban-scale geospatial information.

The smart services proposed address the following three scenarios:

(1) Improved inclusion and personal mobility of aging people and diversely able citizens.

(2) Energy dispersion & solar energy potential assessment.

(3) Noise mapping & simulation.

The targeted users of i-SCOPE are:

- Diversely-abled citizens needing customised routing instructions. Specifically, mobility impaired users or people with limited ambulation requiring barrier-free routing functionalities or visually impaired users who cannot read maps and need voice-based semantically rich routing instructions.
- City administrations that need to define policies in terms of heat dispersion and solar potential at urban level as well as experts/professionals/companies that need to have high precision solar potential assessment.

- City administrations needing to assess noise through simulation as well as existing mapping data in order to create noise maps according to EU Directive 2002/49/EC on noise. Citizens, who can access real-time data as well as accumulated maps on areas and time-scales of interest.

4.2 Usage

The typical use case of i-SCOPE starts with a differently-abled user, for instance with mobility constraints (e.g. a wheelchair user), who starts an App in their smartphone looking for a route that can guide them through the city along barrier-free routes. Directions are provided by the smartphone through an easy-to-use Augmented Reality interface.

Another differenty-abled users, with serious visual impairement, asks for a customised route that can guide them through the city. The smartphone in this case starts providing spoken, semantically-rich instructions describing the surrounding context in detailed manner. Additional feedback is also provided through a portable Braille displays connected to the smartphone via Bluetooth.

In a different scenario a city planner starts a 3D web application to create very high-resolution solar potential maps of the city. This is required to define new policies or incentive schemas at the city level. The solar potential map is created, through a specific web services, from an interoperable 3D model of the city. Professionals can also use the 3D web-client to access the 3D city and provide for a specific building information on a refurbishing project, for instance uploading relevant data, such as thermo images, regarding energy performance of a building. This is part of a compulsory procedure to obtain an certification on energy rating of the building.

In the last scenario a city administrator starts a 3D web application to access noise data being retrieved by citizens through their mobile phones. Users are used as remote sensors and the data generated by their smartphone through an ad-hoc App, can be used to generate 3D real-time noise mapping data. The system also allows accessing historical data regarding noise maps. Citizens can use the App to provide real-time measurements of noise levels in specific parts of the cities to file an official complaint for excessive noise exposure (e.g. due to vicinity of roadwork or entertainment venues).

4.3 Innovative features

From the aforementioned use cases it is clear that i-SCOPE features a number of innovative aspects. With regard to the first use case Most routing and navigation systems have been developed for vehicles. i-SCOPE smart routing service returns orientation and navigation information, customised to cater for diversely able users, providing:

- Automatic map-descriptions in words (e.g. for visually impaired users or in contexts where visual information cannot be accessed).
- Maps with larger fonts and/or mouse over acoustic descriptions.
- Navigation descriptions in easy to hear versions.
- Navigation directions provided in a format suitable for Braille displays.
- Information about the surrounding, i.e. streets (name of the street, lengths, type, crossings), landmarks (points of interest, orientation points) and areas (parks, squares).
- Navigation functionalities without distances (in meters) but based on landmark descriptions.
- Context awareness, through a “visual map in words” (automatically read aloud by the client) providing all the required spatial information.
- A visual map whose graphical appearance is adapted to the specific user requirements of visually impaired users.
- A simple button to invoke the “where am I?” function providing additional descriptions of the surrounding targeted to people with reduced orientation skills (e.g. elderly users).

When observing the second use case, dealing with solar potential mapping, i-SCOPE provides an improved solution, if compared to current solar assessment GIS (e.g. ESRI Solar Analysis), since it ensures a calculation based on real 3D layouts of buildings. Traditional applications instead calculate solar potential based on raster data that need to be created separately from existing terrain and, if available, merging

building information. Other online services (e.g. Photovoltaic Geographical Information System by JRC) is simply based on the position (lat/lon) and through manual specification of the roof layout (orientation, slope etc.). i-SCOPE solar assessment is based on accurate 3D georeferenced models of urban environment and therefore accounts for:

- Real layout of roofs and other structures (e.g. walls, slabs etc.).
- Correct positioning.
- Shadowing effects induced by adjoining buildings as well as vegetation, infrastructures (e.g. power line posts).

Unlike other solution all the aforementioned information is automatically calculated from a high precision UIM available in the interoperable standard CityGML. In turn as output the services delivers:

- Interoperable provision of solar maps through Web Coverage Service (WCS) or Web Map Service Time (WMS-T).
- Solar simulations can be calculated through a remote service, based on interoperable standard WPS. This way any client (including commercial or open source GIS software) can perform simulations by invoking a smart service based on an interoperable protocol.
- Finally i-SCOPE promotes an innovative scenario to support the update of data on heat dispersion from community of citizens and professionals. This information can be later accessed by city administration for planning or taxation purposes. City administrations can easily create maps to show how policies have contributed to improving energy efficiency in areas of the city.

Last but not least, the third scenario, dealing with noise mapping, has a distinct innovation flavour in that:

- Noise simulations can be calculated through a remote "smart" web service, based on interoperable standard Web Processing Service (WPS). This way any client (including commercial or open source GIS software) can perform noise simulations by invoking a smart service based on an interoperable protocol.
- The EU Directive 2002/49/EC on the assessment and management of environmental noise requires large cities in Member States to produce noise maps and action plans to curb noise pollution. Current efforts to comply with the directive are based on simulations rather than field measurements, based on statistical data for transport (air, train and large roads) and industry. By using measurement data collected by citizens as well as by traditional sensors, possibly in combination with statistical data (e.g. on urban traffic flows), these existing efforts can likely be improved upon and will certainly throw a different light on the actual situation.
- Simulated maps are by construction dated (typically 3 years back), and they are in terms of averages over day, evening and night periods over a whole year. Real-time maps provide finer granularity in terms of time as well as space.
- Simulated approaches map the situation at 4m above the ground at each house's most exposed facade, while real-time noise mapping through mobile sensor networks provides a people-centric view on urban

4.4 Technology

i-SCOPE integrates open source technologies and previously developed partner projects within a comprehensive toolkit promoting interoperability through the use of OGC and other open standards for data exchange and services. This allows for independent development and functionality deployment provided by different web-services. In i-SCOPE pre-existing technologies, wherever not available as services, will be wrapped by a service layer in order to ensure compliancy with the overall schema The following diagram provides an overview of the project architecture.

i-SCOPE will significantly rely on CityGML. This is the open standard for interoperable encoding of 3D Urban Information Models. Since i-SCOPE refers to Smart Cities CityGML and its extension according to the requirements of the project is the most prominent solution. The standard is being developed by the Open Source community under coordination of OGC. As previously mentioned, i-SCOPE requires extension of the core standard as well as the creation of two Application Domain Extension (ADEs) and the extension of a

third one (on noise) of the current CityGML. This will extend modelling capabilities making CityGML compliant to the requirements of the three scenarios tackled by the project:

- Sun Potential Mapping
- Noise Mapping
- Differently-abled-friendly routing

i-SCOPE services will integrate the BRISEIDE (www.briseide.eu) platform along with the processing services required. The toolkit is currently undergoing extensive testing in several pilots across Europe and provides services to access spatio-temporal data both in terms of data access and data processing. i-SCOPE will also extend the routing algorithm developed by BRISEIDE. This is based on OpenStreetMap available dataset, and it can exposed as an OpenLS service. Additionally in i-SCOPE the new service will provide a routing algorithm that will be friendly to people with disabilities. For example; the dataset will provide information on ramps to get on the pavement after crossing a street. The routing algorithm will use this dataset to provide the person using the i-SCOPE service with routes that:

- Require the lesser effort to get from point A to point B;
- are the quickest in terms of time,
- are the shortest in terms of overall length,
- always accounting for the requirements of disabled people.

i-SCOPE will also rely on integration of existing technologies. Specifically i-SCOPE will integrate a tool to generate 3D city models based on existing geodata developed by MOSS (a German company partner of the project), that can provide combine different data such as terrain models and floor plans to produce a realistic 3D city as CityGML. The technology will be customized and adapted to i-SCOPE's requirements in order to operate as a web service through a software layer that can provide interoperable access to simulation functionalities via a WPS (Web Processing Service). i-SCOPE will also integrate existing noise simulation technology, currently developed on top of Oracle and ESRI technology. To do so an WPS component will be developed to ensure interoperable communication with noise simulation software as interoperable web service. Similarly i-SCOPE will also deliver a service for sun potential calculation and production of solar irradiation maps by extending the "r_SUN" function – module of GRASS by creating a WPS interface.

i-SCOPE will also use services developed by partner CEIT that can create semantic spatial descriptions from GIS repositories. The spatial description derives from vector data so that a largescale mapping is possible. This method makes it possible to describe the shape of crossings, blocks, etc. in words and in a standardised way.

The project will also integrate noise level mapping technology based on NoiseTube, a technology initially developed within the scope of the FP6 project TAGora by Sony CSL in collaboration with Vrije University Brussels. The NoiseTube application for smartphones allows users to collect geo-located noise level measurements and share them in real-time. The NoiseTube server software, accumulates and stores all shared data and uses it to generate noise maps (as OGC KML files), user tag clouds and basic statistical noise information.

The web client will be based on 3D Geobrowser, developed by Fondazione Graphitech to access and manage geographical information according to OGC standards. This is a mature software, that currently supports exchange of map information in a totally interoperable manner; loading of CityGML models; access to processing features as WPS. The system is based on an enterprise level SOA designed to provide all the access, management and processing functionalities of multi-dimensional GIS and satellite data through OGC – OpenGIS Consortium compliant web services. Within i-SCOPE the 3D Geobrowser will be extended to provide support for CityGML at high level of detail.

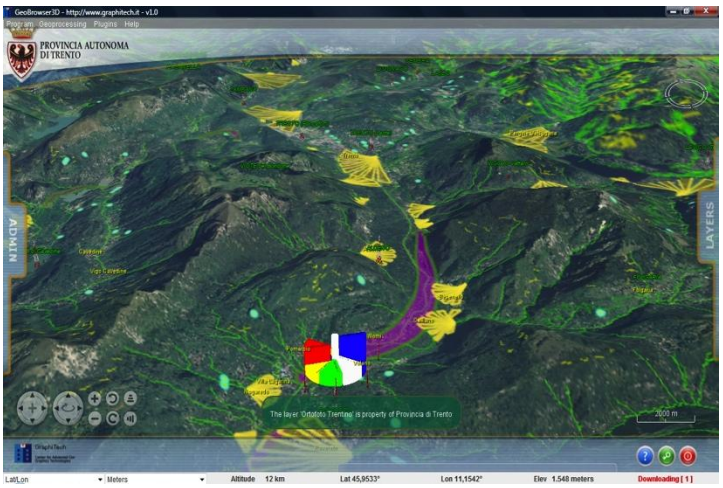

Figure 1: the 3D web-based GeoBrowser by Graphitech

5 CONCLUSIONS

i-SCOPE is facing very critical issues connected to the future quality of life and economic/financial performances of our cities and city-regions. Decision making processes, at local, regional and national scale, are more and more connected to the use of complex tools based on articulated and mult i-SCOPEs informative systems and related digital tools.

The three adjectives (smart, inclusive and sustainable) characterizing the EU2020 strategy request for major change in the way of defining the way of being competitive and at the same time keeping under control the unbalances connected to regional disparities, but even to look for more effective and efficient solutions in the se of digital data. In fact, this way, especially those connected to the definition of smart solutions for the economic growth of European cities, city-regions and major scale territories, is strictly connected to the proper design of an EU Digital Agenda (DA).

The i-SCOPE outcomes are to identify in set of tools, services and policies that will contribute to major horizontal tasks connected the EU digital Agenda (e.g. access of data owning to public sector information, and enhancing the EU innovation capacity), but, at the same time, the project's outcomes will affect and impact on the realms of a) interoperability and standards of spatial data, b) the research and innovation sectors and c) trying to propose effective solutions to major social challenges (e.g. ageing issues).

Moreover, the implementation of smart services in the urban realms could be one of the innovation to consider for town planner in order to understand and better design the new planning challenges determined by ICT inputs, solutions, opportunities. It is to consider that for many cities, and this is valid even for i-SCOPE pilot partners, "going smart" could be currently seen just as a slogan useful to be in a stream of EU investments. It is important to understand, in implementing i-SCOPE, which ICT solutions can really make the difference in terms of a) making planning instruments more effective and efficient (re-thinking the way of designing planning tools), b) moving the decision making process to a wider arena (communities matter), c) opening new opportunities for public and private spaces in the city (technology helps in exploiting hidden, until now, potentialities). i-SCOPE introduces services based on 3D data and technologies in the world of town planning, where decision making is literally and legally centred on 2D tools; this is definitively a frontier to consider, smart technologies based on use of 3D data. Smart services should not just focus on practical application (e.g. this part of cities is suitable or not for solar enegy tools…), but should be capable to contextualize the capabilities of facilitating practical application into a major urban strategic framework, if the smart cities services find the way to pass from the scale of 'solutions providers" to that of strategic organiser of cities potenitalites in terms of energy, noise, use of spaces, mobility, services to citizens and so on at urban and metropolitan scale, at this point we cann see them as vectors of innovation within the many contexts of urban planning.

Concluding, the many i-SCOPE outputs, from the more technological ones to the definition of indicators and frames for policies, will fall on different categories (from meta data modelling, definition of platform to the design of services and urban/territorial policies) that cannot bring to a synthesis if not faced in the context of a pluralistic and multi-faced governance based on the directive and directions given by the EU. The

questions connected to inter-regional/cross border use of data, those connected to the indications for the design of trans-national services (the market is definitively global), the other linked with the indication to provide for the design of policies and strategies (the EU should provide a soft creation of coherence among all national and local policies in order to avoid unbalances in use of funds and in the definition of policy principles) are just few examples that demonstrate how the i-SCOPE purposes cannot be solved at local or at national level, but required to be set up, experimented and implemented at EU scale through the implementation of a partnership including, public administration (cities and regions) SMEs and research centres.

6 ACKNOWLEDGMENTS

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Identification of Innovative Solutions to Decarbonise Transportation of People and Goods in Smart Cities

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1 ABSTRACT

The two major challenges mankind has to face during the 21st century in the context of transportation are urbanization and CO_2 emissions. These two phenomena cause serious problems and bring along a strong need for the implementation of innovative and "smart" solutions in future cities. The substantial need for these solutions, however, can lead to interesting commercial opportunities for innovative companies.

In the light of this trend development an innovation project, which was based on the lead user approach, was conducted by the Institute for Entrepreneurship and Innovation (E&I Institute) at the Vienna University of Economics and Business (WU Wien) in cooperation with Kapsch TrafficCom AG (Kapsch). The latter is a member of the Kapsch Group, a worldwide renowned Austrian company. Kapsch operates in over 35 countries and is a leading international supplier of intelligent transportation systems (ITS). Its core business is the development and supply of electronic toll collection (ETC) systems, and the technical and commercial operation of the latter.

Finding radically new concepts and solutions is always a challenging task. However, the lead user method is an applicable tool to gain deeper insight into complex problems and to produce highly innovative ideas and solutions.

The main goal of this research project was to find innovative solutions to decarbonise transportation of people and goods in "Smart Cities". Several important constraints have to be considered in connection to the underlying problem. Firstly, solutions must be commercially realizable by the year 2025. Secondly, commercial business models should be marketed on a B2G or B2B basis. Thirdly, the focus lies on cities with more than two million inhabitants. In addition, solutions must be scalable. Finally, any solution ought to lead to a reduction of CO^2 emission.

A major difficulty for the conducted lead user method was the definition of the search field and the term "smart city". In general, there is no singular definition of what makes a city smart and there is also no clearly defined strategy which must be implemented in order to improve a city's smartness (Austrian Institute of Technology, 2011). Smart cities have several dimensions as outlined by the European Commission (2009): smart mobility, smart environment, smart governance, smart people, smart living and smart economy. While the interdependencies of these dimensions were only investigated in phase 1 of the lead user project, it was necessary to narrow down the search field so as to be able to find feasible concepts and solutions.

2 SMART MOBILITY

The current mobility trend can be characterized by the rapid exhaustion of fossil fuels combined with increasing environmental, health and safety problems (Grob, 2009). Especially in Asian cities the rapid urbanization and motorization, which is due to an increased income level, led to poor conditions of urban transportation (Morichi, 2005). Thus, smart mobility solutions would need to primarily solve problems of accessibility and availability of sustainable macro (for longer travel distances, e.g. trains) and micro mobility (for bridging the "last mile", e.g. flexible public individual transport), combined with efficient Intelligent Traffic Control (ITC) systems. Lenz (2011) pointed out that travel behaviour is ever more diversified nowadays, which leads to a shift from mono-modal to multimodal transport. This means that different transport modes in cities (trams, buses, metro, trains, cars etc.) will need to be interlinked and coordinated to ensure short travel times. Additionally, this requires an interconnectivity of all transportation modes and/or users so that shared information can be used to improve the prediction of traffic flows (Kambitsis, 2010).

In addition, transportation modes themselves can be improved in a smart way. By converting fuel-driven cars into electric cars, for instance, this approach has already been put into practice. Several countries have

already built large funds to facilitate this development with regards to their public transportation systems (Coune, 2011). However, the common "last mile" is still not covered–even if the public transport systems are

very advanced (i.e. micro mobility). This is one reason why further solutions in the area of electric vehicles are still required (IET-Transport Forum, 2003).

Shared-vehicle concepts might also intelligently reduce the number of cars in cities (Winterhoff et al., 2009). A reduction of the number of cars used in cities is necessary as space (especially in connection with parking lots) becomes more and more limited. Furthermore, the abandonment of cars in cities would also tackle the problem of CO_2 emissions.

3 DOOMSDAY SCENARIO FOR FUTURE CITIES

To get better insights into the problems inhabitants of megacities face today, Kapsch prepared a "doomsday scenario". In this presentation current trends and developments are projected into the future with the aim to show how cities would look like by the year of 2030 if no further actions were taken (see Figure).

Fig. 1: Excerpt of the doomsday scenario of Kapsch

In order to get to a common understanding of what goals we addressed, we envisioned a future smart city which they presented to all project participants (see Figure 2).

Fig. 2: "Beautyville" Vision of a Smart City by Kapsch

4 OBJECTIVE AND METHODOLOGICAL APPROACH: THE LEAD USER METHOD

The objective of the project was to find innovative solutions for megacities in order to lower their level of CO2 emissions and leverage their citizens' satisfaction by enhancing life quality by application of the lead user method. Involving lead users and experts from all over the world shall help to overcome functional fixedness which often occurs within a company and in turn hinders innovative progress. Involving people from analogous markets should further encourage this out-of-the box approach.

High competition, shorter product life cycles and rapid technological change made it crucial for companies to constantly innovate. Especially radical innovations are needed in order to remain competitive. In this respect traditional marketing research methods often fail to deliver valuable results.

Most marketing research methods work with random samples of customers in order to ensure that they represent the average typical customers (Lüthje & Herstatt, 2004, p. 554). They are often restricted to obtain only information about the users' needs and assign the task of generating ideas for solutions to manufacturers (Gary L. Lilien, 2002, p. 1043).

However, average users are strongly constrained by their real world experience, an effect called "functional fixedness". Studies showed, for example, that those who use an object or see it used in a familiar way are blocked from using it in a novel way (Gary L. Lilien, 2002, p. 1043). In order to forecast their needs in the future or assess a radically new product, the customers have to master the very difficult mental task of imaging a context of use, which does not yet exist. Therefore, average users are unlikely to contribute insights into new product needs and possible solutions (von Hippel, 1986, p. 791).

In contrast, so called "lead users" do not have to imagine themselves in a not yet existing situation because the "new" is already familiar to them. (Lüthje & Herstatt, 2004). According to von Hippel lead users have two distinguishing characteristics: "(1) They are at the leading edge of an important market trend, and so are currently experiencing needs that will later be experienced by many users in that market. (2) They anticipate relatively high benefits from obtaining a solution to their needs, and so may innovate." (von Hippel, 2005, p. 22). The first characteristic is based on the assumption that market needs evolve over time and are driven by important underlying trends. Therefore, solutions developed by lead users today will be attractive to many users tomorrow (see Figure 3). The second was derived from studies showing that the greater the expected benefit from a needed innovation is, the greater the investment in obtaining a solution will be (von Hippel, 2005, p. 22).

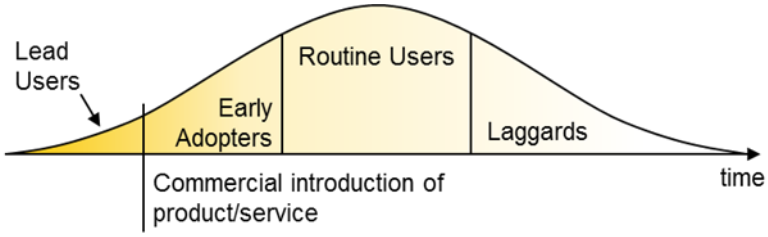

Fig. 3: Lead users' position in the adaption curve (Churchill, von Hippel, & Sonnack, Lead User Project Handbook, 2009)

The lead user research method exploits this fact by integrating lead users directly into the company's concept development process. Consequently, the project team can benefit from both the solutions and the information concerning the underlying need held by lead users (Churchill, von Hippel, & Sonnack, 2009, p. 6).

Products developed by lead users are often commercially attractive, have higher novelty and address newer customer needs (Gary L. Lilien, 2002, p. 1055). Furthermore, the method is not restricted to leading edge users in the target market, but also tries to make use of users from advanced analogous markets, which have similar needs in a more extreme form. This approach increases the likelihood of identifying radically new ideas for new products and services that will be "breakthroughs" for the target market (Gary L. Lilien, 2002, p. 1043).

In many cases lead users do not request financial compensation for their services. This phenomenon is called "free revealing" and means that all intellectual property rights to the information are voluntarily given up (von Hippel, 2005, p. 9). It mainly appears when lead users are part of other fields and industries and would not feel any negative competitive effects from revealing what they have done, or when they developed their

innovation just to solve their own specific need. In these cases lead users are generally happy to share their knowledge (von Hippel, 1999, p. 54).

Freely revealing users may benefit from enhancement of reputation, from positive network effects due to increased diffusion of their innovation, and from other factors like being able to buy a well-produced solution to their need (von Hippel, 2005, p. 9).

As shown in Table 1, lead users can be found in both low and high technology fields (Churchill, von Hippel, & Sonnack, 2009, p. 11). The percentage of users who improve prototypes or develop new solutions is significant. The numbers range from 10% to nearly 40% depending on the industry (Lüthje & Herstatt, 2004, p. 556).

Study	Field of innovation	Users sampled (n)	% of users who developed solution for own use
Lüthje (2004)	Equipment for outdoor sports (Germany)	153	10%
Lüthje (2003)	Medical surgery equipment (Germany)	261	22%
Franke and Shah, (2002)	"Extreme" sporting equipment (Germany)	197	38%
Tietz, Morrison, Lüthje and Herstatt (2002)	Kite surfing equipment (Australia)	157	26%
Lüthje, Herstatt and von Hippel, 2002	Mountainbike equipment (USA)	287	19%
Morrison Roberts and von Hippel, 2000	Library information search system OPAC (Australia)	102	18%
Herstatt and von Hippel, 1992	Pipe hangers hardware (Switzerland)	74	36%
Urban and von Hippel, 1988	PC-CAD for the design of printed circuit boards (USA)	136	24%

Table 1: Fraction of users who build solution for own use (Churchill, von Hippel, & Sonnack, Lead User Project Handbook, 2009)

In recent years there has been an increasing interest in applying the lead user method to the development of products and services (Nikolaus Franke, 2006, p. 302). It was successfully used by numerous world leading companies like 3M, Johnson&Johnson Medical and HILTI (Lüthje & Herstatt, 2004, p. 553).

5 PROJECT DEFINITION AND GOALS

After Kapsch had decided to conduct an innovation project in cooperation with the E&I Institute, which is among the leading departments all around the world regarding the implementation of lead user projects, they nominated a group of people who worked out a more detailed area of focus within the search field of smart cities together with the E&I Institute. Out of two remaining subfields, namely "decarbonising urban transport" and "smart energy solutions", the former was chosen as it seemed to be related to the more urgent need for solutions, especially from a user`s perspective, and in turn to a higher chance of commercial success.

The next task was to find a precise description of the search field and the overriding goals of the project. The following constraints were thus set: The main focus of the project should be to identify innovative solutions, with commercial potential, that decarbonise individual and/or public transportation of people or goods while increasing the users' convenience.

Furthermore, some specifications were made to narrow down the focus and to provide the project team with a better understanding of the expected outcome of the lead user project:

- The underlying concepts to the solutions should be highly innovative, but must be commercially realisable by the year 2025 or 2030 at the latest.
- All existing and future technologies, systems and products may be used to draw concepts. Creativity should only be limited by realistic technology forecasts.
- Development phases of three to five years are expected.
- Commercial business models should be marketed on a B2G or B2B basis.

An expansion to the B2C market will only be considered if there turns out is a major business opportunity that requires this step to be taken.

- The main focus should lie on cities with more than 2 million inhabitants. Solutions have to be scalable.
- Smart cities are defined as to be systemic, human, anticipatory, resource-efficient and technologically innovative.

Concerning the regional focus of the project, it was agreed that both, cities in developed and in developing countries were of interest to the project partner and that a better regional focus could be developed during a later phase of the project.

6 DATA COLLECTION AND ANALYSIS

In a first step, the search field was narrowed down to the most accurate needs and trends. In order to do so, the students involved in the project systematically skimmed through the relevant literature, browsed the World Wide Web and conducted more than 500 interviews with experts and megacities' citizens who were affected of the problems described above.

We thereby identified 18 needs which were then ranked according to their importance. After having presented the outcome of the need and trend analysis to the project partner, the latter agreed to the recommendation of focusing on the four suggested needs, namely:

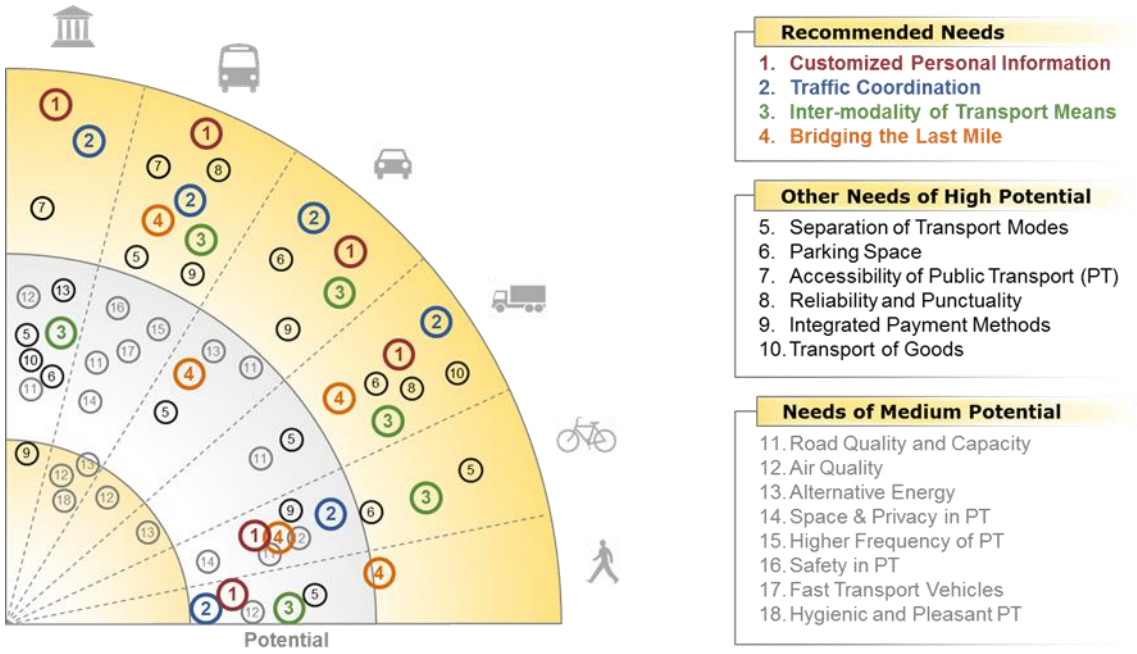

Fig. 4: Trend matrix (own contribution)

6.1 Need for Customized Personal Information

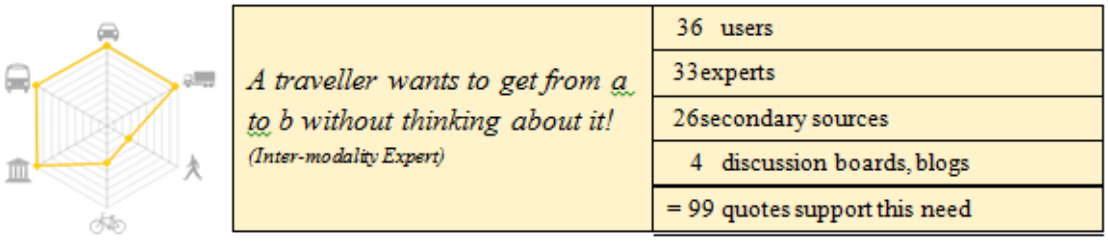

Fig. 5: Need for Customized Personal Information (own contribution)

Both users and system operators strive for information that would be real-time, accurate and relevant and simultaneously presented in a user- friendly fashion. This need turned out to be extremely relevant with a full score of five out of five and is relevant for all participants of public transport. This is not as surprising when considering the fact that information sharing can influence a passenger's comfort, might enhance

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accessibility to divergent destinations as well as improved itineraries and, last but not least, can lead to time efficiencies.

In the first instance it should be emphasised that users want an easy access to relevant information that would provide details concerning all modes of transport. It should help every traffic participant, from a cyclist to a driver to a metro operator, in a seamless transition from point A to B. It is imperative that information is reliable and 'up-to-minute', because otherwise it would not fulfil its task of assisting travellers in trouble and enabling a stress-free journey. A few examples of the nature of information needed would include schedules for different transport modes, envisaged delays, accessibility information, traffic congestion and availability of cycling paths. Providing such information would definitely solve the general confusion with currently often incomplete, lagged and unreliable information. Furthermore, it would also reinforce the image of stability and security of the transport system.

6.2 Need for Traffic Coordination

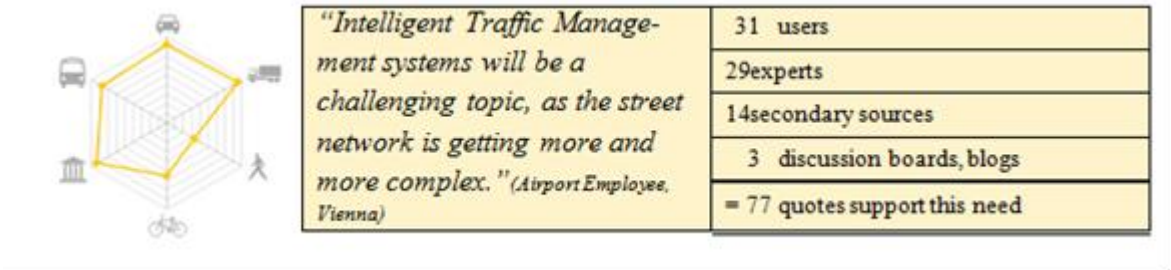

Fig. 6: Need for Traffic Coordination (own contribution)

Due to rapidly changing traffic conditions it is getting important to communicate on-site information as quickly as possible. Improved traffic management is essential for a better coordination of traffic participants. A reason for this is the constantly rising number of cars. Furthermore, the local situation in different cities should be taken into account when thinking about the management of traffic. The importance of this need is reflected by the fact that it affects all inhabitants of cities, such as pedestrians, cyclists, car drivers, logistic companies as well as public transport and the government. Therefore the need for better traffic management received the highest relevance.

Drivers are frustrated by a discontinuous traffic flow since time is getting more and more important in today's world. Also, logistic and service companies providing cities with goods and fulfilling important tasks lose time and money if the traffic management is poor. Especially emergency and breakdown services need to move fast from one place to another. Pedestrians and cyclists are also affected, as red traffic lights and traffic congestions slow them down as well. Thus, all traffic participants ask for coordination mechanisms which immediately adapt to changes. Therefore, also the government is interested in solutions to this need. A good and adoptive infrastructure for everyone is essential in order to assure a high quality of life in big cities.

Besides, parking is another important issue influenced by traffic management. Drivers looking for a parking space reduce speed and block other traffic participants. Therefore, better information on the availability of parking is also required.

6.3 Need for Inter-modality of Transport Means

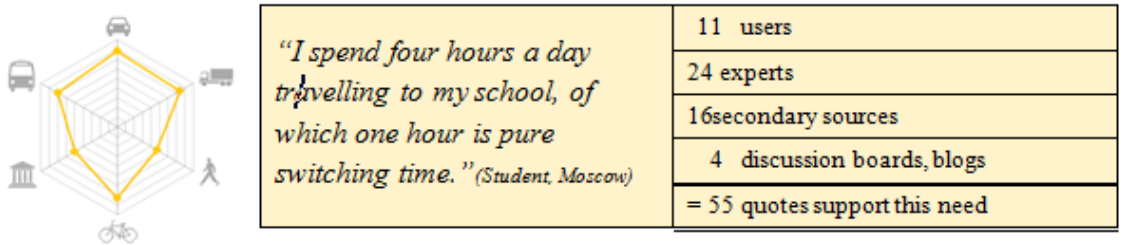

Fig. 7: Need for Inter-modality of Transport Means (own contribution)

Integrating various–public and private–transport modes and in turn minimizing the time spent both on travelling and changing means of transport was the idea behind intermodality. This need received the highest relevance of five out of five points and is relevant to all participants. However, we considered governments, public transport, private drivers and logistics service providers to be most affected.

As road networks become more congested, other various modes of transport will need to take an increasing role. It is important to help people to switch between private and public transport; therefore, a better link between these two is necessary.

Since travel distances are increasing in megacities, it is not possible to get to the destination using only one mode of public transport. However, those different modes are often not synchronized or not well planned - this can prevent people from getting where they want as fast as they could if everything worked smoothly. As several users expressed during the research, people are "... not going to use public transport instead of ... [their] car unless it is as convenient." Hence, an optimal integration of various transport modes should provide a complete door-to-door service for customer, because people do not like changing transport modes. They want to minimize time they spend on that and do not want to lose a single minute waiting for transport.

Intermodality can basically split up into four main demands: Firstly, traffic systems should be comprehensive. In concrete terms, travellers require a complete door-to-door service in form of one integrated system for all modes of transport. Secondly, schedules should be integrated, more flexible and aligned to allow reducing time. Thirdly, simplicity is important: people do not want to spend time thinking about which combination of transport to use, but rather demand a predefined solution. Finally, seamless switching options are important in order to provide barrier-free and time-efficient movement between transport modes.

People want convenient (parking) solutions in case they have to use their cars or bicycles to get to remote public transport stations that are not in walking distance from their homes. All of the above should be managed in order to increase public network attractiveness.

6.4 Need for Bridging the Last Mile

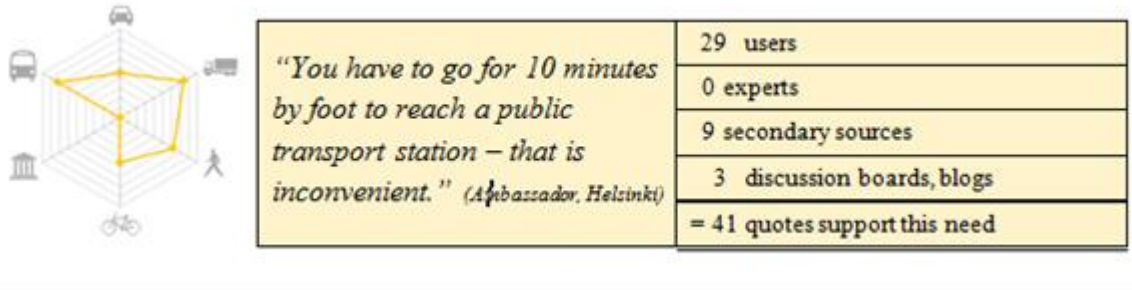

Fig. 8: Need for Bridging the Last Mile (own contribution)

The "last mile" need describes the need for more convenient and more efficient movement of people from a transport hub to their final destination. The need received a relevance of four out of five. Especially inhabitants of suburban areas and people facing physical difficulties are affected.

People are unwilling to walk long distances between transport stations and targeted final destinations, primarily due to personal safety and time issues. These issues are important for people who experience health issues or face the physical difficulty to carry different goods on their own. Also, the question of covering the last mile is especially acute where land-use patterns have moved more jobs and people to suburbs with a lower population density. These regions are often not within walking distance to existing public transportation options. Transit use in these areas is often less practical which in turn promotes either a reliance on cars resulting in more traffic congestion and pollution, or forces people to change their place of residence and move to a convenient, but more expensive area.

Traditional issues connected to the "last mile" need in public transit include the lack of feeder buses, of improved bicycling infrastructure as well as of an urban planning reform:

- Lack of biking infrastructure and bike-sharing solutions

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Biking is increasingly being looked at as an important mean to connect people to the network of transit systems. Efforts should include improving bike infrastructure such as creating dedicated bike lanes and building bike stations at transit hubs, encouraging employers to provide shower facilities and other bike friendly amenities, as well as effective highly adaptable bike sharing programs.

- Lack of adequate planning-based solutions

"Last-mile-barriers" could be eliminated by locating housing close to transit and providing other transit incentives.

- Lack of shuttles and feeder buses

Shuttle services that connect transit with commercial centres and/or places of employment could help overcome the "last mile" barrier.

During the next phase (=identification of suitable problem solvers within the trend fields) more than 600 people were directly contacted in order to find the most suitable lead users and experts. The communication media ranged from phone and Skype calls (approximately 700) to emails (roughly 300) and forum entries (about 100). Out of a total of 617 people as many as 110 people were interviewed at least twice, 39 lead users and experts were regarded as "perfect fits", and in the end 27 of them were invited for innovation workshops.

7 CONCLUSION

In the course of three workshops with nine lead users and experts participating at a time, nine innovative concepts were finally presented:

7.1 The Hive

The HIVE system (Humans use Information to choose Vehicles to travel in an Environmentally friendly way) allows traffic participants to adapt to special needs of the various traffic situations on the basis of information gathered via car2car communication.

7.2 JA–the Journey Assistant

JA is a software-program which allows its user to personalize his/her journey. Offering various journey opportunities to the latter, it does not only combine the different modes of transport, but also integrates the opportunities of the whole city into one system. Due to its self-learning intelligence it is able to adapt to the user's preferences.

7.3 E-chair

The e-chair, a small electric vehicle, serves its user to cover the last mile and longer walking distances within the city. Due to its shape and an integrated system which communicates with the environment, it allows the user to drive on walkways or crowded areas.

7.4 The HUG

Several interchange points, big hubs, will be implemented in each city. Each passenger will be connected to a traffic system which allows the passenger to opt–depending on the purpose of the journey and other important facts as the weather–for a personalized vehicle which brings him/her to the interchange point closest to his/her final destination. This hub station provides for further individualized vehicles to cover the last mile.

7.5 Why not Number One

"Park Now" or "Why Not Park Number One" is utilizing existing Kapsh ITS technology for optimizing the parking situation in a city. A central system is aware of space available in parking lots as well as the parking costs and will automatically lead the cars to the free parking lot closest to the driver's final destination.

7.6 Star egg vision

Traffic participants can become members of a traffic community. A Smart-phone app allows them to enter their upcoming journey. A dynamic system matches the needs of all members and suggests the most efficient journey and possible collaborations with others for each user.

7.7 S³

The goal of the S³ system is to provide open, reliable real-time traffic information for users and systems. S3 helps to better coordinate traffic in a city and will make transportation more convenient and time-efficient.

7.8 Move your Black Box Information System

Move your Black Box Information System is a system that helps optimizing an individual's route and the traffic flow at the same time by merging information on public and private transportation which can be gathered by implementing sensors on the road. Intermodal transportation solutions, time-efficient locomotion and the reduction of congestion shall form the positive output of the system.

7.9 Free Move–Move Free

This concept addresses the problem of inefficiently used road space resulting from rigid traffic management. Rather than offering an innovation to an existing infrastructure frame and rules, FreeMove innovates the frame itself. Traffic rules should be adapted to the needs of a user.

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Implications of Land Use Mix on the Sustainability of African Urban Centres: A Case Study of Stellenbosch, South Africa

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1 ABSTRACT

Sustainable development has emerged to guide land use management in most cities yet it is an elusive concept to put into practice. Most African urban centres employ the ubiquitous advocacy-based indicators which dominate sustainability programmes and hinder sound decision making. Moreover, there is paucity in research that investigates land use mix and its impact on urban sustainability in African urban settings. Land use mix is of particular importance given Africa's history of fragmented spatial planning. This paper investigates the use of earth observation data to derive a land use mix index (LUM) and to calculate land use frequency (LUF). It proposes the use of decision consequence analysis as a simple way to put sustainable land use planning into practice and to support day-to-day land use decisions. A model that computes the land use mix and LUF was developed using ArcGIS 10. The results demonstrate that the use of decision consequence analysis, earth observation data, LUM and LUF can aid local planning authorities to go beyond descriptive analysis of urban sustainability to a more robust and objective analysis. Local planning authorities can also use the land use mix index and LUF to effect policy change on sustainability and for day-to-day decision making.

2 INTRODUCTION

Sustainable cities are high on the development agendas of many nations, but are of particular importance in African countries that are experiencing alarmingly high rates of urbanisation (UN-HABITAT, 2009; Shen et al., 2010). Rapid urbanization often leads to land use practices that disregard future needs and cause inevitable problems such as; urban sprawl (Breheny and Batey, 1992), brownfields (Burton, 2000), sedimentation of watersheds (Farrow and Winograd, 2001), urban pollution (Brandes et al., 2010), overcrowding (World Commission on Environment and Development (WCED), 1987), increase of natural and man-made risks (World Bank, 1994), collapse of public services (UN-HABITAT, 2002), soil degradation (Sattler et al., 2010) and haphazard development (Hicken, 2009), often leading to the consumption of natural landscapes needed for urban parks and recreation (Barredo and Demicheli, 2003; UN-HABITAT, 2002).

3 SUSTAINABLE DEVELOPMENT AND LAND USE PLANNING

Sustainable development is a fuzzy concept (Winograd and Farrow, 2007) encapsulated in the seminal definition by the Bruntland Commission as "Development that meets the needs of the present without compromising the ability of future growth to meet their own needs" (WCED 1987, p 23). It follows that for urban land use to be sustainable it has to meet the needs of the current as well as future urban citizens (Seghezzo, 2009; Wolf and Meyer, 2010). Accordingly, cities should be able to sustain the call by today's citizens to alter land use without jeopardising the future generation's needs. Sustainable development and urban land use planning are noble concepts (Hall, 2010), but the challenge is to put them into practice. Ideally, they should be incorporated into a comprehensive decision framework to guide daily, personal, business or policy decisions (Hall, 2010; Ness, 2001). These grand intentions are, however, difficult to monitor and implement given their complexity, vagueness and, at times, immeasurable tenets (Zhang et al., 2011). Sustainability often remains a condition that can be used and abused by various stakeholders without clearly defining what it implies in a land use planning context (Hall, 2010). What is required is a model of sustainable development which accurately captures and allocates costs, such as environmental damage, pollution and land consumption. Decision consequence analysis (DCA) can assist in simplifying the complexities associated with sustainable land use management.

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4 DECISON CONSEQUENCE ANALYSIS

DCA formalises the decision-making process by making use of decision theory, probability and statistics (Hall, 2010). The process breaks down complicated problems, such as sustainable development and land use, into increasingly smaller units until the particular component can be accurately analysed and understood within the context of the overall problem. The basic elements of DCA are an unacceptable current condition and a desired future condition. To achieve a transition between these two it is necessary to have an understanding of each condition, to identify possible pathways between the two and a way to measure the progression between them.The current action trigger in most African cities and towns is the high rate of urbanisation which leads to unsustainable land use practices (Klosterman, 2001). The challenge is how to measure or diagnose progress between the current state and the desired state (objective) of maintaining sustainable land use practices. A proposed solution is the employment of objective metrics developed using geographical information systems (GIS) and data collected with earth observation methods.

5 EARTH OBSERVATION

Campbell (2006) defines remote sensing of the earth's surface (earth observation) as the practice of deriving information about features on the earth's surface using images acquired from an overhead perspective. Earth observation has the capability to provide a quick synoptic view of a city and is consequently extremely valuable for collecting information in developing countries were municipal records are seldom able to keep pace with the rate of development (Hall, 2010; Repetti, Soutter & Musy, 2005). Earth observation also uncovers aspects of the built environment that are often opaque to urban planners and social scientists (Bar and Ford, 2010) and has been used in sustainability studies as a data source for indicator development (National Academy of Sciences, 2003). These indicators include land use/cover (Barredo and Demicheli, 2003), road networks (Victoria Transport Institute, 2010) and building density (Angel, 2010). It is difficult, time-consuming and prohibitively expensive to collect such data by other means (e.g. field surveying) (National Academy of Sciences, 1998).

6 SUSTAINABILITY INDICATORS

Sustainability indicators are bellwether tests of sustainability and they reflect something basic and fundamental about the long-term economic, social, and environmental health of a community (Maclaren, 2004). Such indicators are pointers toward progress or lack of the overall health of a community, neighbourhood, town, city, region or larger area and must reflect the overall well-being of urban land use, should be integrating, forward-looking (Maclaren, 2004), distributional, and subject to feedback loops (Hall, 2010). Examples include (1) land use change (Wang, Cheng and Chen 2011), (2) land use mix (LUM) (Song and Rodriguez, 2005) and (3) land use frequency (LUF) (Guindon and Zhang, 2005). Employing such indicators replaces the ubiquitous advocacy-based approaches which dominate the sustainability programmes in Africa and hinder sound decision making.

Land use change is an important indicator in urban sustainability as it measures the rate of transformation of mostly agricultural and natural ecosystems to intensive urban uses (Wang, Cheng and Chen, 2011). It has been demonstrated that a high rate of land use change due to urban growth leads to increased motorised transport (Victoria Transport Institute, 2010), energy consumption (Urban Land Institute, 2010), loss of agricultural land (Comber, Brunsdon and Green, 2006), loss of biodiversity (Yang et al.; 2009) and increased water pollution (Zhang et al., 2011). Similary, the impact of LUM on urban sustainability has been demonstrated by Song and Rodriguez (2005). The land use mix index is based on the principle of people moving between different activities or different destinations such as home to workplace or shops, and home to civic institutions such as places of worship and parks (Litman, 2010; Polzin, 2006). The LUM index is consequently a measure of variation (Song and Knaap, 2005), dispersion or diversity of land uses (Neat GIS Protocols, 2010). The equation for the LUM index is:

$$= \{-\Sigma_k[(p_i)(ln\, p_i)]\} / (ln_k)_k$$

Where is the proportion of each land use class per neighbourhood; is the natural logarithm; and is the number of land use classes. Essentially, the LUM measures the extent to which land uses are heterogeneously distributed within a neighbourhood (NEAT GIS Protocols, 2010). The index values range from zero to one where 0 indicates land use homogeneity, which is less sustainable, while a value of 1

represents heterogeneity which is more sustainable (Song and Rodriguez, 2004). The LUM can be global (GLUM) and local (LLUM), where the GLUM is a measure of the overall mix of a city or town while the LLUM shows distributin of the LUM within neighborhods of a city. Ultimately, the land use mix affects sustainability through its impact on environmental, social and economic costs (Figure 1).

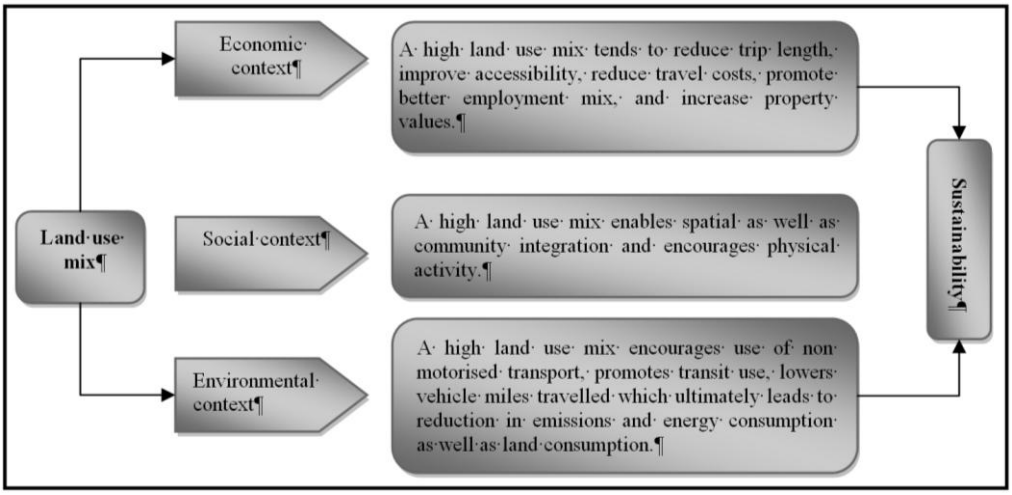

Fig. 1: Impact of land use mix on urban sustainability.

Alternatively, land use frequency refers to the number of land uses found in a neighbourhood or city. It is analogous to having a variety and complimentary of land sues such commercial, residential, education and recreation within a neighbourhood (Song and Rodriguez, 2005). Similar to the land use mix index, land use frequency has perceived social, environmental and economic impacts.

7 METHODS

Study area

Stellenbosch, the second oldest town in South Africa, was chosen as study area. The town is situated in the Western Cape province of South Africa approximately 55 km east of Cape Town's central business district According to Interstudy (2009), Stellenbosch has an estimated population of 60 000 of whom 27 700 are students (Stellenbosch University, 2010). Stellenbosch consists of suburbs of great wealth coexisting with impoverished townships, informal settlements and poor households. Consequently, Stellenbosch faces the challenge of balancing urban and economic growth against expansion into and consumption of valuable agricultural land, and the preservation of natural and cultural heritage while simultaneously attempting to alleviate abject poverty.

Data collection, land use mapping and analysis

Ortho-rectified colour aerial photographs and cadastral data of Stellenbosch where obtained from the Centre for Geographical Analysis (CGA) for 2000 and 2010 respectively. SPOT5 imagery for 2010 was acquired from the South African National Space Agency (SANSA). A land use map of 2000 was obtained from Dennis Moss Partnership. A land cover classification was performed on the 2010 SPOT5 imagery, using a supervised Geographical Object-Based Image Analysis (GEOBIA) approach. The resulting land cover map was visually interpreted along with ancillary data to develop a land use map. Land uses were classified per land parcel in ArcGIS 10 by means of a land use classification rule set which was adapted from Anderson et al.'s (1976) land use classification scheme.The land use maps of 2010 and 2000 were used to calculate GLUM, LLUM and LUF indexes. The latter two indexes were calculated for neighbourhoods 2x2 km in size. This neighbourhood size was selected as they correspond to actual land use development patterns and are sufficiently large for use of none-motorised transport and automobile use (Ewing and Cervero, 2001). All analyses were automated in the model builder tool of ArcGIS 10.

8 RESULTS AND DISCUSION

Land use mix index

The GLUM index for Stellenbosch is relatively high, registering, 0.74 and 0.72 in 2000 and 2010 respectively. The high global land use index value suggests heterogeneity in land use patterns as well a surge

toward spatial integration of land uses in Stellenbosch. The high value denotes a high level of social integration and the index functions as a proxy for the vibrancy of the civic life in the town. Given South Africa's spatial policy which is geared toward integrated development, the GLUM index can be used as a measure of spatial as well as social integration.

Unlike the GLUM index, the LLUM index is a breakdown of the global index. Figure 2 shows that some areas in Stellenbosch have higher LLUM index values and that there is a band of relatively low LLUM (less than 0.6) stretching from the south-western (near Technopark) to the eastern parts (in Uniepark) of Stellenbosch. This band of low LLUM suggests a lack of diversity in land use and spatial dispersion of land uses and these have adverse social, environmental and economic costs which hamper sustainable development. In the north-eastern parts of Stellenbosch, spesifically suburbs Welgevonden, Khayamandi, La Colline and Onder Papegaaiberg, the land use mix index rises above 0.6 suggesting diversity of land uses which minimises economic, social and environmental costs.

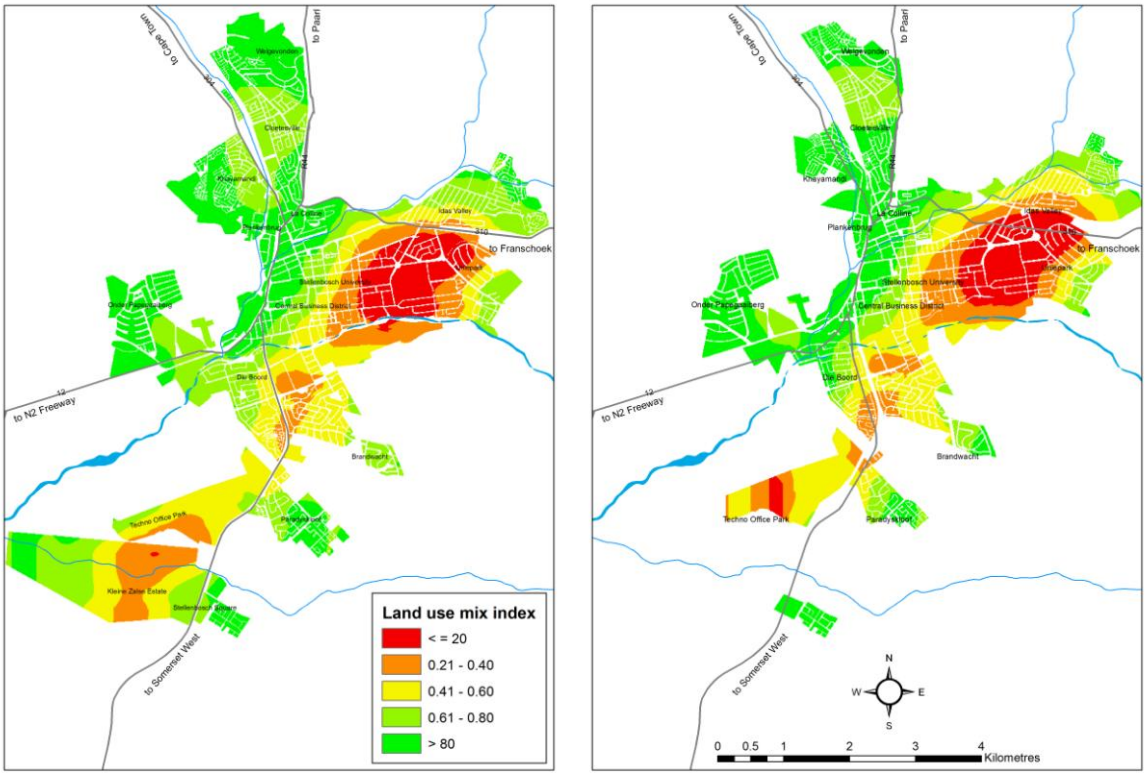

Fig. 2: Distribution of land use mix index values in Stellenbosch, (a) 2000 and (b) 2010.

Over the ten year pereid the change in the LLUM is minimal, however most changes occurs in the urban edges, near Stellenbosch Square in the south and Welgevonden in the North, which could potentialy indicate urban sprawl. Analysis of the change in LLUM can assist planners and decisions makers to implement local planning policies that encourage mixing of activities. Inspection of the LUF per neighbourhood portrays how LUF affects the LLUM.

Land use frequency

The map of LUF for Stellenbosch shows an intensification in the land uses from 2000 to 2010 (Figure 3). There is a band of low LUF per neighbourhood stretching from Technopark, Paradyskloof to the southern parts of Stellenbosch with fewer than nine land use classes per neighbourhood in 2000. This band dimisishes in intensity in 2010 with a general increase in the number of land uses noticable in the southern parts of the town. However, this increase can be partly attributed to the addition of Kleine Zalse Estate and the Stellenbosch Square shopping centre development, which had a positive effect on LLUM in the southern parts of Stellenbosch.

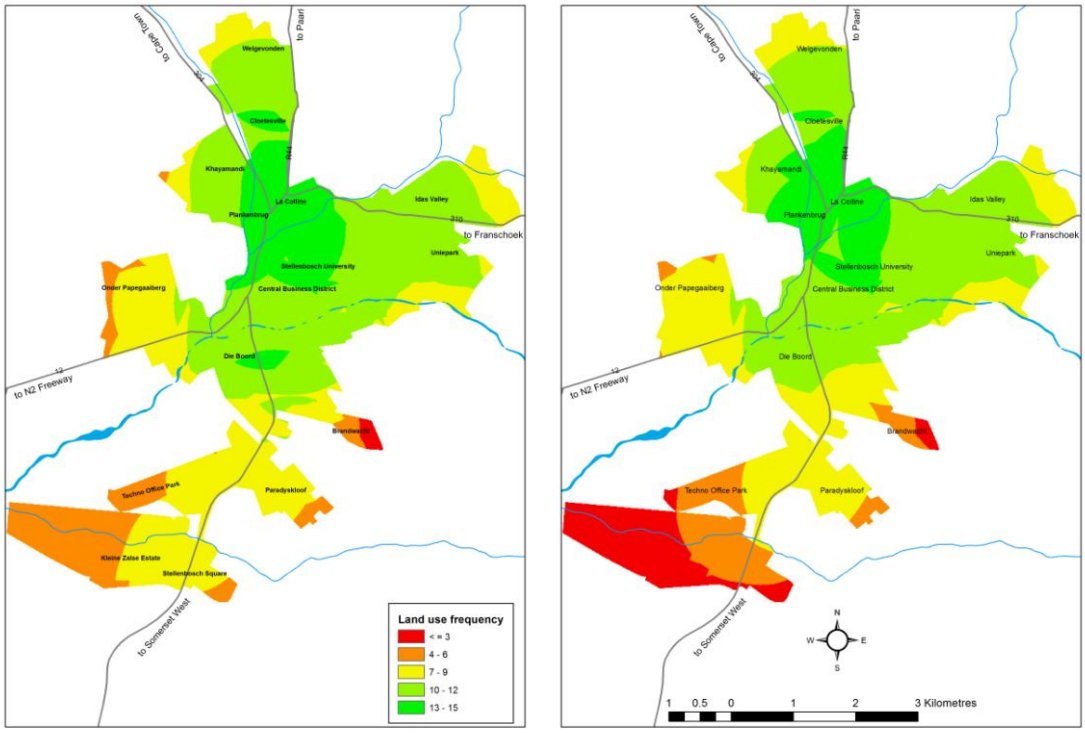

Fig. 3: Land use frequency distribution in Stellenbosch, (a) 2000 and (b) 2010.

Low LUF does not necessarily correspond to a low land use mix. For example, neighbourhoods abutting the Central Business District have a LUF of between 10 - 12 due to land use gentrification as a consequence of the change to greater mixed use comprising commercial and residential uses, yet those central neighbourhoods exhibit LLUM index values of 0.6 or less. In contrast, neighbourhoods abutting Welgevonden in the north experienced an intensification of LUF over ten years accompanied by an increase in the LLUM from 0.3 to 0.8. Similary, the LUM in southern parts of Stellenbosch changed as a result of the new commercial (Stellenbosch Square) and cluster housing (Kleine Zalse Estate) developments where the LUM mostly registers values of 0.6 or less. LUF and the LUM are correlated closely although an increase in the LUF does not necessarily equate to an increase in the LLUM. The LUM and LUF are objective, but they cannot be used in isolation as they cannot indicate areas where urban sprawl is potentially occuring particulary around Stellenbosch square in the south and Welgevonden in the north.

9 CONCLUSION

The study has demonstrated that the LUM and LUF are essential indicators in descring the mix of land uses which is a crucial factor in acheiving urban sustianability. The LUF and LUM allow planners to advance from basic descriptive sustainability reports, which can be subjective and rudimentary, to more robust objective assessments which can be actively applied in decision making. Moreover, these indicators aid in the identification of best practices which can be replicated elsewhere.Though the LUM and LUF are objcetive they fall short in identifying urban sprawl as such they should not be used alone. Both earth observation and DCA make it possible to put the elusive concept of sustainable development into practice to make day-to-day planning decisions or effecting policy changes.

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Innovative Informationstechnologien als Bausteine einer nachhaltigen Stadtentwicklungspolitik

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1 KURZFASSUNG

Zu Beginn wird auf die zunehmende Bedeutung der Bürgergesellschaft an partizipativen Beteiligungsverfahren in der nachhaltigen Stadt- und Siedlungsentwicklung verwiesen sowie auf die Probleme der Kommunikation zwischen Experten und Laien im Bereich der planenden Disziplinen kurz eingegangen. Anhand der Darstellung heute verfügbarer Informations- und Kommunikations (IuK)-Technologien wird die potentielle Eignung der Augmented-Reality (AR)-Technologie für Kommunikationsprozesse im Bereich der Baukultur hergeleitet.

Anschließend wird dargelegt, welche Zielestellungen in dem Forschungs- und Entwicklungsprojekt ArchKM-AR formuliert wurden, um einen anwendungsreifen AR-Prototypen zu erstellen, der von Laien und Experten gleichermaßen nutzbar ist. Die dafür notwendigen Arbeitsschritte, mögliche Anwendungsszenarien sowie ein Ausblick beschließen das Papier.

2 HINTERGRUND UND PROBLEMSTELLUNG

Partizipative Beteiligungsverfahren sind eine Bereicherung in Entscheidungs- und Planungsprozessen der Stadtentwicklungsplanung um wichtige Fachkompetenzen, um Meinungen, Ideen und Kreativität. Die Meinungs- und Interessenäußerungen sowie die Bewertungen durch die teilnehmende Bürgerschaft sind dabei Ausdruck politischer Teilhabe als Voraussetzung einer funktionierenden Demokratie. Sie verschaffen Entscheidungs- und Planungsprozessen im Idealfall nicht nur die nötige Akzeptanz, sondern sind ebenso wichtige Grundlage für ihre konsensfähige Durchsetzbarkeit.

Die Bundesstiftung Baukultur erklärt das Planungs- und Bauwesen zum „sichtbaren nationalen Markenzeichen, mit dem die Bürger sich identifizieren, das Lebensqualität steigert und attraktive Städte und Gemeinden sichert." (SCHADE-BÜNSOW, 2009). Wird dieses Ziel erreicht, gelingt eine nachhaltige, langfristig stabile Stadtentwicklung.

In den aktuellen Diskussionen um Baukultur zeigt sich, dass das öffentliche Interesse an ihr steigt–und dass die Meinungen darüber zum Teil recht weit auseinander liegen. Gründe dafür liegen im divergierenden Verständnis sowie in der unterschiedlichen Wahrnehmung von Architektur- und Gestaltqualität bei Laien und Experten. Was aus dem unterschiedlichen Wissen über Architektur und Baukultur, und ebenso aus den Unterschieden von Fachsprache und Alltagssprache resultiert. Dabei zeigen Untersuchungen, dass eine Vereinheitlichung der sprachlichen Kodierung dazu beiträgt, die Barrieren in der Experten-Laien-Kommunikation zu überwinden. Möglich wird sie, wenn die Vermittlung von Wissen und Informationen von der verbalen hin zur visuellen, bildlichen Darstellung verschoben wird. Insbesondere sehr realistische, d.h. perspektivische Darstellungen in Malerei und Fotografie entsprechen weitgehend der Wirklichkeit und rufen damit ein hohes Maß an Verständnis hervor (Pohl, 2003).

Zum anderen ergibt sich ein unterschiedliches Verständnis von Gestaltqualität und Baukultur aus dem sinkenden Vertrauen in die Gültigkeit der Urteile und Ratschläge von Experten (Bromme & Rambow, 1998)–verursacht u.a. durch die stetige Diffusion der Grenzen zwischen wissenschaftlichem Wissen und Alltagserfahrung (Bromme u. a., 2004). Als Katalysator dieses Prozesses entwickelten sich in den vergangenen Jahren die modernen Informations- und Kommunikationstechnologien (IuKT). Sie ermöglichen die stetig erleichterte Aneignung von Wissen, so auch Expertenwissen, und damit eine Expansion von technischem und naturwissenschaftlichem Wissen in Richtung der Laien.

So verhält es sich auch in den planenden Disziplinen. Hier führte die Einführung rechner- und informationsgestützter Werkzeuge zur Erweiterung des zweidimensionalen Zeichnens über die dreidimensionale Konstruktion von Gebäudemodellen hinaus, bis zur Berücksichtigung weiterer planungsrelevanter Dimensionen bzw. ergänzender geometrischer und semantischer Informationen (BIM = Building Information Modeling).

Die Neuen Medien und Technologien leisten daher heute bereits wichtige Beiträge zur Architekturkommunikation und befördern Entscheidungs- und Planungsprozesse. Konkrete Anwendungsfälle aus den Bereichen Virtual Reality (VR) und Web 2.0 haben dies in der Vergangenheit bewiesen (OKUPE, 2007) (BURG, 1999).

Unter der Betrachtung der stetig wachsenden Medienkompetenz der heutigen Informationsgesellschaft (STATISTISCHES BUNDESAMT, 2011) und der zunehmenden Verbreitung intuitiv zu bedienender und weitgehend barrierearmer Endgeräte, wie Smartphones und Tablet-PCs, wird daher die Frage aufgeworfen, welche innovativen Technologien den positiven Trend zur bürgergesellschaftlichen Beteiligung an partizipativen Prozessen zusätzlich unterstützen und damit zur Stärkung von Zivilgesellschaft und nachhaltiger Stadtentwicklung beitragen können.

Andere Branchen, wie die industrielle Fertigung oder die Computerspielindustrie, sind den planenden Disziplinen dabei in technologischer Hinsicht voraus. Sie setzen verstärkt auf Virtual- (VR) und insbesondere Augmented-Reality-Systeme (AR), die nicht nur komplexe räumliche Daten verarbeiten können, sondern zudem multimodale Eingabemöglichkeiten vorhalten. Hierfür wurden bereits Prototypen entwickelt (BEUCHERT, 2010). Insbesondere die AR-Technologie bietet für den Bereich Architektur und Städtebau ein weites Anwendungsspektrum, verfügt sie doch aufgrund technischer Voraussetzungen über die Fähigkeit, auf Basis der Bildverarbeitung Kommunikationsprozesse im Sinne einer nachhaltigen Planungspolitik zu vereinfachen und zu beschleunigen. Dort bleibt sie jedoch bis dato weitgehend ungenutzt.

Im Projekt sollen die fachlichen Grundlagen zur Entwicklung einer AR-Software für diese Zwecke praxisnah erfasst und analysiert werden. Das Vorhaben evaluiert über eine Statusanalyse und Expertenbefragungen aktuelle Methoden und Technologien im Bereich AR. Anhand der Vorarbeiten wird ein Konzept für den vorgesehenen Anwendungskontext eines AR-Systems erstellt. Im weiteren Verlauf erfolgen die Entwicklung neuer Softwarekomponenten, die Modifizierung und die Anbindung bestehender Programmkomponenten, sowie die Zusammenführung der einzelnen Bestandteile in einer praxistauglichen AR-Anwendung unter der Einbindung einer ergonomischen Benutzeroberfläche. Das Hauptziel besteht in der Entwicklung einer funktionsfähigen Augmented-Reality-Anwendung für mobile Endgeräte im Einsatzfeld der Baukultur: Städtebau und Stadtentwicklung fallen ebenso darunter, wie Architektur, Landschaftsarchitektur, Denkmalpflege und Archäologie. Darin soll sie der Exploration, Kommunikation, Kollaboration, Wissensvermittlung, Interaktion und dem Marketing förderlich sein. Als Zielgruppen wurden Laien und Experten im Themenfeld der Baukultur definiert. Weitere Ergebnisse des Forschungsprojektes sollen darüber hinaus Erkenntnisse und Empfehlungen zur Verwendung existierender AR-Autorensysteme hervorbringen. Die AR-Anwendung wird für mobile Endgeräte, wie Smartphones, Ultramobile-PCs, Handhelds etc., konzipiert und hergestellt.

3 ZIELSTELLUNG

Ziel des vorgestellten Forschungsvorhabens ist die Konzeption, Entwicklung und Erprobung eines Augmented-Reality-Prototyps mit vorwettbewerblicher Reife als Werkzeug der Exploration, der Laien-Experten-Kommunikation, der Partizipation sowie des Marketings in der Architektur und fachverwandter Disziplinen unter Nutzung aktueller Virtualisierungstechnologien sowie zur Verfügung stehender Datenschnittstellen und tangibler Benutzerschnittstellen.

Der Prototyp wird in seiner Entwicklung an gängigen mobilen Endgeräten wie Tablet- oder Ultramobile-PCs, also Geräten mit hinreichend großen Displays, ausgerichtet werden, die über alle notwendigen sensorischen Erfassungs- und Eingabesysteme verfügen (GPS, WLAN, UMTS, Kompass/ Beschleunigung, Kamera, Mikrofon etc.). Die Portierung auf PC-basierende Endgeräte birgt eine sehr niedrige Nutzungs- und Kompatibilitätsschwelle infolge der weiten Verbreitung des Standardbetriebssystems. Die zu verwendende feature-based Tracking-Technology ist hochinnovativ und bietet ein markerunabhängiges Erkennen von Raumgeometriedaten. In Verbindung mit den Datenquellen GPS-, Kompass- und Beschleunigungsmessung ist beim featured-based Tracking eine sehr hohe Registrierungspräzision im Außen- und Innenbereich zu erwarten, was der Darstellung zu einer sehr hohen Darstellungsgenauigkeit (Überlagerung synthetischer Raumdaten mit Realbildaufnahme) verhelfen wird. Zur effizienten Abwicklung kollaborativer Arbeitsprozesse wird der zu entwickelnde Augmented-Reality-Prototyp die Möglichkeit des photo-based Tracking vorhalten.

3.1 Erkenntnisziele

Das o.g. Vorhaben soll Aufschluss geben zu den Forschungsfragen:

- Eruierung der Möglichkeiten der Anbindung/Nutzung bestehender (mobiler) AR-Systeme
- Untersuchung des Imports von Planungsdaten aus derzeit genutzter Standardsoftware (CAD/GIS/etc.)
- Erhebung, ggf. Entwicklung von Planungsdaten-Schnittstellen sowie deren Evaluierung
- Ermittlung von Handlungsanweisungen/eines Leitfadens zur Nutzung von ARTechnologien für Experten und Laien; inkl. Ermittlung des Arbeitsprozess (Geschäftsprozessanalyse) und Dokumentation und Aufbereitung als Leitfaden anhand des entwickelten Prototyps
- Möglichkeiten der Entwicklung eines anwenderfreundlichen Prototyps, der hinsichtlich seiner Handhabung (inkl. Aufbereiten von Daten, Workflow) und Visualisierung-Qualität für die Praxis geeignet ist.

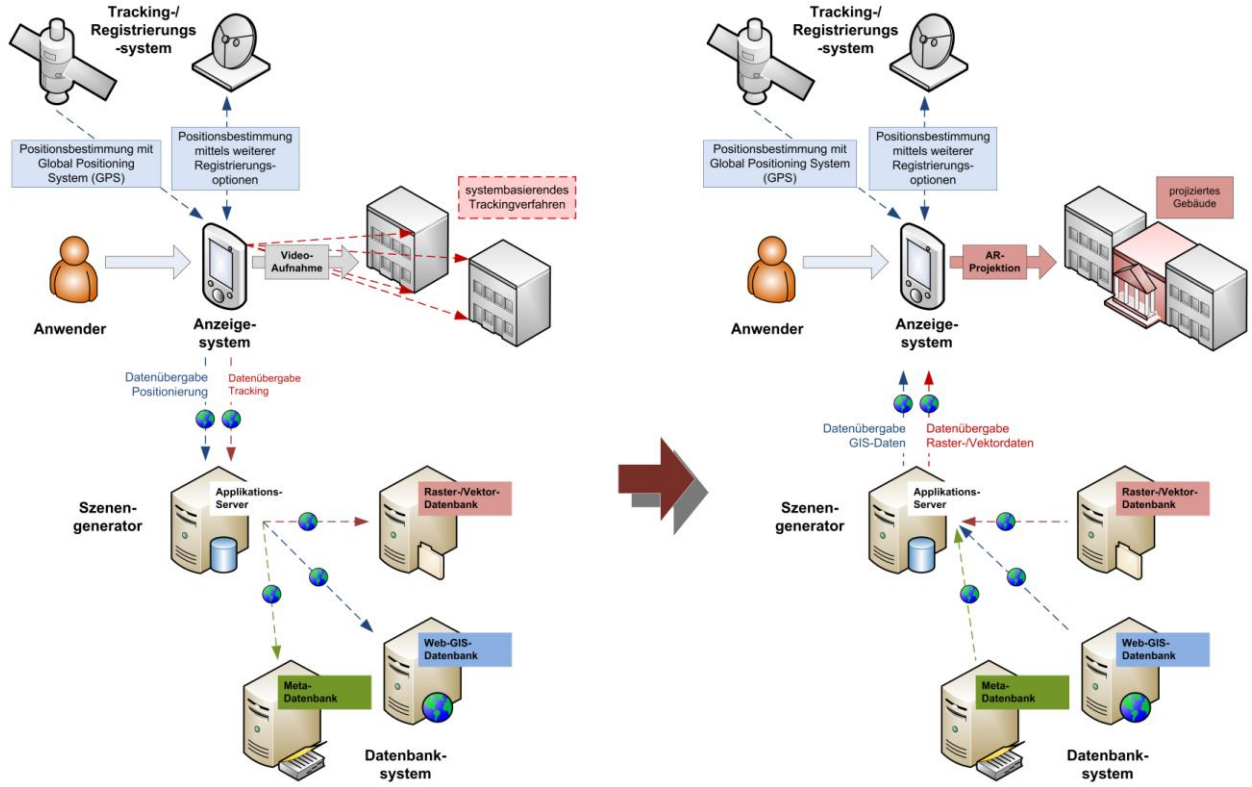

Fig. 1: Aufbau u. Funktionsweise eines AugmentedReality-Systems (Quelle: eigene Darstellung, nach (SCHILLING, 2008), S.9)

3.2 Innovationscharakter und inhaltlicher Nutzen

Der Innovationscharakter des Prototyps liegt in einer anwendungsreifen mobilen Augmented-Reality-Applikation auf Basis eines feature-based Tracking-Verfahrens, die sowohl für Experten als auch für Laien intuitiv benutzbar ist.Ein solches System existiert derzeit am Markt nicht und zahlreiche Forschungsvorhaben belegen den Stellenwert des Themas Augmented Reality als Werkzeug der Architekturvermittlung.

Der inhaltliche Nutzen besteht in der weitgehenden Sicherstellung einer barrierearmen/-freien Kommunikation und Kollaboration auf den Ebenen Laie-Experte, Laie-Laie und Experte-Experte in deren Folge die Verständlichkeit von Baukultur gefördert wird, damit die Motivation zur Partizipation (E-Partizipation als Bestandteil von E-Government und Web 2.0) an Planungsprozessen steigt und letztlich die Akzeptanz von Planungsvorhaben und Entscheidungsprozessen nachhaltig befördert wird.

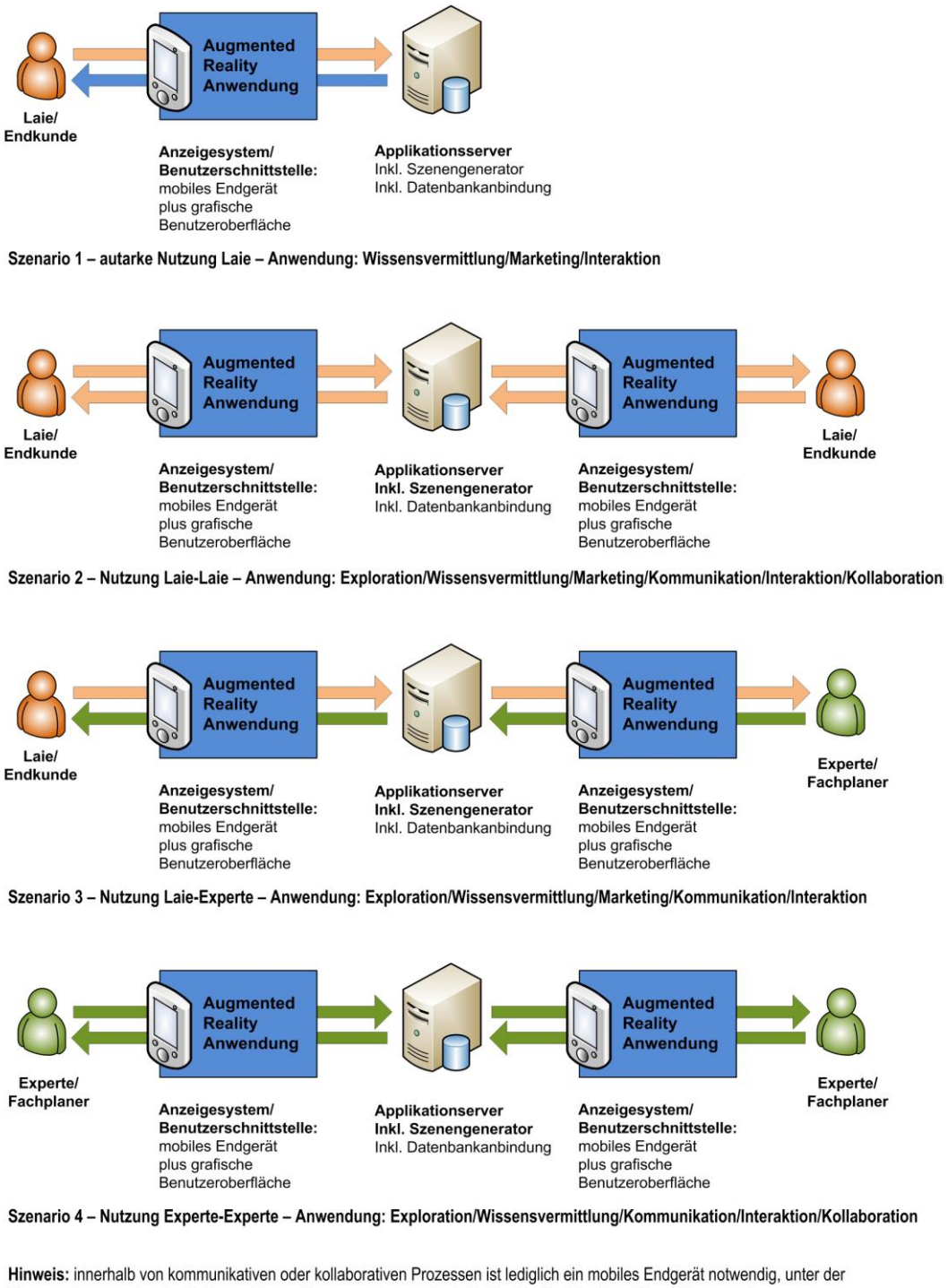

Fig. 2: Szenarien der Nutzung von AR-Systemen im Architekturbereich (eigene Darstellung, 2009)

3.3 Anwendungsszenarien

3.3.1 Architekturkommunikation

Ein Anwendungsfall ist die Bereitstellung von Planungen in Form von AR-Daten für Neubau- und Sanierungsmaßnahmen oder Wettbewerbsverfahren. So erhalten die Zielgruppen, wie Bürgerschaft, öffentliche Auftraggeber, etc., Zugriff auf Inforamtionen zu Planungsvorhaben und kann sich ein dezidiertes Bild vom zukünftigen Zustand des Planungsgebietes/-objektes verschaffen. Werden zusätzliche objektorientierte Modelldaten hinzugefügt, ist der Empfänger der Informationen in der Lage, sich ein eigenes Urteil zu bilden und dies interaktiv oder in angeschlossenen Beteiligungsverfahren kund zu tun. Dem Planer eröffnet sich so die Chance durch eine verständliche Sprache einen wichtigen Beitrag zur Baukultur zu

leisten. In Kommunikationsprozessen mit Planungspartnern kann AR als Werkzeug der Zusammenarbeit über Unternehmens- und geografische Grenzen hinweg zum Einsatz kommen. Augmented Reality hilft so in kollaborativen Arbeitsprozessen bei Planungs- und Bauvorhaben den wichtigen Kommunikationsaspekt hinreichend zu berücksichtigen und zu befördern.

Fig. 3: Anwendungsbeispiel der Nutzung eines AR-Systems im Architekturbereich (HOCHSCHULE ANHALT, 2012)

3.3.2 Denkmalpflege/Archäologie/Tourismus

Mit der Anbindung an Datenbanken internetbasierender Geografischer Informationssysteme (Web-GIS), an Wissens- und Informationsdatenbanken (zwei- und dreidimensionale Rasterbzw. Vektordaten) können mit Augmented Reality auf mobilen Endgeräten Informationen zu historischen, möglicherweise bereits verschwundenen Gebäuden oder Bauwerken zugänglich gemacht werden. Denkbar sind in dem Zusammenhang virtuelle Rekonstruktionen des kulturellen Erbes. So dass Ausgrabungsstätten geschont und tatsächliche Rekonstruktionen mit Rücksicht auf den Verlauf der Geschichte obsolet werden.

4 VORGEHENSWEISE

4.1 Themenkomplexe

Wegen des umfänglichen Themengebietes und der angestrebten Interdisziplinarität wurde das Vorhaben in vier Themenkomplexe gegliedert:

4.1.1 Kommunikation, Marketing

Dabei werden Aspekte der Kommunikationspsychologie in Kommunikationsvorgängen zwischen Experten und Laien bzw. innerhalb von Expertengesprächen untersucht.

4.1.2 Visualisierung, Interfacedesign

Es wird hierbei auf die Potentiale und Grenzen derzeitiger Visualisierungsmöglichkeiten in der Architektur und ihren fachverwandten Planungsbranchen fokussiert. Gemäß der Zielstellung und des geplantes Einsatzes von mobilen Endgeräten für AR-Systeme, werden im Sinne des anwenderzentrierten Projektansatzes Konzepte zur Ausformung ergonomischer, multimodaler Benutzeroberflächen (Interface-Design) entwickelt. Sie gewährleisten eine benutzerfreundliche und intuitive Bedienung, sowie die Möglichkeit interaktiver Eingaben in Echtzeit und des kommunikativen Austausches.

4.1.3 Augmented-Reality-Umgebung

Hierin wird sich der technischen Konzeption und Realisierung der AR-Umgebung zugewandt werden. D.h. alle serverseitigen Komponenten und Funktionalitäten des mobilen Endgerätes sind herzustellen; darunter zählen Tracking, Registrierung und die Sequenzgenerierung für die Interaktion in der erweiterten Realität (AR-Umgebung); Schnittstellen für Datenaustausch zwischen Endgerät und anderen Systemkomponenten, wie dem Applikations-Server, werden programmiert sowie die Benutzeroberfläche mit allen notwendigen Funktionalitäten für das mobile Endgerät hergestellt

4.1.4 WebGIS-Umgebung, Georeferenzierung, Standortinformationen

Ein zentraler Punkt der Anbindung synthetischer Daten an das AR-System besteht in der Herstellung von Georeferenzen über die Verknüpfung mit sogenannten WebGIS-Servern. Damit eröffnet sich die Möglichkeit der geografischen Verortung digitaler Daten und ebenso des Einbezugs weiterer Dimensionen (Zeit) und anderer Metadaten (geografische Informationssysteme und/oder Wissens- und Artikeldatenbanken, ggf. von Drittanbietern).

4.2 Projektphasen

Sämtliche o.g. Themenkomplexe durchlaufen gleiche oder ähnliche Projektphasen bzw. wissenschaftliche Arbeitsschritte, die der nachfolgenden Grafik entnommen werden können. Hervorzuheben ist die Statusanalyse deren Ergebnis ein Pflichtenheft ist, das konkrete Aussagen trifft zu:

- den einzusetzenden Technologien: Auswahl der geeigneten Trackingmethoden, Daten- und Protokollstandards (VRML, EDIFACT, WMS; WFS, GBF, SOAP etc.),
- zu entwickelnde Programmfunktionalitäten zur Administration der Systemkomponenten (Back-Ends) bzw. Anwenderschnittstellen (Front-Ends), zur Gestaltung der entsprechenden Benutzeroberflächen (Screen-Design),
- mzusetzende fachliche Methoden und Möglichkeiten der Interaktion und Kommunikation

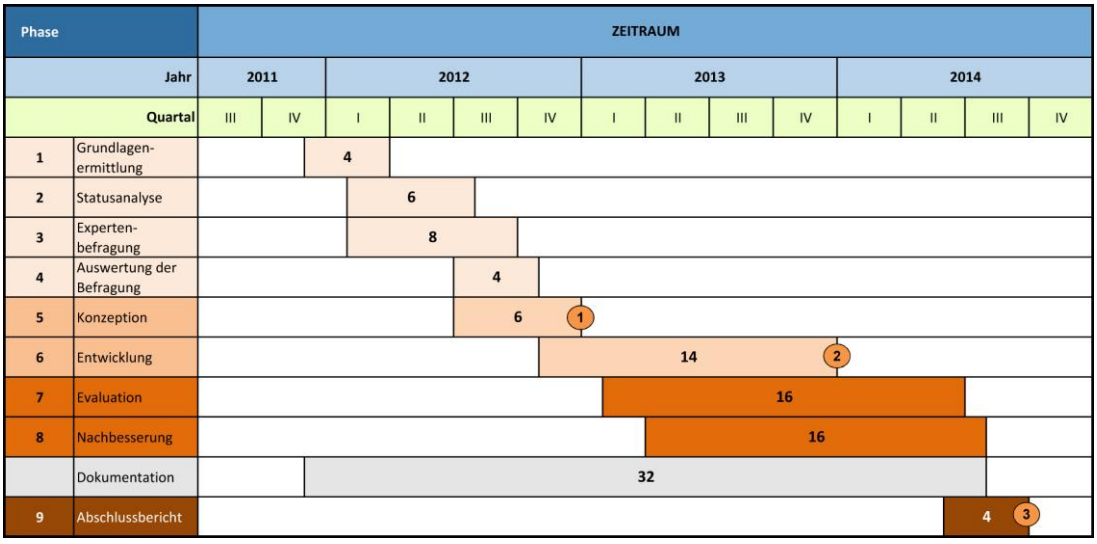

Fig. 4: Meilensteinplan für das Forschungsvorhaben (Quelle: eigene Darstellung, 2009)

5 AUSBLICK

Die wissenschaftlichen Ergebnisse des interdisziplinären Projektes werden zeitnah in die wirtschaftliche Entwicklungspraxis übertragen, so dass auf Grundlage der Vorhabenergebnisse gemeinsam mit den beteiligten Projektpartnern eine zügige Weiterentwicklung des Prototypen bzw. einzelner Komponenten angestrebt wird. Ziel ist die Entwicklung eines marktreifen Produktes. Ferner werden die beteiligten KMU ihr Produkt- bzw. Dienstleistungsportfolio auf Basis der Forschungs- und Entwicklungsergebnisse zum Zwecke der Vermittlung von Baukultur erweitern und anpassen können.

Im Mittelpunkt steht überdies der zukünftige Einsatz der innovativen Technik als Kommunikationswerkzeug innerhalb öffentlicher Beteiligungsverfahren sowie unterstützendes kosten- und ressourcenschonendes Instrument der Planungsvermittlung.

6 ERGÄNZENDE ANGABEN

Dieser Beitrag wurde erstellt im Zusammenhang mit dem Forschungs- und Entwicklungsvorhaben *AugmentedReality (AR) als Werkzeug der Architekturkommunikation und des Architekturmarketings– Konzeption, Entwicklung und Erprobung eines mobilen ARPrototyps für Planung, Beratung und Kommunikation in Architektur, Landschaftsarchitektur und Denkmalpflege (ArchKMAR).*

Das Vorhaben wird im Rahmen des BMBF-Förderprogramms Forschung an Fachhochschulen mit Unternehmen (FHprofUnt)

GEFÖRDERT VOM

Bundesministerium
für Bildung
und Forschung

7 KONTAKT

Das Forschungs- und Entwicklungsvorhaben ArchKM-AR ist ein kooperatives Projekt der

Fachbereiche 1 und 3 an der Hochschule Anhalt. Projektleitung: Prof. Dr. Claus Dießenbacher, Dipl.Ing. M.A. René Krug.

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Integrated Action Plans and Training Course for Circular Land Management

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1 ABSTRACT

The project CircUse–Circular Flow Land Use Management is financed from the program CENTRAL EUROPE. Twelve partners are preparing the concept of Circular Flow Land Use Management, which represents an integrative policy and governance approach. This would presuppose a changed land use philosophy with regard to land utilization. Such modified land use philosophy can be expressed with the slogan "avoid–recycle–compensate".

To implement the CircUse philosphy the developing of action plans on a local level with the circular flow land use management concept included can be an appropriate way. Action plans have been initiated by the CircUse partners countries taking part in the project. An element of an action plan can be the development of institutional models or rather management structures–case studies will show ways to devolop such structures. Furthermore an initiated training course to circular flow land use management fosters awareness and implementation of the philosophy. The following text will give an overview of above mentioned activities which support sustainable land management.

2 ACTION PLANS TO CIRCULAR FLOW LAND USE MANAGEMENT

In general action plans represent a package of measures, which can contribute to promote more sustainable land use in our cities and regions. The action plans help to steer brownfield redevelopment and promote land utilization with specific focus on the new European funding period 2014-2020.

The project CircUse developed action plans in six partners countries to influence urbanised land governance, planning, information, organization, stakeholders´ co-operation, marketing of the inner development potential, funding and budgeting arrangements. These action plans have covered various scales of operation, ranging from a site-based plan to a regional plan. Plans were produced in English and in the local language, hence, partners can share on a transnational basis the experiences they have gained while preparing and negotiating their action plan. These plans demonstrate six various approaches to sustainable urbanised land use management with a common aim: more sustainable urbanised land use.

The integrated action plans for circular land use management of urban regions represent a package of measures which can be implemented or initiated locally. These have been prepared for the project pilot areas of the Ústí NUTS III region (CZ), for the Trnava microregion (SK), for the region of Voitsberg (AT) and for Middle Saxony (DE). They promote the increased use of existing urbanised land and contribute to brownfield redevelopment strategies. The packages of measures usually aim at reducing zoning for development of undeveloped land and exploiting the inner development potential of urbanised land. In addition, two other pilot areas have also prepared action plans but with different focuses. In Asti (IT) the focus of the action plan has been put on implementing a new tool, the Spatial Development Support System (SDSS), which will be tested on Asti's pilot case. In Piekary (PL) the focus falls on the selection and site specific planning with investments for the greening of a brownfield. The action plan is prepared for the district of Piekary, where the funding for the plan has been allocated. This plan includes measures for economic and social reactivation of the post-industrial district coping with all negative effects of the past with all the sites's constraints keeping it currently unusable.

The integrated land use management action plans for circular land use management are informal instruments which establish circular flow land use management on a short and mid-term basis. The plans result from discussions among stakeholders on the aims of land use policy and incorporate the outcomes from various analyses of existing local, regional and national governance instruments. Assessments of spatial and organisational shortcomings were also considered. These plans reflect the willingness of participating

stakeholders to work jointly on improving the sustainability of urbanised land use within their jurisdiction or interest area. The plans help to unify the interests of various local stakeholders and help to set up common goals, identify measures, and find funding sources which would lead to the fulfilment of the identified goals. Also the documents allocate responsibility and budgets for realising these measures. Such plans are normally closely linked with established instruments of formal and informal spatial planning. However, the action plans also list stakeholder responsibilities, aspects of organisational and management processes, as well as performance reviews and a time schedule for implementation.

Preparation of an action plan is a process which leads to specific packages of measures necessary for the short and mid-term timeframe to make progress towards accomplishing the policy aims of sustainable urban and regional land use. Integrated action plans are highly implementation-oriented. They cannot and should not replace current planning but instead the measures depicted in the action plans should be combined with spatially relevant formal and informal planning or existing sectoral planning and concept planning. One of the most important benefits of the action plans is that they provide a framework for transparency in decision making processes, a flow of information, and an improved communication structures.

The approach proposed is multidisciplinary, based on economic, social and environmental aspects: so the potential partnerships are high in number and importance. Such partnerships are moving towards a more strategic and collaborative approach, ensuring more intense relationships able to create additional value to the project. This shift represents an opportunity to maximize benefits for partners and citizens. This kind of approach is used for collaborative activities, including the development of interoperability, cross-sectorial participation and new opportunities offered by innovative solutions.

3 INSTITUTIONAL MODELS FOR CIRCULAR FLOW LAND USE MANAGEMENT

The success of circular flow land use initiatives is closely linked to the availability of adequate operators and financial tools to implement these policies. Given the fact that private initiative is limited, the creation of specific agencies is recommended. Even though land management is a main component of regular local government actions, the implementation of the circular flow land use management concept still needs a management structure. The creation of specific agencies could be an important tool to assure the delivery of a better public service in close relation with private stakeholders.

Over the years many different models for these agencies have been tested in Europe, with differing structures (100% public / 100% private / public-private mix); legal forms (private limited / private not-for profit / charitable etc. [1]); geographical boundaries (from site-specific to city / municipality, sub-regional or regional areas); and operational remits (from basic site remediation & recycling, through to responsibility for wider economic and/or social responses).

3.1 Management structures in Europe

Specific models for operators in Europe are the creation of development agencies, such as the legal structures of “Etablissement Public Foncier” in France and the “Land Restoration Trust” in the United Kingdom and the former regional development company North Rhine-Westphalia (Landes-entwicklungs¬gesellschaft Nordrhhein-Westfalen (LEG) (NRW-URBAN) with the “Grundstücksfonds in North Rhine-Westphalia.

The three selected case studies highlight innovative institutional solutions of circular land management on inter-municipal and regional level. They go beyond purely marketing or project-oriented approaches. Common features are:

- The main goal is a sustainable urban and regional development
- They are not based on individual projects or individual portfolios
- They prepare the development of problematic sites
- All institutions are not profit-driven and nor complementary and they are not competing with the private housing sector

[1] There is some debate as to how truly ‘private sector’ these agencies are. It is true to say that they are created by the state and the extent of their true independence is very often dictated by the prevailing structures of governance; however it is accepted that many do operate on a daily basis independently of other government/state agencies.

- They are dependent on the close cooperation of local authorities
- They have access to ongoing public funding programs (eg. from ERDF), which remain unchanged
- They are set-up as "interdisciplinary teams" where, alongside the planning qualifications, qualifications for environmental remediation, legal, administrative and financial sciences are also involved

3.2 Development of management structures in the CircUse project

The development of this management structure could be also part of a regional CircUse action plan (see above). Such a structure should have defined competences, a business agenda and a mission statement that matches the regional development plan. These tasks can be either fulfilled by an already existing or by a newly established organisation. Both approaches have their pros and cons. In the CircUse project both models will be tested–because it developes innovative agency models in the Silesian region in Poland and the region Voitsberg in Austria.

In the City of Piekary in Poland, circular flow land use management objectives will be implemented through the existing Piekary Śląskie Industrial and Technological Park EkoPark Ltd. (short term: Ekopark) organisation. This organization in Piekary will be used to implement a new land management function. The aim of the CircUse activities in Piekary is the start of operations for the management structure to carry out the tasks of investment planning, maintenance of a land management database, and public awareness activities. The main responsibility of this CircUse pilot project will be the establishment of a future concept for a 130 hectar former mining area as well as a new definition of tasks and proposals for new management structures to foster land revitalisation. Above all, a feasibility study will describe the business agenda for land management and the organisational integration.

In the Austrian pilot region of Voitsberg in Styria, a new land management agency will be established. Similarly, the Voitsberg region was also a former mining area. For this region, an operational structure and a business plan for a new land management agency will be developed. In this CircUse pilot project so far, main regional stakeholders were identified, tasks defined, and the work on an management concept has started. The business plan depicts the business agenda of the future agency and a sustainable financing plan. The management agency's main responsibilities will be data monitoring, development of an overall concept, initiation of sustainable projects, transfer of information, and awareness building. The aim of the CircUse activities in the region of Voitsberg is the presentation of a model agreement for setting up a land management agency that is transferable to other PPs.

The evaluation of the activities and experiences of the pilot regions Piekary and Voitsberg and the comparison with other good European practices will result in a model for appropriate management structures in Central Europe. Based on the experience from Piekary and Voitsberg an implementation concept for the other CircUse pilot regions will be developed. All CircUse partner regions will select and discuss proposals on adequate local/regional institutional models based on the European examples and first steps of the pilots in Silesia and Styria.

In general the conjunction with instruments of a circular flow land use management "co-operation" and "organisation/management" and "management" are important fields of activity. Therefore new structures of organisation, management and co-operation were developed and tested in the framework of CircUse project.

4 CIRCUSE TRAINING COURSE

Besides new management structures, it is also important to disseminate the circular flow land use philosophy to those actively engaged in land management activities. To do this, training course material concerning circular flow land use management was developed within the CircUse project and is offered to local authorities and other stakeholders for adaptation and reuse. The development of training materials was based on the realisation and evaluation of a "pilot training course". The pilot training course "Land use of tomorrow in the region of Voitsberg" was held in May 2011 in Baernbach (Austria). This step was important to gain practical experience regarding the functioning of a previously prepared training course method. Based on the experience of the Baernbach pilot training course, a "Guideline for the preparation of a CircUse training course in partner countries" was developed. The guideline for a sustainable land management

training course is aimed at the promotion of the idea of circular flow land use management in EU member states.

The guideline includes training course materials consisting of six modules. These modules include strategic and instrumental aspects of a circular flow land use management in the fields of urban and regional planning, soil and land use information, co-operation (e.g. municipalities, public and private partners), funding programmes and schemes, as well as economic incentives. The course material has a transnational character since it will be able to be transferred and used as a training support in other regions and also in other projects concerning sustainable brownfield and greenfield management. The following table lists the names, aims and contents of the six course modules.

Modules	**Aims**	**Contents**
Land use impact – problem analysis and interactions	• introduction to the issue of circular flow land use management • general awareness raising referring to problems with land take development • identification of interdependency and interdisciplinary nature of the problems associated with uncontrolled land taking	• land consumption in the relevant country (e.g. brownfields: inventory and potentials, settlement development and follow-up costs for infrastructure) • objectives of the national sustainable strategy (if existing) or other relevant political documents of the relevant country • current situation of the state, region or city • outcome and results of land consumption in the last decades (ecological, social and urban development problems)
Principle, aims and strategy	• understanding of the methodical approach of circular flow land use management • clarification of terms referring to the method • show the additional value of CircUse to conventional planning traditions	• principle of circular flow land use management • objectives of circular flow land use management • strategy of circular flow land use • management scopes of action of circular flow land use management
Pilot municipality – land potentials and development scenarios	• development of the future City …(insert city).. with consideration of the CircUse principle • check of inventory potentials for inner development • become acquainted with balancing approaches and scenario development to achieve sustainable land management • become acquainted with practice tools for the implementation of circular flow land use management in the municipality/region	• circular flow land use management in the municipality • land take potentials in the inner area and outskirt area • land balances and prognoses for the land demand • data management • development of planning at municipality level • scenario techniques
Stakeholders	• identification of approaches for all relevant administrative and private actors • identification and analysis of behaviour patterns, motivation, support and opposition • awareness raising for network development and the creation of adequate cooperation and organisational structures	• spectrum of actors • demands for land use • setting up of building, types of cooperation and organisational forms
Instruments	• development of understanding regarding the effects, potentials to achieve objectives, and efficiency of single instruments • development of knowledge concerning an adequate use of instruments • awareness raising for possible new (e.g. economic) steering instruments for sustainable land use management	• mix of instruments: fields of action and strategic objectives • existing instruments for stronger regional circular flow land use management to foster an inner development • additional existing instruments of a circular flow land use management in regions with a growing development dynamics (special issue: protection of free space and regeneration areas) • additional existing instruments of a circular flow land use management in regions with a shrinking development dynamics (special issue: re-and deconstruction, renaturation) • new instruments for a regional circular flow land use management
Action plans	• introduction to requirements, objectives and the development of action plans • knowledge building of a general processing algorithm and adaption approaches on the way to action plans • Implementation of objectives und instrument proposals to measurements and activities in the frame of integrated action plan	• general information on action plans • preconditions for the development of action plans • land policy objectives of action plans • structure of action plans • exemplary measurement packages for a regional action plan

Table 1: Six modules of the CircUse trainings course for local authorities and stakeholders, German Institute of Urban Affairs

The guideline will help to implement a CircUse training course in EU countries; all users, though, have to adapt and optimise it referring to national or regional purposes. Therefore, the curricula has to be adapted by integrating aspects of policy framework, of the countries' and regions' general grade of development and experience in the field of land use management, the specific situation of land consumption and the schedule

of responsibilities for tasks of land use planning and land use decision making between all relevant stakeholders. It is important to remark that all these aspects are dependent on a relevant urban region or municipality and cannot, therefore, be directly transferred from one to another EU member state.

The adaption of the course material should be implemented on the municipal or regional level. For the organisation of a training course it is important to start planning at an early stage. Preparations should be started five months before the fixed date of the training course. Relevant stakeholders on the regional level will vary from region to region, but will be identified among the following groups:

- land use planners and environmental experts in municipalities and regions,
- decision makers on a municipal and regional level (in administration, as land owner and developer),
- other interested expert audience.

It is always important to include the decision makers and other responsible stakeholders for the relevant issues. In general, the training course should be a two days event. It is suggested to seek the involvement of an experienced moderator for the implementation of such CircUse training course on local level.

The "Guideline for preparation of CircUse training course in partner countries" is published on webpage www.circuse.eu.

5 CONCLUSION

The potentials, chances, and preconditions for implementation of a circular flow land use management are ambitious, but sustainable changes of current behavior are needed. Common problems and a diversity of national and regional frameworks could be faced by a common strategy of circular flow land use management. The implementation of circular flow land use management needs an integrated approach which encompasses the wider spectrum of policies and activities providing a package of instruments (policy mix). In this instance, current and potential new instruments should be gathered according to regional differences in framework conditions. Permanent knowledge acquisition and awareness of circular land use management are crucial preconditions for a successful implementation of a strategy for reducing land take and strengthening inner development. The instruments, action plans, and training courses presented above contribute significantly to the improvement of land management by both teaching those causing unsustainable land use and offering a tool for the better management of land.

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Introducing Integrated Eco-Mobility to the New Asian Urban Model – Filling Systemic Transit Convenience Gaps. A Case in Chongqing's High-Density Jiangbei Centre

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1 SUMMARY: FILLING "TRANSIT CONVENIENCE GAPS" WILL OPEN POSSIBILITIES FOR ECO-MOBILITY WITH IRRESISTABLE CONVENIENCE

Very high densities characterizemany transforming and new urban centres in Asia and China. Allocating the right mix of uses and finding good economic models for real estate development and property ownership to achieve economic sustainability continues to be challenging in light of competing developments in all larger cities. Creating robust urban morphologies, roadway- and public space typologies that balance multiple modes of transport in the public realm effectively, while managing local preferences requires planning geniuses – or even better: intensive horizontal cooperation and coordination – to achieve compactness and livability. Serving new Asian and Chinese high density centres with transportation often becomes the single-most critical concern of planning and approving authorities. Apparently, relying heavily on individual car-ownership and road-based transportation cannot be a satisfactory solution and already results in gridlock and in an unpleasant fight for public space between buses, cars, pedestrians and others. It is not uncommon in Asia that private vehicles are given high priority, discriminating pedestrians due to an implied difference in social status and to promote a car-based economy. Intelligent solutions for eco-efficient urban mobility need to be based on public transportation and have to match or even have to go beyond the best of what we have in cities around the world today in terms of a wider range of (electric) and innovative vehicles, attractive places of interchange, finer networks of accesibility, real-time mobile mobility information systems as well as consumer-oriented operations and reasonable pricing and convenient payment systems.

China is in the very fortunate situation of having a leadership that understands the importance of good infrastructure and thus funding and implementing networks for various modes of transport, private and public, road-based and rail-based enjoys a high priority in Chinese cities. A system of urban highways, ring roads and arterial roads has been constructed over the past 15 years. Three LRT/MRT lines are in operation and several more are planned. The main mode of public transport at present are buses. One experimental BRT line in the Yuzhong district has been largely regarded as a failure, but this is aguably due to suboptimal routing. The existing and planned LRT/MRT system will greatly improve accessibility within the metropolis. However it seems that there is a systemic service gaps both between the lines as well as between the actual stations particularly in centre locations. In Chongqing the topography of steep valleys and hills up from the Rivers as well as a hard rock geology presents an additional challenge to development and connectivity.

The authors identify systemic „transit convenience gaps" most urban public transportation systems intrinsically have. And, we believe that, if these gapse were to be filled, it would make public-/semi-public-/shared mobility solutions more user-friendly and convenient. Innovative solutions and creative technology for vehicles, places for intermodal exchange and mobility information for mobile devices will make a huge difference. If the focus is on user-friendliness, availability, positive experience, safety and security, there is a substantive potential for much higher acceptance of transit and eco-mobility choices.

Four transit convenience gaps have been identified by the authors for the transit system in Chongqing and in the Jiangbei Centre area:

(1) MRT/LRT lines station distances are too far apart from each other to make it convenient to walk to a station and to walk between stations. This becomes apparent when compared with other world cities.

(2) The mesh of MRT/LRT lines leaves gapse that are too great to be convenient to walk to stations. An intermediate system of rapid transit within a district or between two districts is needed. Ideal would be BRT or a streetcar.

(3) The inconvience that exists between bus-service and taxis or private vehicles could be filled by service through minibuses or vans, public and semi-public models are possible.

(4) The gap bewteen walking and bicycle riding or cars and taxis might be filled with publically available, individual mobility assistants like Segways, e-bikes and other innovative tecnology yet to come.

2 CHONGQING AND "TWO RIVERS" NATIONAL LEVEL SPECIAL DEVELOPMENT ZONE: DEVELOPMENT TREND NORTHWARDS WITH JIANGBEI BEING MOST CENTRAL

Chongqing is on its way of becoming a major urban agglomeration and economic powerhouse on the upper reaches of the Yangtze River in China's western region. Urban and economic development is surging and the city has redeveloped in its centre area and expanded over the past ten years almost beyond recognition. High density places have been rising and continue to develop in the historic centre of the Yuzhong peninsula bounded by the Yangtze and the Jialin Rivers. And several centres outside the historic urban area are under way. The most notable centre development is the new Jiangbei CBD just north of Yuzhong across the Jialin River. This CBD is the most significant centre development of the „Two Rivers" national level special development zone that is north of the Jialin river and west of the Yangtze River and includes the airport and Yangtze Port facilities as well as several large scale industrial clusters. This new development direction northwards will put the Jiangbei CBD in a strategic centre of gravity of the region.

The ongoing urbanization can be described, in a simplified manner, as two primary patterns. 1. Core city redevelopment: high-density mixed-use development and re-development of historic areas on the Yuzhong Peninsula and 2. New city districts and industrial development: development primarily with functional separation and a system of super-blocks and overly wide roads radiating primarily north into the"Two Rivers" zone. In this process a system of high-density commercial and business centres and many high-density residential compounds as well as manufacturing and logistics zones are being allocated and built. This model can be observed in many places throughout urbanizing China and in other countries in Asia.

The city's dramatic topography at the confluence of the Jialin and the Yangtze Rivers with steep slopes at both rivers and hills elsewhere presents major challenges to urban development. The topography also offers many opportunities both for unique place settings and views, natural district ventilation and creative pedestrian connections with public escalators and elevators that are be planned in some new areas, comparable to Hongkong's „Mid-level" area south of „Central". However, „bull-dozing" away hills to ease development is a commonly accepted practice to increase developable land in the city.

Planning and implementing an eco-efficient transportation and mobility system in Chongqing in light of these circumstances faces several challenges:

- The topography is a challenge for development planning as well as for transportation planning;
- Due to the topography, the use of bicycles is not part of Chongqing's mobility vocabulary,
- Codes and transportation engineers tend to prioritize private vehicles with wide roads and many highway-style intersections over transit and non-motorized traffic,
- MRT/LRT are difficult to construct due to the steep topography and a hard-rock geology,
- The development model of separating uses on an urban superblock scale makes walking from residences to work, factories, offices, as well as to restaurants, shopping and parks very inconvenient due to long distances.

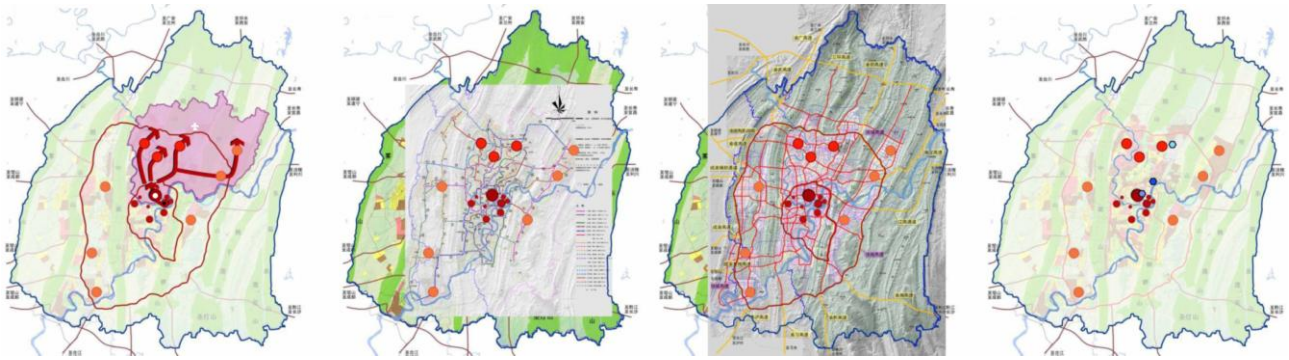

Image 1: Chongqing strategic urban area plan within outer ring road. The purple area in the left image is the "Two River" zone. In blue is shown the future outer ring road and red the ring road and orange the arterial roads system Red dots are centres. Arrows indicate growth trajectory. Second image shows planned MRT/LRT. Third image shows existing and planned trunk roads. Right

image shows locations of international airport (north) container port and high-speed railway station locations. All these initiatives support a shift of gravity from historic Yuzhong Peninsula with the new "Jiefang Bei" CBD (black dot left image) towards the north with Jiangbei CBD (white dot left image)becoming clearly most accessible and central.Significant improvements to public transit are essential filling the transit convenience gaps much needed to avoid gridlock. Source: Stefan Rau over Chongqing's strategic plan.

3 HYPER-DENSITY DEVELOPMENT PROPOSAL AND TRANSPORTATION CHALLENGES

The new Jiangbei CBD is continuing to be refined and developed. Within this high-density environment the authors were asked by a private client to propose a master plan including programming, land use and –intensity definition, building types development, open space configuration and transportation concepts. For the relatively small site of five hectares within a dense urban context that has been developed over the last 15 years, the authors proposed a very high density with a floor area ratio of nine (FAR: 9). Although this is very high, there are many examples of such densities within mixed-use centres and mixed-use developments in Asia and China.

The justification of the density in this particular site is based on several factors such as central location, proximity to a green space and the lack of several urban functions that might be allocated within the site to complement land uses in the context and complete the land use mix creating compactness and "short distances". Accessibility to the centre area at large is excellent with a new subway and arterial roads. However, access to and from the micro-location of the site itself needs to be improved as well as management of circulation in and around the site.

Due to the centrality of the location and the anticipated density, regular in-progress discussions with and informal pre-approvals from the district planning department, district government and the city department of planning were essential. The proposed very high density and the details of the mix of uses were disucssed at length to ensure an optimization of functions that would complement those already existing, planned and under construction in adjacent areas. This exercise results in a conceptual reduction of distances from housing to jobs, commerce, services, education, health care and open space within the new centre. In short: the objective was to create compactness.

What has been the biggest concern of the local officials however, was vehicular accessibility avoiding roadway congestion and the planning of sufficient number of parking spaces as well as access to parking that avoids backlogs onto roads. The authors were very concerned about access via public transportation and in reviewing the transit system - existing and planned - major shortcomings on a systemic level were identified and they had to be overcome through innovative concepts.

Image 2: High density developments in the area of the Jiangbei CBD. Pedestrian environment has some nice elements in some places already but need to be completed and connected to become a cohesive, convenient, pleasant and safe system: Pathways through green spaces. Beautifully landscaped and wide sidewalks with cars at times parked on them. Public stairs and public escalators enhance walkability. Roadways with Taxisand capacity to handle exclusive bus-lanes/BRT. Source: Stefan Rau and Wang Dan.

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4 EXISTING AND PLANNED MRT/LRT SYSTEM LEAVES TWO SYSTEMIC GAPS: NETWORK LINES ARE TOO FAR APART AND STATION DISTANCES ARE TOO GREAT

In Chongqing the planned network of MRT and LRT lines is very ambitious and it is very laudable. However there are two kinds of convenience gaps in this system, the first being the lines are too far apart and the second being the sations are too far from each other.

The mesh that is woven with planned and existing MRT and LRT lines leaves holes to great to be conveniently serving all urban areas. This is surely due to the difficulties dealing with the topography and the involved capital investments due to the geology.

To solve this systemic problem, the authors recommend to introduce a bus rapid transit overlay inbetween the rail-based transit network. This BRT system can easily be accomodated within the existing new road carriageways, built in the last several years. This would be easy to install with exclusive bus lanes and effective bus stops and flexible to change routings if adjustments are needed for better service.

The second type of gaps that are created by the MRT and LRT network is that distances between two stations are too far apart from each other to be conveniently serving citizens and not condusive for them to switch from a car to public transit. The concept behind this is to have the trains run quickly from start to end which is a reasonable objective with respect to speed and effectiveness. However, it defeats the purpose of a public transit system which is to offer a convenient mode of transportation, a desirable service for people to use.

If compared with cities around the world it becomes apparent that Chongqing's MRT and LRT network and station distances leave too many convenience gaps. This may be true for other networks in other Chinese cities as well, where station distances are spaced 1 to 2 kilometers apart generally, and not becoming significantly denser in center areas as is the case in other world cities with successful transit systems with a high modal split of public transit ridership.

The authors recommend to review this principle both for Chongqing and as well for other Chinese cities and simply add stations inbetween on existing and planned lines to enhance user-friendliness and make people use transit as their first choice of getting to and around in the cities and their high density centres.

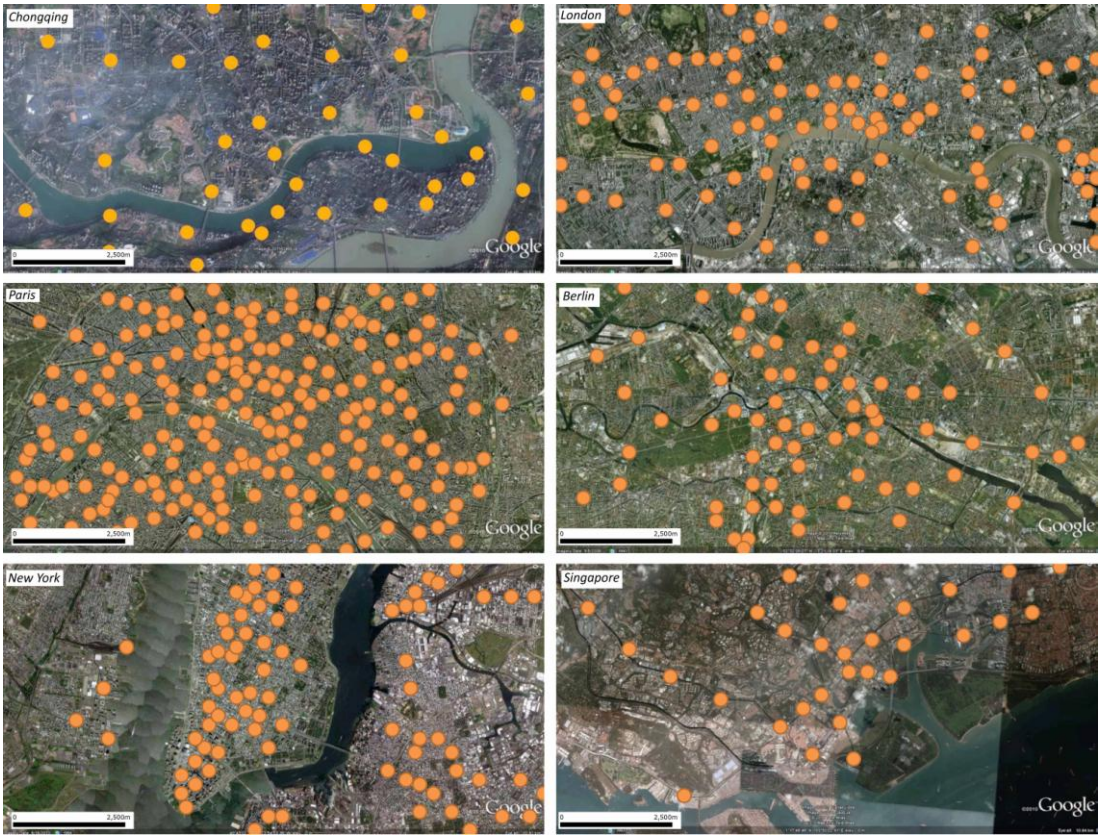

Image 3: Comparing subway station density of six cities. Chongqing's planned subway line stops to be implemented by 2030 (top left) is by far the city with the station distances too great to be convenient for citizens to use.Clear transit convenience gaps. Singapore (bottom right) comes next and here it isapparent that in the central locations station distances become nearer compared with peripheral locations. Source: Stefan Rau over Google Earth and Google Maps.

5 BUS LINES AND BUS STOP DISTANCES TEND TO BE TOO FAR APART AS WELL

In Chongqing and in many Cities in China buses tend to have stops spaced rather far apart compared with buses in western cities. The reason behind this is identical with the reason behind the distance between subway stops: long-distance speed and effectiveness. Also in this case it comes at the cost of convenience for commuters. More stops, even stops on demand on every intersection would make it much more attractive for people to switch to buses and thus many traffic jams due to individual vehicles can be avoided.

Not too seldom it can be observed that bus routes and bus stop locations stay unchanged even with new transit lines opening and at time bus stops are not relocated to be next to transit stations which makes interchange inconvenient.

Bus routes need to be adjusted and revised to respond to transit system changes and to respond to changes in land uses and densities reflecting new magnets of trip generation. Stops need to be nearer to one another in dense places and on-demand in lower dense places.

6 PROPOSAL FOR ECO-MOBILITY CHOICES AND MULTI-MODAL PUBLIC TRANSPORTATON: STRATEGICALLY FILLING THE "TRANSIT CONVENIENCE GAPS"

Solving traffic challenges for cities especially in high-density environments is rather ciritcal in various respects. Accessibility, urban livability, community life, environmental quality, public health, safety and security in public spaces, eco-efficiency and low-carbon economy are all directly related to urban transport and vice versa.

If a commonly accepted goal is achieving low-carbon eco-efficient mobility, we must be serious about the need to get people out of their cars by offering most attractive, convenient mobility choices that cannot be resisted. It is of utmost importance that public transportation service offers convenience to individual mobility needs of all residents, workers, shoppers and visitors both to get to and from the centres as well as to get around inside the centre areas.

To achieve convenience we have to fill „transit convenience gaps" that seem to exist systemically in most places, not only in Asia. These gaps exist due to, among other reasons: physical urban patterns, transport technology used, the scale of vehicles and operations economics.

These convenience gaps may be filled through various means, number one being intermediate sized vehicles and innovative new vehicles. Number two, most importantly – as we don't have to reinvent the wheel – is employing creative models for shared ownership and mobility services, management and operations models are most needed with many encouraging examples already in place in various cities. Number three is information on mobility choices and ordering capabilities ought to be readily available on people's mobile phones real time and anywhere on the go.

Image 4: Proposed multiple modes of transport integrated to become an eco-efficient and convenient mobility system. Filling transit convenience gaps. Source: Stefan Rau and various internet sources for icons.

The authors were originally asked to work on a five hectare site and ended up consulting transportation consultants and the district and city government on improving the transportation system. For the example in the Jiangbei Centre of Chongqing, a place with virtual non-existance of bicycles due to topography and culture and in addition to roadway- and roadway management improvements as well as parking provision,

the authors proposed eight specific strategies to provide an attractive and convenient system of eco-mobility filling the transit convenience gaps:

(1) MRT/LRT more stops:

Additional stops in-between existing and planned stations to serve residences and offices within a five to ten minute walk maximum. China's subway systems tend to have distances between stations too great reasoning speed is of greater importance than convenience. However a balance needs to be found and convenience and other factors of user-friendliness will ultimately decide on the success of system which can be measured by transit ridership and modal split.

(2) BRT added in-between network:

Introducing a City-wide BRT system on the existing and planned new roads which have enough capacity to give one lane exclusively to buses. The BRT lines strategically fill the systemic gap between subway lines that exists also due to the topography and it will provide rapid transit within a district and between two districts. BRT seems to be an obvious choice offering effectiveness at a very reasonable capital upfront investment while also being flexible with routing and adjustments over time.

(3) Improved bus routing and added Minibus service using electric vehicles:

Introducing a district-wide minibus sSystem with convenient stops and personal cargo delivery will serve the need for a strategic level of public or semi-public service needed below that of buses and above that of taxis or private vehicles. On-demand stations and service flexibility will make this effective and convenient to go around within a district and to go to and from MRT/LRT stops.

(4) Renting/Sharing/Pooling a variety of vehicle types:

Introducing a variety of vehicle types and vehicle sizes and ownership models as well as management and operations models with vehicle stations in every residential community and even every residential block and high-rise buildings and with branches in all major office and commercial buildings. Car or vehicle sharing associations and vehicle rentals with membership or preferential treatment and competitive rates will be fun and attractive and combines the best of all: providing individual mobility and great choices of vehicles on demand and tailored to the actual need each time, with the benefit of a hassle-free mobility not needing to worry about vehicle maintenance.

(5) Slow-moving individual mobility assistants:

Electric bicycles, segways and a new generation of assisted electrical slow moving individual mobility devices will fill a gap where one feels walking is just a little too far and takes just a little too long or is inconvenient due to topography. In addition to private ownership and parking options offered in many, convenient and safe locations, shared and rental models of these mobility assistants should be offered to ensure availability of devices and flexibility of useage.

(6) Pedestrian friendly environments, fine-meshed networks, safety and security:

Pedestrian system planning is introduced with completed pathway-network, road crossings, public elevators and escalators to overcome hills, and overall design for pedestrian safety and security. Walking needs to be a most safe and pleasant experience to be the first of all choices to get around in a centre area. To improve pedestrian connectivity sometimes it is needed to create additional infrastructure, beyond sidewalks and pathways. In centre areas that could be a system of elevated walkways directly linking the commercial areas of buildings with one another and connecting to public transportation. And it could be a system of undeerground connections from subways directly to buildings along commercial or cultural pathways. Attractive and safe public spaces, sidewalks, plazas, parks and pathways are essential for a walkable place and a prerequisite for people to chose walking as a first choice of getting around. Detailed planning and urban design is required to ensure seamless, safe and attractive connections between different modes of transportation on foot.

(7) Inter-modal transit stations and eco-mobility centers and -stations:

Changing from one to another mode of transportation is an inconvenience most of the time. One aspect is the proximity, accessibility and attractiveness of stations. Here the authors proposed that in every residential compound and all major residential, office, commercial and service buildings there would be an inside and outside space with a variety of vehicles, storage space and with supplemental services like lounge,

conference room, wifi, concierge, convenience retail and small services. These are offered in two categories as comprehensive eco-mobility centers with many choices of transportation modes and vehicles and as eco-mobility stations sometimes just canopy roofs or niches or rooms with vehicle or devices storage outside or inside a building. Of course inter-modal transfer stations are associated with all subway stops and there will be safe and attractive exchanges with buses, minibuses, rented/shared vehicles and slow-moving individual mobility assistants.

(8) Interactive, real-time mobility choices information and ordering system for mobile phones:

On the level of operations the authors propose creativity on design, prizing, fare integration, real-time mobile information on mobility choices, mobile orders of vehicles and customization of service.This may be realized with GPS tracking of all modes of transportation and en-route vehicles and information on time, route details, energy use and carbon footprint for each specific mobility choice will give every individual all options for an intelligent, custom-tailored mobility choice at each situation.

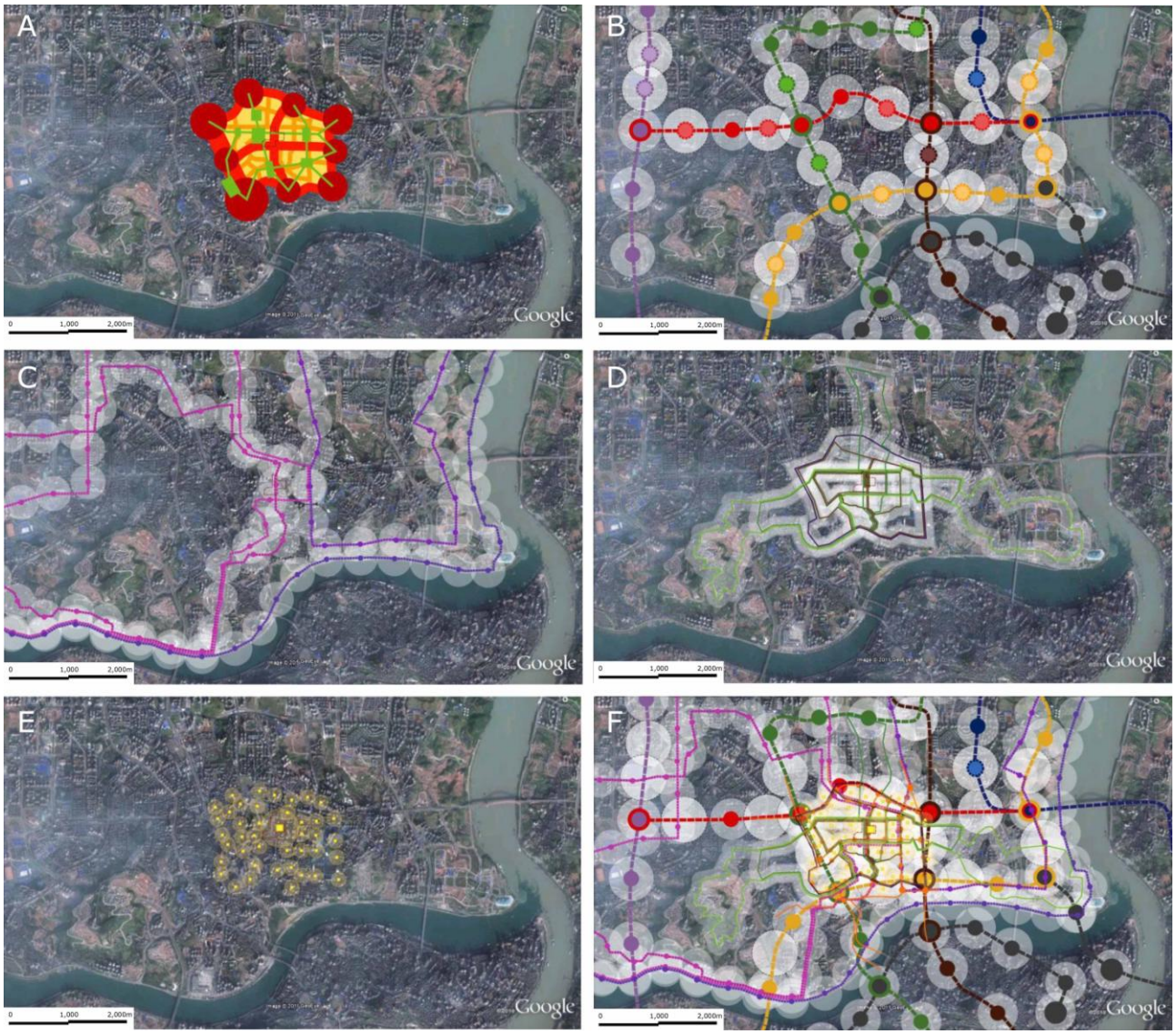

Image 5: Proposed Eco-Mobility system, networks and station locations for the Jiangbei CBD. Filling transit convenience gaps on city-wide, district scale and local levels. A:Concept diagram of highest densities and mixed commerce and office at MRT/LRT stations, commercial corridors linking them, high-density residential and neighbourhood main-streetsas well as pedestrian connections and green spaces. B: MRT/LRT network and stations as planned and with added stations(with dashed lines) to enhance convenience. White circles are 5-10 minute walks. C: Proposed BRT lines on already existing mostly new roads with capacity to handle an exclusive bus-lane. Filling the systemic gap left by the MRT/LRT system due to topography and cost. D: Proposed district-wide minibus system to fill the convenience gap left by buses White shaded lines are 3-,minute walking distances from the routes that have on-demand stops. E: Eco-mobility center and eco-mobility stations conveniently located right where people demand mobility. Minibus-stops, taxi-stations, taxi on demand, car-rental and –sharing, individual mobility assistant storage. F: Overlay of all public and semi-public mobility systems on the map. Orange lines and dots show adjusted bus-routes and added stops. Source: Stefan Rau over Google Earth.

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7 CONCLUSION

For high-density urban centres effective eco-mobility is needed to avoid gridlock, excessive use of energy and to enhance livability and environmental quality. Especially in the hyper-dense Asian and Chinese urban centres, transportation increasingly challenges the centres' livelyhood. While the synergies of the mix of uses and the densities are appreciated, the experience of congestion increasingly becomes a turn-off for business locators and residents chosing their housing.

To solve the accessibility challenge to and within the new hyper-dense Chinese and Asian urban centres we need a variety of creative solutions both for the hardware of lines and vehicles but also for the software of operations and service design to systematically fill the transit convenience gaps. The focus of the action needs to on maximizing the convenience of mobility consumers when conceptualizing eco-efficient mobility solutions.

During their planning effort for a private client and in negotiations with the district- and municipal governments, the authors identify three major „transit convenience gaps" of public transportation service that need to be filled strategically. Filling these „gaps" seem to be of strategic importance as they indeed seem to be systemic and not only in centres in Chongqing, China or Asia. To improve public transportation service aiming for ecologically-efficient mobility the authors recommend three strategies to address these „gaps".

- Rapid transit for intra-district and inter-district transport filling the inconvenience gap in the MRT/LRT network. Electric run BRT is the system of choice with flexibility and low-cost and streetcar a long-term solution.
- The inconvenience gap between in the bus-service and inbetween bus service and taxis or private vehicles might be filled by electric minibuses/vans as well as ubiquitous electric-car sharing and e-car-rentals. PPP is encouraged.
- The convenience gap bewteen walking and bicycle riding or cars and taxis might be filled with readily available, individual mobility assistants like Segways, e-bikes, smart-wheels etc.

Due to the very high densities of residents, jobs and shoppers in the new Asian centres, the market vialbility for these intermediate public and semi-public mobility solutions are, and the authors are quite firm on this: most certain.

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It's the Footprint, Stupid! Urban Assessment by Footprinting Public Transit

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1 ABSTRACT

In terms of energy consumption, emissions and the necessary sealing of surfaces, transport systems play an important role in the city. Roughly 37 % of the final energy used (City of Vienna 2009) are required for transport. Transport is also the main source of greenhouse gas emissions, accounting for 42 % of Vienna's total greenhouse gas emissions and recording the greatest increase of such emissions (up 37 % for the period 1990-2005, see ANDERL, GANGL et al. 2009). As regards building materials, civil engineering structures house roughly one fifth of such materials in Vienna .

Hence the solutions chosen for transport are essential for the sustainable development of cities.

Public transit is said to be environmentally friendly and, a more recent development, also sustainable. An interesting approach is to think of ways and means of illustrating its eco-friendliness or sustainability. In fact, the terms "environmentally friendly" and "sustainable" are regional compacts on how much our natural environment (including animals) can tolerate in terms of ultimate sink. This also refers to its absorption capacity. There are no generally recognised standards available as yet for sustainability. Therefore the present paper proposes to use a highly aggregated quantity as a starting point for orientation in (ecological) sustainability considerations. To put it more succinctly, the paper addresses the issue of the ecological footprint (EF) which serves to measure the appropriation of "nature", i.e. of ecosystems, by humans. The EF approach juxtaposes the biologically productive land surfaces appropriated for human use with the biologically productive areas that are available. This is measured in surface units (e.g. hectares). EF accounting is intended to show the relationship between nature's exposure to human demand and the amount of biological capacity available to nature.

2 URBAN ASSESMENT

2.1 Result – the ecological footprint

To identify this footprint, Vienna's public transit provider WIENER LINIEN commissioned the Institute of Water Quality, Resource and Waste Management of the VIENNA UNIVERSITY OF TECHNOLOGY to conduct a study (BRUNNER et al. 2011). Within the given framework of Wiener Linien, it has been calculated that one trip on the metro leaves an ecological footprint (EF) that is three times smaller than the one left by a person travelling by car. Provision of infrastructure and rolling stock accounts for 43 % of the metro's EF, metro service and the upkeep of station services account for 57 %. In terms of urban planning, the surface needed for the extension of the U2 line is six times smaller than the one needed by the MPT reference system. One of the strategic aims of the City of Vienna is to achieve a 40 % share in the modal split for public transport; this would result in a reduction of the EF of one U2 ride by 10-20 % (~0.14 m2/passenger kilometre/year). (BRUNNER et al. 2011). But first the benefits of the ecological footprint versus conventional methods will be shown based on cost benefit analysis, as this is the method which is most widely used in the world, including Austria, where guidelines issued by the Austrian Association for Research on Road, Rail and Transport (FSV) mandate such an analysis for any infrastructure investment.

2.2 Economic assessment and use of resources

As a rule, economic analyses assume an unlimited amount of resources. Such assumptions can only be understood if we take a closer look at the times when these theories were developed. The very idea of finite resources was alien to representatives of both the classical and the neoclassical schools of economic thought. This is why the two theories are based exclusively on the exploitation of existing raw materials, but they ignore the changes in natural deposits and fail to reflect the risks of supply. Even an economy that is supplemented – in ecological terms – by a closed substance cycle does not take material deposits into consideration; furthermore, the raw materials included in this cycle will ultimately enter ecological processes as emissions. Therefore it only considers the input side of materials, while on the output side it focuses exclusively on the benefit components of goods, with the materials as such being ignored. An examination of the economic benefit or of the social welfare gains based on economic considerations or simply the

application of the Kaldor-Hicks criterion (benefit cost quotient of the cost benefit analysis) are ultimately always summaries of current assessments, i.e. unrealised gains. Since at the end of the day the balance of savings and debts will always be zero, i.e. money has no value of its own, it will be the material goods which decide whether the individual and/or the state or humankind as a whole have become richer or poorer in the context of any given measure. Therefore the material or resource base is of key interest for political decision-making. It is surprising that so far the issue of resources has been addressed mainly in philosophical sustainability terms or under the aspect of primary energy sources. In this context one question is essential: how can one capture and account for the available "stock", i.e. the existing natural resources and the raw materials (goods) already processed?

One of the central tenets of neoclassical economic thought is that of the relative scarcity of resources. Lionel Robbins (1935) is one of the authors who established this as a cornerstone of modern economics. His approach went hand-in-hand with the fact that only the scarce resources traded at market prices were taken into account far into the 1960s. Resources having no market price were considered either not at all or only in terms of public goods. To this very day they eke out a rather wretched existence in economic theory as "external effects" and play only a minor role in decision-making processes.

Maybe many economists, politicians, but also engineers, are still under the strong influence of classical economic thought as propounded by Adam Smith, whose assumptions concerning future production methods were very optimistic. They must be understood in the social context of his time, but they were relativised as early as 1800 when Robert Thomas Malthus asked the question of whether the quality of available land would suffice for meeting people's food requirements. In the first half of the 19th century classical economists paid much attention to the issue of natural resources. This implies that they still had an integrated picture of economic and ecological processes. Their thought linked the limits of production with the extent of raw materials that can be taken from nature without having a negative impact on agricultural production. Today we would probably describe this approach as "adjusting to ecological cycles". But what is important is that in those days economic and environmental processes were seen to be inextricably linked.

This changed abruptly in the second half of the 19th century when economists turned their attention to the "market", to "market mechanisms" and, first and foremost, to the "benefit concept" as a basis for the "value concept".

Technical progress relies on the use of "stock goods", i.e. of "non-renewable" resources, which are mostly fossil raw materials and metals. This has two essential effects:

- There is a limit to the extraction of stock goods, i.e. one day they will no longer be available.
- Having been used in production and consumption processes, they enter ecological processes as emissions. This is particularly true of metal alloys, smoke and/or air emissions and plastics. Once emitted, they form part of an environment where normally they are not present in such large quantities. The Industrial Revolution was a period of transition from a more or less closed cycle of production and consumption to an open economic system based on the consumption of these co-called "stock resources".

This had and still has a major impact on the "problem-solving capacity" of our economic system (of neoclassical make).

- Focusing on the "market" as a place where goods are traded at certain prices has resulted in a situation where seemingly unlimited renewable resources such as air, water, etc. are given no or low prices and are therefore considered to be of no relevance to decision-making or to the market as such.
- No-price resources, though scarce, have been ignored by economic theory. This might have been appropriate for classical 18th century economic thought, but it certainly is no longer appropriate today.
- In neoclassical theory the available factors of production - no matter whether prices are attached to them or not - are assessed by individuals. This engenders major ecological and thus economic risks whenever the value of nature is dissociated from human needs. If in the long term the economy is to make appropriate adjustments to the quantity of available resources and the tolerance limits for exposure in the various spheres (especially the biosphere and atmosphere), we need a clear overview

of the flows of the resources concerned (INPUT/OUTPUT) in order to understand the cycles we want to create and control in the end. But this is not enough! A renewed transition to a sustainable economic order is fundamentally different from the one that led away from the closed production and consumption cycles of pre-industrial periods. Nowadays we need to manage and keep flowing not only the "renewables" but also and in particular the "stocks". The latter are not renewable and their quantity remains constant. Therefore they need to be addressed in a manner similar to the one used for fertile soil, which is not available in unlimited supply either.

This signifies that sustainable economies need detailed knowledge of flows and stocks, as otherwise we are unable to identify the availability of resources in future. In terms of materials and substances we also need to know the precise amount of discharges and emissions into the ecosystem referred to above, which would be impossible without detailed knowledge of flows and stocks.

2.3 Consequences for the assessment of urban areas and functions (urban assessment)

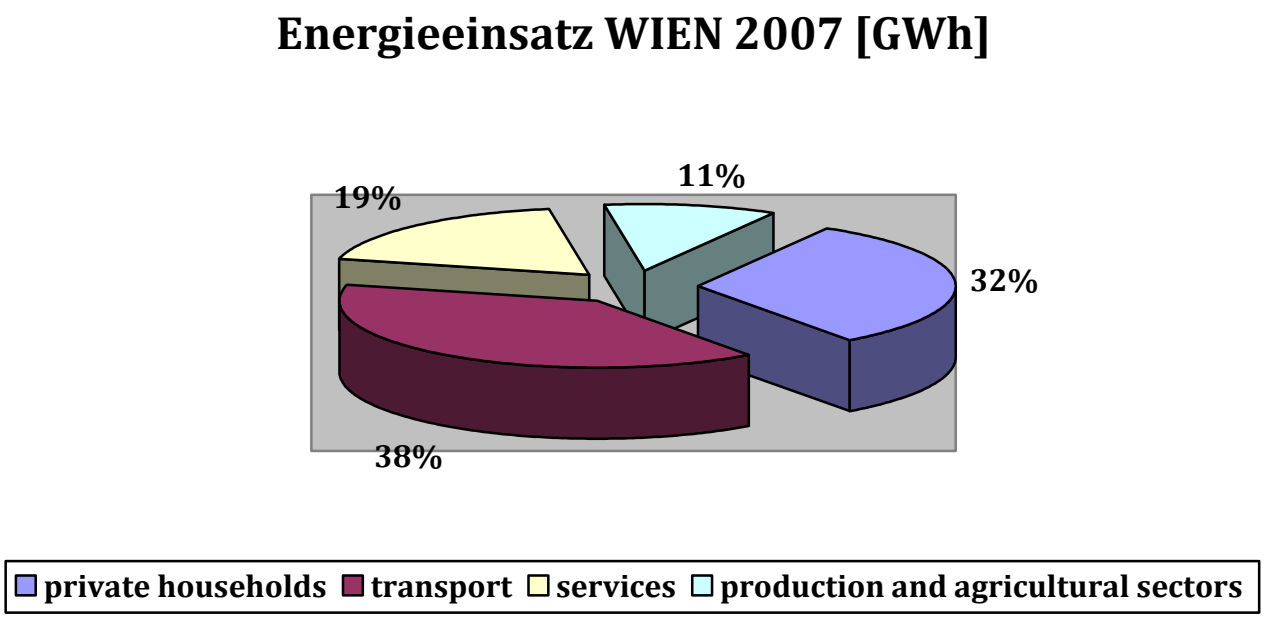
The above brief introduction into neo-classical theory and cost-benefit analysis clearly illustrates that the assessment of any given city's policies and ecological situation cannot be based on economic considerations. Not because economics were one-sided. But because economics simply do not have the relevant information on materials, substances and energy flows. What options are available to us?

In order to assess the situation of a city we need a complete picture of its resources and energy flows.

Vienna offers a number of interesting data sources to give this picture.

Every year Vienna's Municipal Department 20 (MA 20) issues an energy flow diagram for the city.

For instance in 2007 final energy consumption was 131,580 TJ (36,550 GWh) according to the city's energy balance. Fossil fuels and combustibles account for 62 % of this amount. A breakdown of the sources of energy shows that oil accounts for the largest portion (two fifths or 42 %) followed by natural gas and electricity (20 % each). District heating supplies 15 % of final energy. Renewable energy sources account for 3 %, ambient heat for 0.3 % and coal for 0.2 %.



Energy use for Vienna in 2007 [GWh]

Final energy consumption by sectors is as follows:

- Private households account for 30 % or 39,735 TJ (11,852 GWh)
- Transport accounts for 40 % or 52,100 TJ (14,472 GWh)
- Public and private services account for 19 % or 25,226 TJ (7,007 GWh)
- Production and agricultural sectors account for 11 % or 14,520 TJ (4,033 GWh)

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53 % of the final energy consumed in Vienna was used for power and lighting, 32 % for space heating and 14 % for process heating. Since then these figures have risen continually.

Total consumption was 46,627 GWh in 2010, with transport accounting for only 31 % of the energy used in that year (14,414 GWh). This goes hand-in-hand with a changed modal split: public transport (PT) up from 35 % to 37 % and motorised private transport (MPT) down by the same percentage.

This clearly illustrates that the targets to be attained by the transport master plan of the City of Vienna are major steps towards a sustainable transport system featuring a modal split of 25 % for MPT and 40 % for PT.

Various renewable energy sources are used to generate electricity and heat in Vienna. The identified installations for the use of renewable energy account for over 16 % of all power plants in Vienna with a total installed capacity of 210 MW of electricity generation. The most important renewable energy installations in Vienna use hydropower, wind power and – since completion of the biomass power plant in the district of Simmering – also solid biomass.

If we include the small-scale hydropower plants of Wildalpen, Hirschwang, Hinternaßwald and Gaming, total installed capacity will rise to 270 MW of power generated by renewable energy sources, i.e. more than 20 % of Vienna’s portfolio of power plants.

A closer look at the energy flow diagram shows the superiority of Vienna's PT in energy terms.

Meanwhile, only some 625 GWh (traction power, diesel and liquefied petroleum gas; figures for 2010; source: Wiener Linien) are used for 37 % of trips (PT), whereas motorised private transport (including fuel tourism from the eastern region) and goods transport consume 13,246 GWh. This corresponds to a ratio of energy consumption of roughly 1:20 in favour of PT. If this ratio is reduced by fuel tourism and goods transport, it still amounts to more than 1:5.

Energy sources as contributors to substance flows only account for 3 metric tonnes per inhabitant and year compared with a total of 200t per inhabitant and year. True, this is a small quantity, but it has major system implications, in particular for transport.

An analysis of material and substance flows should start with water, as for the most part it is nothing but a throughput quantity.

Brunner shows for Vienna that roughly 147,000 litres of water per inhabitant and year enter the city (system boundary = city boundary) to enable Vienna to meet all functional requirements, 143.000 of which 143,000 litres exit the system in the form of waste water. Wiener Linien, by contrast, need a mere 96 litres per inhabitant, more than half of which is used for metro construction.

A closer look reveals that building materials and consumer goods are essential for monitoring the city’s flows. These two form so-called anthropogenic stocks, i.e. man-made deposits of resources which are currently explored in great detail concerning their recyclability under “urban mining” approaches.

The size of these deposits is enormous. Already now every inhabitant of Vienna "carries a backpack” of such deposits of resources weighing roughly 350 metric tonnes. Each year it grows by another 8-12 metric tonnes, primarily due to brisk construction activity.

This clearly illustrates that urban assessment must be based on closed-system accounts of energy and resources in order to identify the relative proportions of energy consumption (PT:MPT) and be able to provide appropriate estimates of air emissions, fine dust particles and so-called fugitive emissions based on the use of energy and the increase of anthropogenic deposits. This paves the way for any kind of impact assessment supported by an objective quantity structure that can be used as a basis for such assessments.

The importance of micro-simulation, in turn, loses in importance as the macro-level can show where the actual potential resides.

Example: If we reduce the energy used in Vienna on the basis of fossil fuels (according to the energy flow diagram of 2010) by one percentage point, 130 GWh will no longer be needed. This amount corresponds to almost 20 % of the energy use of Wiener Linien. In emission terms this signifies that the current 3.3 million metric tonnes of CO2 are reduced by 33,000 t or by 24 % of what Wiener Linien emit.

A consistent analysis of the targets defined in the transport master plan reveals: motorised private transport (MPT) must lose one quarter of its market share, i.e. reduce CO2 emissions by 825,000t, while public transport (PT) emits an additional 15,000t at most due to this shift in the modal split. In actual terms, the

increase for PT is less as the limiting energy and thus also the limit emissions are almost zero owing to the more favourable dynamics of vehicle movements.

I will not go into more details. The above explanation was meant to show that closed-system accounting for materials and substances, as well as linking them up with the energy flows, will greatly facilitate urban assessment and lift the veil of mysticism that currently shrouds such assessment.

Urban metabolism today primarily works like a linear throughput reactor: water and air flow from the supplying hinterland to the city and on to the disposal hinterland mostly in linear form. With current urban growth we see that the closed substance cycle can meet the rising demand for long-lived goods (e.g. building materials) only to a very limited extent. Demand of the growing city greatly exceeds the supply of secondary substances. The materials and substances accumulated in the city, i.e. the "urban stock", constitute a future source of raw materials (recycling) on the one hand. But on the other hand this stock is a long-term hazard to the quality of water, soil and air if it is not managed with due consideration of its environmental impact. Substance flows entering the environment of the local, regional (or global) hinterland can be more significant than those within the city itself.

Therefore it is essential to restrict oneself to the appropriate quantity structure and adhere to a clear distinction within the impact assessment itself where actions form part of subjective and value-linked decisions. This will not be addressed in the present paper. What is much more important is that the sum total of material and energy in the ecological footprint provides a highly aggregated indicator for assessment at the highest level, i.e. in the thin atmosphere of policy-making.

2.4 On the eagle's wings - the ecological footprint

The Canadian William Rees and the Swiss Mathis Wackernagel developed the model of the ecological footprint: it indicates in hectares how much surface area is needed by any given individual based on the consumption patterns this individual chooses to satisfy his or her needs.

If the entire productive surface of the earth were evenly distributed among all people, this would result in an average of 1.7 hectares or 17,000 square metres. This is equivalent to the size of 3.5 football fields. Currently the average ecological footprint worldwide amounts to 2.2 hectares per person. In other words: we use up more area than is available. Our planet earth is not big enough to satisfy our needs the way we are satisfying them today. We not only live off the interest payments but we are already living off the "ecological capital". The ecological footprint shows that our current consumption pattern is not sustainable.

In future our needs will have to be satisfied in a way which ensures that we make ends meet with the surface area available. For this reason we try, for example, to reduce CO2 emissions and to promote organic farming and local supply chains .

The City of Vienna could, for instance, set itself the target of reducing the ecological footprint from currently 3.9 ha/inhabitant/year to the globally compatible amount of 1.8 ha/inhabitant/year. The use of energy and material would have to drop to the same extent along the entire cycle of production and use, i.e. the life cycle. What would this signify in practice?

For this purpose let us take a closer look at the urban footprint itself.

In 2001 the Municipal Department for Environmental Protection – the MA 22 – had the ecological footprint measured for the City of Vienna. Each Viennese needs an average of 3.9 hectares of surface area. This is far beyond the target value of 1.8 hectares per capita. But in comparison with other large cities in the world Vienna fares very well.

Nevertheless the ecological footprint shows that we consume too many goods and agricultural products, too much energy and water, i.e. too much of what is termed "resources".

"Resources" include natural resources such as soil, water and air. They also include the material and substance flows triggered by human activities and the accumulated "stocks", such as building materials, consumer goods, waste, carbon dioxide, nitrogen and heavy metals.

Resource management means analysing the metabolism of the city and evaluating it based on viable criteria and indicators. This is how urban metabolism can be controlled by efficient measures. Resource management is a central component of sustainable development. Sustainable exploitation of our environment means that the consumption of renewable raw material, water and energy resources must not exceed their rate of

renewal. We must not consume non-renewable resources at rates which exceed their replacement by durable renewable resources. Sustainable use of the environment also means that the emission of pollutants must not be greater than the capacity of air, water and soil to absorb and decompose such pollutants.

2.5 The ecological footprint left by transport in the City of Vienna

The ecological footprint of the City of Vienna is comparable to that of other major cities and at 3.9 hectares per inhabitant of sub-average proportions. In order to come close to the environmentally sustainable limit value of 1.7 ha per capita, other measures for reducing this footprint are necessary.

In this context the policy area of mobility plays a major role. In the whole of Austria mobility accounts for 22 % of the national footprint, with 90 % of it being caused by motorised private transport and air travel. Although 34 % (meanwhile 37 %) of all trips in Vienna are made by public transport (PT), i.e. twice as many as nationwide, the city continues to pursue the policy goal of further shifting the modal split towards soft forms of mobility (PT, bicycle, walking). These plans are a significant contribution to reducing the ecological footprint of Vienna.

The objective of a joint project of the VIENNA UNIVERSITY OF TECHNOLOGY and of WIENER LINIEN was to compare two advanced modes of transport, i.e. "metro" and "motorised private transport" (MPT), with the help of the "ecological footprint" assessment indicator. The unit of reference chosen for this purpose was the ecological footprint expressed in one passenger kilometre units for the two means of transport. The study involved the newly built extension of the Vienna metro line U2 from stations Schottentor to Seestadt and a MPT reference system with the same transport capacity. To reduce the ecological footprint of Vienna's transport sector, greenhouse gas emissions must decrease. Energy efficiency measures in public transport will not produce the kind of economic and environmental outcomes as those achievable by the reduction of greenhouse gas emissions caused by MPT. Moreover, it may prove to be expedient for Wiener Linien to slightly expand the scope of public transport by widening its range of services and lines in order to achieve a shift from MPT to PT. However, such measures might reduce the coefficient of utilisation of metro capacity, which in turn would increase the ecological footprint of Wiener Linien. Within the given framework of Wiener Linien, it has been calculated that one trip on the metro leaves an ecological footprint that is three times smaller than the one left by a person travelling by car. The annual share of the U2 extension in Vienna's ecological footprint (EF) amounts to roughly 0.05 %, while choosing to travel by private car equals a share of 0.16 %. Provision of infrastructure and rolling stock accounts for 43 % of the metro's EF, metro service and the upkeep of station services account for 57 %.

With a share of 99.9 % in the entire EF of the U2 extension, energy surfaces are the dominating factor for absorbing CO2 emissions. Footprint analysis is very sensitive to the chosen electricity mix and energy requirements (which may range from 0.16 to 0.25 m2/passenger kilometre/year). Land required by soil sealing has no appreciable influence on total EF. But in terms of urban planning it is significant. The surface needed directly for the extension of the U2 line is six times smaller than the one needed by the MPT reference system. One of the strategic aims of the City of Vienna is to achieve a 40 % share in the modal split for public transport; this would result in a reduction of the EF of one U2 ride by 10-20 % (~0.14 m2/passenger kilometre/year).

2.6 Outlook: moving towards resource management

The ecological footprint is well and widely known since it is easy to understand and offers a great variety of applications. Such features make it an ideal candidate for media communication. However, the results of individual EF studies are of only limited comparability due to greatly varying system boundaries, allocation rules, conversion factors and functional units. The move from EF to resource and environmental management requires a broader set of methods. Owing to its methodological restrictions and its function as a highly aggregated indicator the ecological footprint is not ideally suited for supporting operational management in taking decisions. Both aspects imply the need to develop an information pyramid of graded levels depending on the target group concerned. The pyramid's apex would be formed by indicators that can be easily communicated by the media to the general public, while the base would be formed by fundamental analysis to inform operational management. The material and energy balances of an enterprise would be part of this knowledge base. Alongside the quantification of direct effects they serve as a point of departure for taking stock of the indirect effects (hinterland). If only the ecological footprint of Wiener Linien were to be

reduced, the future focus would have to be on: a) using those types of concrete and steel for construction which have caused fewer CO2 emissions in upstream processes; b) prioritising an electricity mix for operation which involves fewer CO2 emissions; c) reducing the energy consumption of rolling stock and stations; d) increasing occupancy rates; and e) finding the optimum mix of trams, buses and metros with due regard to the function of each of these modes of transport. Individual measures resulting from the EF concept may conflict with the targets set by transport politics and economics. Example: one method of increasing occupancy rates could be to restrict the service times of public transport. This illustrates that, in the total assessment process, an ecological footprint analysis is only one indicator which needs to be supplemented by other instruments better suited to map the objectives of passenger services offered.

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Kostenreduktion im Bereich der Infrastruktur durch LifeCycle-Management

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Umsetzung - Realisation

Organisationsstruktur "Projektgesellschaft"
Organisational Structure – Special Purpose Company (SPC)
- **Konzessionsgesellschaft in privater Hand**
  Private Concessionaire
- **Öffentlich-Private Gesellschaft**
  Public-Private Company

Vergütung
Compensation Scheme
- **Verfügbarkeitsmodell inkl. Bonus/Malus Regelung**
  According to the availability including Bonus and Malus regulations
- **Leistungskomponente für Qualitätssicherung**
  Performance gratification for Quality Assurance
- **Volle Verantwortung durch Jahrespauschalen**
  Full responsibility through annual lump-sums

Vertrag
Contract
- **Turnkey-Vertrag über 10-30 Jahre**
  Turn-Key contract over 10 to 30 years
- **Zwischen Öffentlicher Hand und Projektgesellschaft**
  Contract parties – Public Authority and SPC

5

Leistungen - Fulfilment

- **Betrieb und Verkehrsmanagement**
  Operation and Traffic Management
- **Erhaltung, Umbau, Ausbau, Sanierung**
  Maintenance, reconstruction, development, rehabilitation
- **Verkehrstechnik und Verkehrsleitung**
  Traffic Engineering, Traffic Guidance
- **LED Straßenbeleuchtung**
  LED Lighting
- **Kommunikationstechnik und Breitband Internet**
  Communications technologies and broadband internet
- **Erneuerbare Energien und Umweltschutz**
  Renewable Energies and Environmental Protection systems

6

Vorteile - Advantages

- **Nachhaltige Erhöhung der Wirtschaftlichkeit**
  Sustainable raise of the profitability
- **Gesicherte Werterhaltung der Infrastruktur**
  Secured maintenance of value of the infrastructure
- **Planbares gesichertes Budget**
  Projectable and secured budget
- **Sicherstellung einer leistungsfähigen Infrastruktur**
  Maintaining the capability of the infrastructure and adapting to new technologies
- **Durch gesicherte Qualität hohe Akzeptanz und positive Belegung der Infrastrukturthematik**
  High acceptance due to high quality standards
- **Gesicherte , ev. erhöhte Wertschöpfung für die regionale Wirtschaft**
  Raising the local creation of value

7

Mehrwert durch Technologie – Added values by technology

1. Verkehrslenkung – Traffic Management
2. Intelligente Beleuchtung – Intelligent Lighting
3. Dauerhafte Materialien – Durable Materials
4. Erneuerbare Energien – Renewable Energies
5. Neue Technologien – New Technologies

8

Verkehrslenkung – Traffic Management

- **Optimale Lenkung der Verkehrsströme**
  Optimised steering of the traffic flow
- **Stauvermeidung**
  Avoiding traffic congestions
- **Parkleitsystem – Vermeidung von Suchfahrten**
  Car- park routing systems – prevention of unnecessary seeking rides
- **Optimaler Verkehrsfluß**
  Optimising the traffic flow
- **Bedarfsgerechte Fahrspurfreigabe**
  Needs based release of lanes
- **Immissionsbezogene Verkehrsbeschränkungen**
  Immission based traffic restrictions

9

Intelligente Beleuchtung – Intelligent Lighting

- **Niedrigst möglicher Energiebedarf**
  Minimalised energy consumption
- **Steuerung jeder einzelenen Leuchte**
  Electronic control of every single lamp by an individual IP-adress
- **Stufenlose Dimmbarkeit**
  Stepless dimmable
- **Justierbarkeit des Lichtabstrahlwinkels**
  Adjustable beam angle
- **Optimierung der Ausleuchtung**
  Optimised illumination results
- **Homogenere Lichtverhältnisse**
  Homogeneous lighting conditions

10

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Dauerhafte Materialien – Durable Materials

- **Hochwertige Straßenbeläge**
  Innovative high – quality road surfacings
- **Setzungsfreies Künettenfüllmaterial**
  Set-free material for refilling ditches
- **Schwingungsdämpfung als Materialschutz**
  Oscillation damping as material protection
- **Aktiver und Passiver Korrosionsschutz**
  Active and passive corrosion protection
- **High-End LED - Beleuchtung**
  Latest LED – Lighting technology
- **Verkehrsoptimierte Kunststofftechnik**
  High end plastics engineering optimised for traffic solutions

11

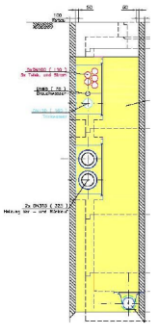
Erneuerbare Energien – Renewable Energies

- **Photovoltaik Paneele auf Lärmschutzwänden**
  Photovoltaic panels on top of noise protection systems
- **Photovoltaik für Beleuchtung und Pannenhilfe**
  Photovoltaic solutions for lighting and call boxes
- **Erdwärmenutzungen von Fahrbahnen**
  Geothermal use of roads
- **Erdwärmenutzung von Bauwerken**
  Geothermal use of buildings
- **Kleinwindkraftanlagen**
  Small wind turbines – building based or stand alone solutions
- **Strom aus Schwingungsenergie**
  Power from oscillation energy

12

Neue Technologien – New Technologies

- **Fahrbahntemperierung über Erdwärme**
  Keeping the asphalt surface at a moderate mean temperature by geothermal energy
- **Energiefreies Eisfreihalten**
  Keeping lanes and places ice free at zero energy costs
- **Schwingungsentkopplung Fahrbahn - Gebäude**
  Oscillation uncoupling between lanes and buildings
- **Überwachungstechnik mit Verfolgungsmodus**
  Surveillance technology with tracking mode
- **Kombitrasseen für Einbauten**
  Technologies for combined laying of all urban utility systems
- **CO_2 – mindernde Versiegelungen**
  CO_2 – reducing sealing for most building materials



13

Land Uses: Anything Anywhere & Anytime? Yes, but How Thematically and Where Areally?

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1 ABSTRACT

The development of Athens from the beginning of the 19th century and particularly after the arrival of 400.000 refugees from the Asia Minor, was realized without a regulatory plan, with complete absence of cadastre and any kind of street plan, on huge properties of few owners that were divided in small plots, were sold in low income class and were arbitrarily constructed. The basic priority of that period was the coverage of the urgent housing needs while the city's planning seemed a luxury.

The economic and social improvement that followed, after the second world and the civil war, dictated by the worldwide standards, had gradually led in a quantitative and qualitative development of urban land uses. These land uses were continuously mixed without regulatory plans to restrict or allow their allocation, until the 80' decade, so under the exclusive influence of market forces, anything was allocated anywhere, anytime. The plans that were legislated in the late 80's didn't result the desired land uses allocation as they didn't provide a strict frame for which land uses would be allowed and where they would be alllocated. The aim of the current paper is to investigate these land uses self regulation during the period where planning did not exist and later during the period where plannung existed, but it provided to land uses the freedom to be allocated almost anywhere.

The procedure that has been followed is the use of records from three successive censuses of employment and population in 1978, 1991 and 2001 for the Athens basin the center of Greece. The study of the diachronic thematic and areal redistribution of land uses in this area shows that although it was realized without any regulatory restriction and complete absence of principles until 1989 and under the influence of an indefinite plan since 1989 it is characterized by a deterministic land uses auto-regulation based on its citizen's everyday life needs. These continuous changes are defined and guided by markets forces, employment, land values in the context of the Total Urban Functional Demand (TUFD). It is remarkable that the formed groupings explain the 64% of the observed diversity of the recorded cases.

This auto-regulation refers to

(a) The reveal of Land Uses groupings which present continuous ameliorations, regarding their Urban Functional Relevance (UFR). This UFR refers to land uses that must co-function in certain city's areas aiming to their own Optimum Function (LUOF) as well as the City's Total Function (CTF).

(b) The way these groupings are allocated in the urban tissue, realizing gradually functional improvements of their distribution, aim a) to the Traffic Minimization (TM) but also in b) the formation of Autonomously Functioning Urban Sectors (AFUS). This deterministically, without regulatory principles, re-allocation and mixture of land uses is not being realized with random mixtures. As it is proved by the functional structures that result from the analyses in the three censuses records, the functions groupings that are revealed are composed by functions that aim to and are guided by the optimum city's function. It is also realized that these groupings through time are composed by different functions, fact that can be considered as improvement of city's functional behaviour.

It is obvious that those two urban dimensions interact in a perpetual completion to the urban sustainability and resilience and secure the better respond to city's change.

2 INTRODUCTION

Each city defines its general function in its urban planning wider area. Land uses are the substance of urban planning that defines city's form and function. In urban planning in Greece,land uses planning since 1833, defined only the kind and position of public uses. It was 1979, when for the first time not specific functions but groups of functions were allowed to be allocated .The ambiguity of this kind of planning gave the city's functions the freedom to be allocated with their own criteria dictated by market forces.

The gigantism of Athens capital, which constantly attracted new citizens, with intensity that differed according to political, economic e.tc. conditions led to plans which tried to manage land uses in the urban tissue. In 1985 a regional plan that was legislated tried to relieve thecenters population congestion and lead

to multi-centric development. In time new urban plans for each of the Athenians basin municipalities were legislated in order to achieve the better management of land uses allocation. Unfortunately the legislated plans of "laisser faire" without a strict frame of allocation gave in first regard the chance to anything to be allocated anywhere, anytime without any areal and thematical discipline.

The current research will reveal the thematic areal and diachronic redistribution of land uses in Athenians basin, an area that by the way concentrated the majority of the country's population and employment. Although the centre of Greece was developed without any regulatory restriction and complete absence of principles until 1985 and under the influence of indefinite plans since 1985. So, the final result of land uses allocation is characterized by their auto-regulation based on its citizen's everyday life needs. We will focus on land uses groupings that have been realised through time, with or without restrictions, which result gradually to functional changes of their distribution

3 METHODOLOGY

Our main aim is to examine the form and the composition of land uses groupings. We examine three dates 1978, 1991 and 2001 in order to obtain a more general and continuous in the time picture of them. The land uses groupings will be revealed with the use of Principal Components Analysis. This statistical technique reveals the structures of the variables that are inserted in the Analysis, which in our case are land uses, measured by their recorded employment. These Analyses reveal the functional structure of the Athenians basin expressed by the extracted Components. These Components are structured by the best linear relationship of the land uses. That is to say which land uses are areally related. Finally the Components are rotated in varimax rotation which allows the best thematic and areal correlation of land uses. In order to achieve the best comparability of the three extracted structures we force the Analysis to extract five components for every available assessment.

4 LAND USES GROUPINGS IN THE THREE DATES

In 1978 the Athens basin was a pole of new residents attraction, with industrial zones developing in its around while the tertiary activities were developing in its central core. The employment that was recorded was 619.664 people. The majority of employees were concentrated in the tertiary sector (57%) while the industrial and manufacture activities gathered the 43% of the recorded employment. This time as told, in the Athens basin existed nor regional neither urban planning, in order to define the detailed allocation of the 37-differnent kinds of land uses. So, the main parameter that influenced land uses allocation was the coverage of the basin's citizen's everyday life needs that ensured the best activity's function, hence it's maximum profit.

The extracted functional structure, from the Principal Component Analysis, in 1978 is composed by five components (groupings of land uses) that explain the 24,5% of the total variance of the existing employment situation (Table 1). This percentage seems to be very low in order to explain adequately and

persuasively the existing shaped structures, but it must be pointed out that the Analysis is forced to reduce the number of Components in order to be comparable with the structures of 1991 and 2001. It must also be pointed out that the above results from an Analysis of 38.322 areal units in which we examine totally 1.417.914 observations (37X38.322).

The first group of land uses (composed by 12 of the 14 tertiary activities) defines Central daily needs land uses while the rest four groupings are formed exclusively by the remaining 23 industrial uses. It has revealed that although restrictions regarding land uses did not exist, the activities themselves seeking to take advantage of the profits that can be ensured by certain areas position have shaped cores where activities are concentrated. It has also revealed that industrial uses have shaped groups as they need areas with common characteristics that means low land prices and adjacency with main axes and in some cases they function on an assembly line.

In the period since 1978 until 1991, have intervended the legislation of the Regulatory basin's plan and the Urban plans for each of the 56 basin's municipalities. Those plans aim, was to create sustainable areas, develop sub-centers and isolate the industrial uses in certain areas while they encouraged the mixture of all uses in order to achieve multifunctional areas.

The employment that has been recorded in 1991 in the 51 activites have increased to 898.307 (from 619.664 in 1978), with 71% distributed in the tertiary sector while the employment in manufacture industries has

decreased from 266.455 to 258.305 employees. The extracted functional structure, in 1991 is composed by five components (groupings of land uses) that explain the 35% of the total variance of the existing employment situation (Table 2). The fact that although the absolute number of employment has increased and the total explained variance of the existing employment situation has also increased shows the tendency for a certain land uses regulation. Central activities remain the main grouping of land uses with increased variance. The second grouping is composed by Public central activities and the rest three groupings are composed by relevant and in some cases functionally connected activities.

THE LAND USES GROUPINGS IN 1978

Component	Economic activity	Employees	Loading	Variance
CENTRAL DAILY NEEDS LAND USES	Retail Trade	101.711	,638	6,673
	Wholesale Trade	49.353	,625	
	Transactions of Affairs	15.921	,604	
	Brokers and representatives	5.454	,590	
	Insurances	6.605	,544	
	Clothing and footwear Industries	38.815	,440	
	Restaurants and Hotels	31.703	,423	
	Rest Industries	7.199	,408	
	Personal Services	12.390	,376	
	Banks and rest Economic Institutions	20.136	,363	
	Printing, Publications and relevant activities	12.952	,315	
	Services of Recreation and Culture	7.475	,108	
	Medical and Sanitary Services	27	,069	
INDUSTRIL USES	Industries of products from tyre and plastic material	10.311	,468	5,04
	Textile Industries	31.359	,434	
	Industries of not metal mining products	10.283	,407	
	Industries of Furniture and goods of furnishing	14.425	,383	
	Industries of Timber and Cork	8.642	,346	
	Industry of Food except drinks	20.805	,267	
	Chemical industries	13.239	,265	
	Basic Metallurgic Industries	1.618	,241	
	Wholesale trade of Litter and Clippings	516	,234	
	Manufacture of machines and appliances	8.686	,210	
	Manufacture of electric machines, appliances and remaining tyres	15.409	,103	
	Tobacco industries	3.683	,039	
INDUSTRIAL USES	Industries of Oil and Mine products	659	,505	4,71
	Mobile Renting	872	,333	
	Paper Industries	5.679	-,182	
INDUSTRIAL USES	Transports	83.039	,600	4,4
	Leather and furs Industries	3.669	-,273	
	Manufacture of Carrier means	32.871	,266	
	Storages	590	,154	
INDUSTRIAL USES	Drinks Industries	4.322	,719	4,00
	Manufacture of metallic products	21.791	,680	
	Communications	14.922	,171	
	Services of Hygiene and Cemeteries	2.533	,078	

THE LAND USES GROUPINGS IN 1991

Component	Economic activity	Employees	Loading	Variance
Private Central activities	Health and social activities	43.560	,734	10,86
	Public administration and defence, social insurance	98.758	,708	
	Intermediary finance Organisation	22.597	,699	
	Retail trade	98.302	,631	
	Recreation, cultural and athletic activities	21.031	,612	
	Insurances	8.122	,558	
	Publications and printings	13.323	,515	
	Hotels and restaurants	36.239	,450	
	Other activities of services	14.857	,361	
	Information technology and relevant activities.	2.898	,347	
	Air transports.	10.107	,332	
	Chemical goods production	9.124	,313	
	Medical tools production	1.489	,174	
	Activities relevant with the activities of intermediary financing organisations	660	,136	
Public central activities	Research	14.705	,796	9,49
	Wholesale trade	54.693	,678	
	Organisations	7.677	,664	
	Water collection, cleaning and distribution.	15.848	,625	
	Recycling	1.661	,550	
	Manufacture of paper pulp, paper and products from paper	6.705	,549	
	Post offices and telecommunications	17.095	,508	
	Textile Production	17.047	,438	
	Coke Production	4.073	,362	
	Equipment Renting	1.731	,345	
	Equipment Manufacture	1.236	,185	
1st grouping Industrial uses	Constructions	57.656	,625	8,09
	Clothing manufacture	26.364	,612	
	Land transports and transports via conductors.	35.015	,603	
	Furniture manufacture	15.769	,548	
	Leather production	7.757	,519	
	Manufacture of metallic products	11.184	,505	
	Industry of foods and drinks.	13.992	,501	
	Production of engines	5.519	,389	
	Vehicles retail sale, maintenance and repair of cars of, motorcycles.	31.010	,375	
	Manufacture of tyre products.	4.986	,360	
	Timber Industry	3.796	,297	
	Manufacture of other products than not metal mining	5.429	,271	
	Electric engines production	2.344	,258	
2nd grouping Industrial uses	Basic metals production	5.894	,556	3,73
	Cars production	3.405	,514	
	Tobacco production	3.621	,459	
	Computer production	961	,374	
	Real estate	945	,200	
Transports	Water transport	16.283	,718	2,64
	Equipment of transport production	13.255	,513	
	Auxiliary and relevant to the transports activities, activities of travelling agencies.	13.253	,469	

THE LAND USES GROUPINGS IN 2001

COMPONENT	ECONOMIC ACTIVITY	EMPLOYEES	LOADING	VARIANCE
Mixture of central and industrial uses	Constructions	94.135	,860	22,09
	Clothing manufacture	22.835	,840	
	Hotels and restaurants	67.740	,800	
	Retail trade	147.567	,799	
	Manufacture of metallic products	13.159	,720	
	Furniture manufacture	17.486	,707	
	Recreation, cultural and athletic activities	35.652	,695	
	Auxiliary and relevant to the transports activities.	26.644	,670	
	Food manufacture	20.966	,654	
	Publications	24.419	,639	
	Land transport	41.950	,585	
	Administration and social seervices	120.173	,571	
	Other services.	19.860	,568	
	Textile manufacture	7.656	,567	
	Trade	46.551	,540	
	Plastic equipment manufacture	3.126	,529	
	Timber manufacture	6.110	,498	
	Paper production	3.216	,477	
	Basic metals production	4.287	,459	
	Leather production	6.679	,411	
	Organisations	3.890	,376	
Central activities	Financial enterprises	35.652	,697	12,92
	Education	85.806	,677	
	Health	75.940	,618	
	Information technology and relevant activities.	13.103	,561	
	Post offices and telecommunications	21.398	,525	
	Insurances	14.201	,511	
	Travel agencies	8.423	,488	
	Air transports.	9.113	,418	
	Chemical goods production	11.258	,411	
	Equipment renting	1.437	,234	
Industrial uses	Recycling	1.017	,699	8,06
	Tobacco pruduction	2.552	,623	
	Oil and fuel Production	3.932	,610	
	Vehicles trade	34.929	,508	
	Research	2.583	,463	
	Computer production	1.132	,409	
	Real estate	1.653	,341	
Advanced industries	Electric engines production	8.518	,508	3,76
	Medical tools production	2.532	,427	
	Production of engines	2.405	,316	
	Radio, tv and communication equipment production	1.630	,298	
	Cars production	1.001	,232	
Transports	Transport	21.335	,849	2,15
	Manufacture of transports equipment.	9.317	,394	

Tables 1-3.

The decade from 1991 to 2001 was characterized by the constant review of the existing plans that faced difficulties in their application as they did not face the obvious demands of the city's function. The census of 2001 employment shows that it has increased in a 38% percentage (from 898.307 in 1991 to 1.245.542 in 2001). This increase is recorded in manufacture and industrial activities (22,4%) and in the tertiary sector (38%) The P.C.Analysis has revealed that, the five groupings that are extracted explain 49% of the total

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variance of the existing employment situation (Table 3).. The first grouping presents a high mixture of central, industrial and manufacturing land uses as it contains 22 of the total 51 urban functions, explaining at the same time 22,09% of the total variance. The second grouping contains 9 central activities and only one manufacture activity. It is obvious that the land uses are creating groups in a bigger degree in relation with 1991 and also that land uses are still mixed without a strict functional criterion.

5 THE ALLOCATION OF THE LAND USES GROUPINGS

For the examination of the land uses groupings allocation, the revealed components are grouped in three categories: the central, the industrial and the mixed groupings. The distribution of the components of the three dates in each of the above three categories is shown in table 4.

SHAPED GROUPINGS			
DATES	**CENTRAL FUNCTIONS**	**INDUSTRIAL FUNCTIONS**	**MIXTURE OF CENTRAL AND INDUSTRIAL USES**
1978	Central daily needs land uses, (1st)	2nd , 3rd, 4th, 5th Industrial land uses	
1991	Private central uses(1st) , Public central uses (2nd)	3rd, 4th, 5th	
2001	Central land uses (2nd)	3rd, 4th, 5th	1st

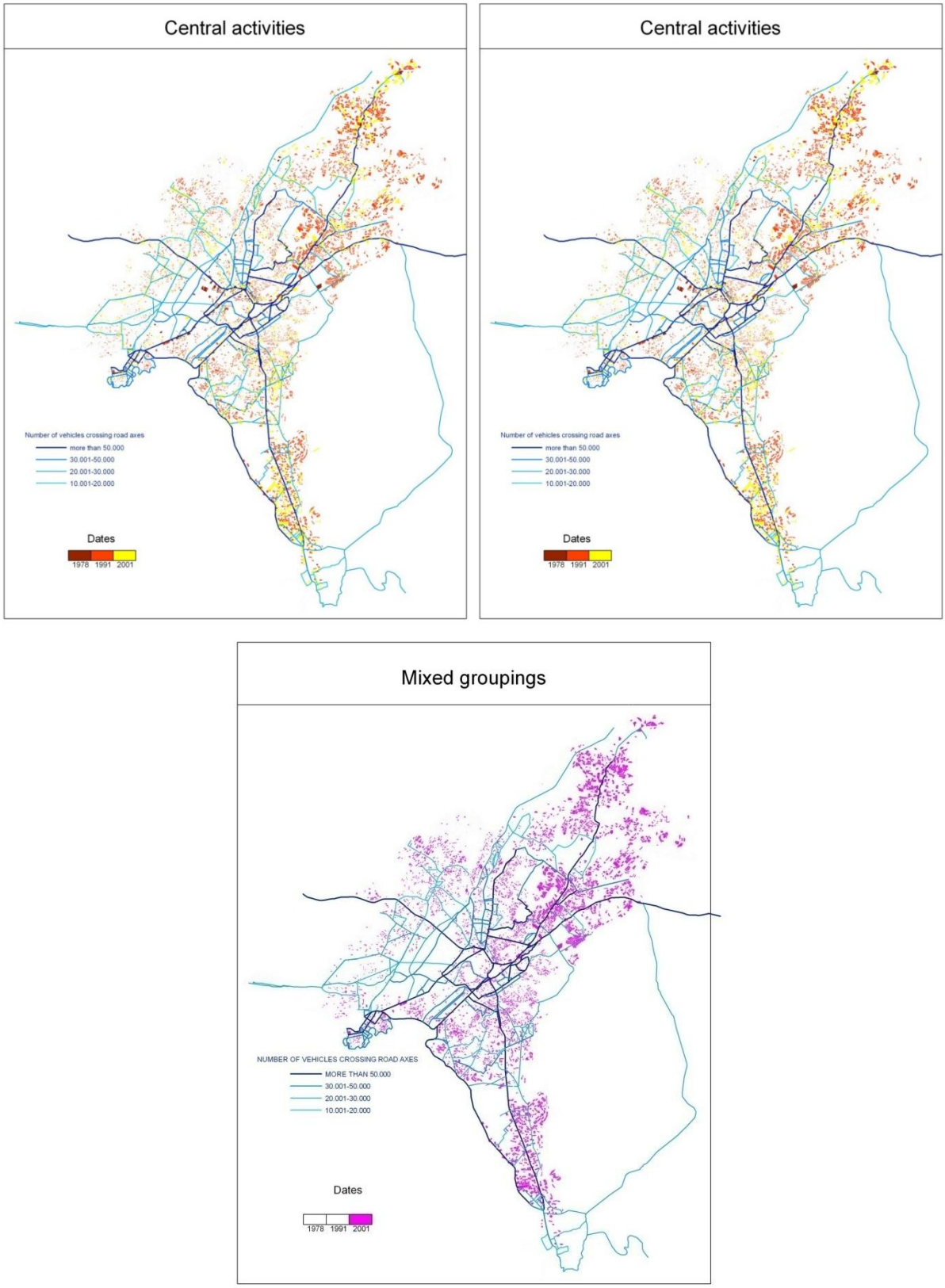
Table 4.

The areal investigation of land uses behavior shows that:

As for central functions, in 1978, the first grouping is allocated in the central core of the basin while other central functions cores and autonomously functioning sectors have not yet been created. In 1991, the central functions are allocated not only in the existing since 1978 core, but have extended on axial form on avenues that lead and cross high-income suburbs. In 2001, central activities are allocated with scattered form in the basin's total, more intensively in the south, north and east basin and will less intensity in the west. We conclude that the existing central functions cores are expanding with different intensity, towards all areas, so autonomuslly functioning central cores are created and that the basin is totally served (Map 1).

As for industrial and manufacture functions, the initial cores that were allocated in 1978 in the basin's total, were extended in 1991 in wider regions and more intensively in the west basin, that still remains the traditional industrial degraded area. In 2001, the mapping of the industrial and manufacture groupings show that they have remained steady in the same areas, as they have not extended or shrinked (Map 2). Therefore, although the employment in this sector has increased it is still concentrated in the same areas, co-existing with tertiary activities. It is concluded that the segregation of uses and the creation of functional zones with specific functions is not created while on the contrary everything is allocated everywhere but with some restrictions regarding not the existing plans, but the optimum service of the urban areas criterion that provides the best profit for these activities.

In 2001, the majority of the recorded cases shows that tertiary and manufacture activities are more intensively mixed. Therefore, the thematic mixture of land uses remains random in the majority of the recorded cases. In the north south and east basin in 2001 the new mixed uses groupings are scattered in all areas where intense central functions groups are also allocated. It seems that the activities of this grouping, that are mixed in a random way, are allocated with the criterion of the maximum coverage of the until then not satisfactory served areas. Therefore, new enterprises of all kinds avoid the congested center and prefer areas that had not until then developed functional centers but had increasing population. So, autonomous areas have started to develop, concentrating all kinds of functions. This auto-regulation that is not exactly following the legislated plans, that tend to sub-centers creation, show that traffic minimization has up to a point been achieved, while autonomously functioning sectors are created with a big degree of randomness. It is concluded that a thematic and areal balance has not yet been achieved. This phenomenon is related to the constant employment and population increase of many areas assisted by the freedom that is provided by the existing legislative framework.



Maps 1-3.

6 CONCLUSION

The subject of the current conference, as posed, leads to the search of the way of grouping of the land uses into the urban body. The structural investigation of an urban body formed during almost a quarter of a century without practically any interference shows clearly that the expected groupings are not steady but for different reasons they change adjusted to the total urban function. Again we are facing the Heiraclitus

famous saying "everything flows". We cannot compare directly the three structures because they result from three different matrices that contain different data from three dates that cover 23 years of the city's life. Our comparison will be nominally and conceptually only from the results of the revealed structures level.

The revealed parts of the city (groupings of land uses) in the three examined dates aim to the regard that the land uses are grouped according to their arising urban functional relavance and simultaneously according to their own optimum function in the total city's frame. Initially it is not possible to imagine a completely clear and rational layout of the thematic and areal defined "parts" of the city. This happens because the city's function is very complicated and also it is accumulatively developed. The revealed results of the analysis are constituting the creation of new theoretical dimentions, namely new parts of the city's function which present the best possible areal distributions. These "parts" are composed by phenomenically random groupings of the recorded urban functions. They result from a numerical classification, based on their linear relations and show that there is a phenomenically random allocation of the urban functions anywhere and anytime. The mapping of these "parts" shows on the contrary that they are areally mixed not randomly but according to a certain URBAN FUNCTIONAL AUTO-REGULATION.

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Looking for New Ideas of Public Space – Public Space Projects in Gdansk Reinforced by Art Activities

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1 ABSTRACT

Revitalization of public open spaces is a complex enterprise in Poland in terms of the art, cultural and information aspects of this process. Simultaneously the public space should play an important role when building the quality of revitalization programs and the quality of city development. The new art and cultural activities are the revitalization tools, which are also the good examples of bottom up ideas helping to start a process of change in the degraded urban areas.

The art and cultural projects, both in Young City of Gdansk (former shipyard areas) or in the Dolne Miasto (historical, degraded city centre district of Gdansk) shows that it is a real need of implementing such ideas and treating them as an important urban operational tools of the revitalization program.

The Wyspa Progress Fundation and the LAZNIA Center for Contemporary Art are very interesting initiatives which not only enable to transform the public space but also help to bring art into the urban space. The Wyspa Institute of Art is located in the building of the former Basic Shipbuilding School in the Gdansk Shipyard. It has become a home of the Wyspa Progress Foundation, an innovative artistic organization combining the presentation of contemporary art with reflections on the shape of social culture.

LAZNIA Centre for Contemporary Art is an animator of a new artistic project whose aim is to create a permanent collection of artworks in the urban space, called the Outdoor Gallery of the City of Gdansk. It is supposed to act as a stimulus to change the character of the district, where the institution is located. It should join the process of social and architectural transformation of this run-down district of Gdansk, called the Dolne Miasto, cooperating in a long-term revitalization plan.

Both projects (The Wyspa Progress Foundation and the LAZNIA Centre for Contemporary Art) are starting to be the catalyst of change in the revitalization areas of Gdansk. Due to revitalization process the degraded urban structure should be closer to meet the needs of people in their everyday life.

2 THE ROLE OF ART IN A PUBLIC SPACE WHEN CREATING THE REGENERATION PROGRAMME

2.1 Public space as an important element of building the regeneration program

The public space should play an important role when building the quality of revitalization programs and the quality of city development.

The public space and the whole strategy of building public space are a key element of regeneration programs. Building these programs is a multi-dimensional task based on spatial projects as well as on the „soft“projects related to local community. It is essential that designing the attractive public space for revitalization program is one of the most important factors that decide about its success. The attributes of a good public space like aesthetic and compositional attractiveness should have decisive role when creating city regeneration program (Zuziak p. 28-38).

The mentioned public space could not be only a showroom but should fulfill a further more important role – should be the heart of urban activities, determinant of local identity and a key element of structural conjunctions. Only this kind of space could be important for the local community (the actor of urban regeneration program) and have the significant role in the whole regeneration process.

2.2 Why exactly art in a public space

Speaking about public space it would be essential to understand what is the relationship between the public art initiative and urban regeneration program.

Commonly known examples of the artistic district (South Houston – Soho in New York, Marais in Paris, El Raval in Barcelona) demonstrate how art is important when creating the identity of degraded urban space. These districts attract the artistic bohemia, architects, and designers. The built-up area, former degraded, receives a new architectural value by converting into artist work-rooms, mansard roofs, galleries or museums.

Worldwide there is also the action of implementing the pieces of art in a public space. The actions organized by the Public Art Fund in New York (Manhattan, Rockefeller Center) or creating a permanent collection of art in Potsdamer Platz in Berlin or in Liverpool could be a good representation of it. What is more, Public Art Fund in New York has been committed to working with emerging and established artists to produce innovative exhibitions of contemporary art throughout New York City. By bringing artworks outside the traditional context of museums and galleries, the Public Art Fund provides a unique platform for an unparalleled public encounter with the art of our time.

It should be underlined that art in a public space is also an alternative for art in galleries and is a chance for artists to obtain a mass consumer as well as capture the individuals that do not have contact with art in their everyday life.

The types of public art involved in urban regeneration programs depend very much on the type of regeneration programs. For example Tim Hall and Iain Robertson demonstrate that we can recognize a broad distinction between flagship, or prestige, revitalization projects and communal regeneration projects. These have been summarized by the Policy Studies Institute as:

- contributing to local distinctiveness
- attracting companies and investment
- having a role in cultural tourism
- adding to land values
- creating employment
- increasing the use of open spaces
- reducing wear and tear on buildings and lowering levels of vandalism. (1994,p. 38)

3 PUBLIC SPACE PROJECTS IN GDANSK REINFORCED BY ART ACTIVITIES

3.1 Revitalization of Dolne Miasto in Gdansk through the art

The Dolne Miasto in Gdańsk is a historical, degraded urban district which is located in the close neighborhood of city centre (Głowne Miasto) however isolated. The Dolne Miasto is indicated as a pilot revitalization area due to its high cultural values. Furthermore it is the only part of a historical downtown that was not destroyed during the war. The second important factor is the necessity of immediate renovation activities in this area. The district of Dolne Miasto has got a specific genius loci because of its urban blocks, historical buildings (great examples of architecture dates to XIX century), characteristic public spaces. However the area is degraded and its state is becoming exacerbated. This situation ultimately affects social processes.

The stimulus of change in Dolne Miasto is LAZNIA Centre for Contemporary Art. It is an animator of a new artistic project whose aim is to create a permanent collection of artworks in the urban space, called the Outdoor Gallery of the City of Gdansk. The collection of the Gallery is supposed to be created by years and the works of arts are chosen in the international competitions. The important works which have already appeared in Dolne Miasto are: LKW Gallery by Daniel Milohnic and Alexander Rijkers from Germany, Staging Anonymous by Dominik Lejman, Invisible Gate by Front Studio from New York or Untitled by Esther Stocker from Austria.

The LKW Gallery by Daniel Milohnic and Alexander Rijkers is the lorry in a viaduct, a symbolic representation of mental barrier between Dolne Miasto and the rest of the city. Due to its construction it is easy accessible and simultaneously it is a place where workshops for children, exhibitions, concerts are being held. As authors say the LKW Gallery shall help to build a passage at Szopy-road, between Dolne Miasto area and the centre in order to integrate the district into the city of Gdansk. Furthermore the passage shall be an impulse for further artistic work and creation. The non-area under the bridge is transformed into a place of communication.

In December 2009 a new installation called the Invisible Gate design by Front Studio from New York won the competition. This is an urban, monumental project that has got influence on a city scale. Moreover the

Invisible Gate is characterized by a wide symbolic meaning thanks to the form of mirrors, reflections and pictures of architecture, people and river giving a wide range of interpretations.

The Outdoor Gallery of the City of Gdansk is an important and necessary element of the revitalization of the Dolne Miasto and plays a great role in eliminating social problems - through the art. Competitions of the Outside Gallery of the City of Gdańsk are a part of actions of the artistic practice as well as they are creating social behavior. The project is the part of the wider program which helps to improve living conditions in the housing areas. It also enables to change a character of the district and helps to create a unique collection of art in the urban space.

Fig. 1: The Invisible Gate design by Front Studio from New York. Photo by Anna Szynalewska

3.2 When the art becomes too difficult

Broadly promoted strategy of revitalization of Dolne Miasto through art is one of the most important issues related to LAZNIA activities. When presenting the program for 2010 there were a lot extreme opinions about the entire project: from the full of hope beliefs that Dolne Miasto will be a social laboratory to the very critical ones.

What is even more interested the inhabitants itself do not pay so much attention to the project.

When reported by Weronika Korbal, the respondents were rather insensible to theatrical character of installation by Dominik Lejman or other works presented by The Outdoor Gallery.

On the other hand the workshops for children organized by LAZNIA (e.g. architecture for the youngest or workshops with Front Studio) were very much approved by the local community.

This example shows that the art in public space, as a revitalization tool, will have a proper meaning only then when it will involve the local community.

3.3 The Wyspa Progress Foundation on the post- shipyard areas

The Gdansk Shipyard is a significant place, simultaneously symbolic in a mass memory of polish people. It is a place of freedom and place of birth of Solidarity in 1980 as well as the place of difficult experiences of transformations. In 1990 when the shipyard was adjudged bankrupt the city decided that on the post-shipyard areas will be a new city centre district called Young City of Gdansk. To start a process of change and revitalization of the area the artists were asked to liven up the space. The aim was to create the cultural space open for the city.

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Fig. 2 : The Wyspa Progress Foundation. Photo by: Joanna Kurkowska

In 2004 the Wyspa Progress Foundation was founded by Grzegorz Klaman and Aneta Szyłak in the building of the former Basic Shipbuilding School in the Gdansk Shipyard.

The Wyspa Progress Foundation is an innovative artistic organization combining the presentation of contemporary art with reflections on the shape of social culture. There is a place for workshops, library, club and exhibition. The artistic actions and exhibitions can be also found in the open space of Gdansk Shipyard.

Fig.3 : The Young City of Gdansk and the Wyspa Progress Foundation (IS WYSPA). Source: www.mlodemiasto.pl

But first of all the Wyspa Progress Foundation is a bottom up idea helping to start a process of change in the degraded urban area. However this process is not easy. The field researches led by Professor Joanna Tokarska Bakir (2008) show the differences in understanding the space of transformed shipyard by the social groups. For the artist this space is connected with symbols, history and the magic of post-industrial area. In the contrary the former shipyard workers emphasize the economical and the political context. In the same time both groups are afraid of the new investments and criticize the commercialization of the Young City project.

4 CONCLUSIONS

Public art can help alleviate a wide range of urban and social problems. In the same time it can be a good revitalization tool only then when it will involve the local community in the process of change. Both Gdansk' projects (The Wyspa Progress Foundation and the LAZNIA Centre for Contemporary Art) shows that revitalization process can be started due to art . It is also important that this kind of initiatives should have the wider context as well as they should reflect the processes of revitalization of the degraded urban substance.

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Memorable Square: Identities, Meanings and the Production of Urban Space in Yogyakarta, Indonesia

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1 ABSTRACT

Traditional space in Yogyakarta Indonesia is called alun-alun. It takes form as a square, which is located in front of the palace and is surrounded by essential buildings. Taking all into account, alun-alun is located in the area, which represents the power and civilization symbol. The initial function of alun-alun was not intended to serve royal purposes and show the grandeur of sultanate. Through history, alun-alun has been changing its role and becoming merely to be public space. It has experienced various tensions over its reproduction and control ranging from the issue of privatization, commercialization, and misuse to the tension between modernization and conservation. The mushroomed of street vendor and the absence f institution and management together with the lack of planning regulation have been declining the importance of alun-alun. Waiting for the ideal form of future alun-alun through debates among stakeholders has been creating negative impact and left this place abandoned.

2 ALUN-ALUN IN THE EARLY FORMATION OF KASULTANAN YOGYAKARTA (1755-1880)

2.1 Introduction

The establishment of Yogyakarta city was initially begun with the construction of the king's palace (kraton), while its architecture reflects the Javanese view of the cosmos. Within this overview Yogyakarta and its kraton is considered to be the imago mundi, the replica of the universe, where maintaining the balance between macrocosm and microcosm was fundamental. At the core of Javanese philosophy is the concept of dualism that shows the balance through dialectical interaction of opposites, such as interconnection of mountain and sea, solid and void and north and south. Two other important Javanese philosophical concepts are symmetry and hierarchy. Symmetry relates to the design and layout of buildings, while hierarchy could be seen in the arrangement of each building components and its relationship to other parts. These concepts of dualism, symmetry and hierarchy are strongly reflected in the layout of kraton and its two open spaces.

Spatially, kraton is a residence complex of the reigning king of Yogyakarta Sultanate. Taking a form of Javanese house, kraton contains series enclosures which each encircled by wall and a main gate. Each enclosure consists of courtyard with several open and closed pavilions. A pavilion without wall surrounding it is called bangsal or tratag, while the closed one is called gedhong. According to this Javanese house pattern, a large open space adjacent to bangsal could be considered as the courtyard of kraton complex. It has two open spaces on the northern and southern parts following the north-south axis, which are called alun-alun. The words alun-alun at least is interpreted in two ways. It comes from word 'alun' or the wave since it is an open space which is covers by sand like an ocean. Other believes it comes from words 'alon-alon', which means 'walk slowly' due to old Javanese custom. In the past, people who would be facing the king in the sitihinggil has to prepared themselves, started from alun-alun they had to walk slowly and set the pace in connection with royal procedures.

2.2 Alun-Alun Under Sultanate Power

The concept of hierarchy has put northern parts of kraton as the front and considered more important, while southern parts were considered pengkeran or the backside.Northern alun-alun covers an area of 310x 280 m2 which is bigger that southern alun-alun which only covers an area of 160x160m2. It took form as an open square located in front of bangsal pagelaran. The illustration of early kraton and northern alun-alun could be interpreted from a sketched by A. de Nelly in 1771 (Figure 1). Southern alun-alun was encircled by tapered wood fences called pinacak suji and guarded by Javanese royal soldiers armed with keris, a javanese dagger, and spear. Those indicated the importance of this space.

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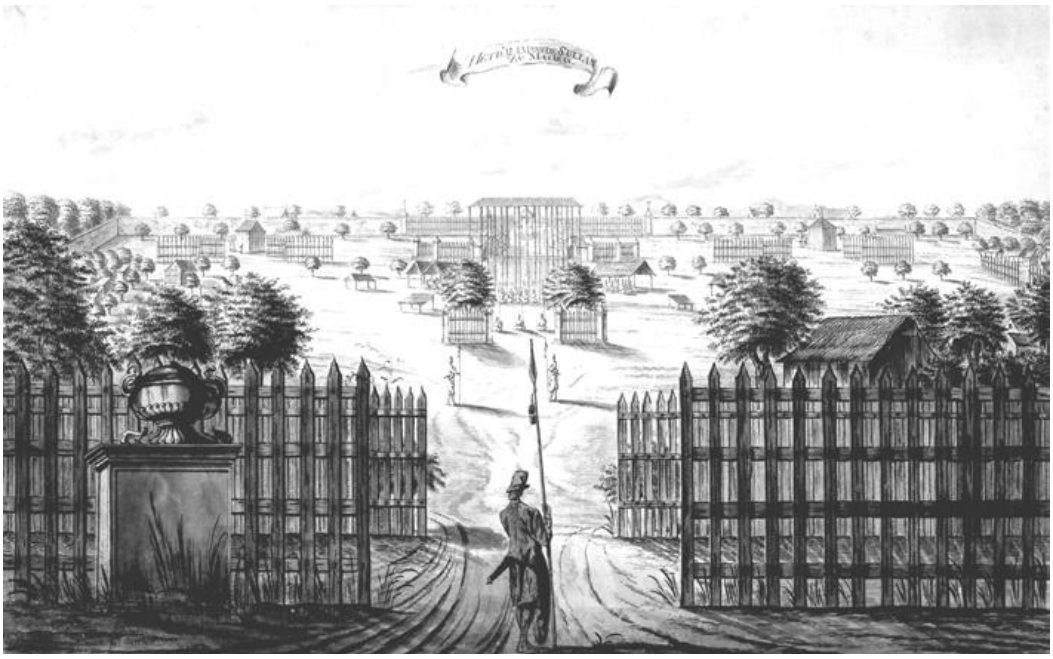

Figure 1. View of the Yogyakarta kraton from the northern square (alun-alun) sketched by A. de Nelly, one of Johannes Rach's pupils, in circa 1771.Source: Courtesy of the Rijksmuseum, Amsterdam as cited in Peter Carey 2008.

The surface of northern alun-alun was covered only by fine sand represented the shorelesss ocean which in turn is a universal image for the infinity of God. The center of square was completely released which make two banyan trees dominated the view. A pair of banyan trees called Kyai Dewandaru and Kyai Janandaru represents the idea of macrocosm and microcosm. Kyai Dewandaru represents the union of sultan and God, where dewa literally means god and daru or andaru symbolizes wahyu (divine radiance). Kyai Janandaru represents the unity of sultan and his subjects, where jana literally means human to characterize humanity in general and the population of sultanate in particular. Together they represent the two aspect of the Javanese doctrine of 'manunggaling kawulo lan gusti' (the unity of servant and lord). While the two banyan trees at center of alun-alun are primarily a symbol of mystical knowledge and the infinity of God, sixty-two banyan trees represented the age of Prophet Mohammad when he died also surrounded it. The boundless ocean and mystical union represented by twin-fenced trees at the center realizes the essential unity of creator and the created.

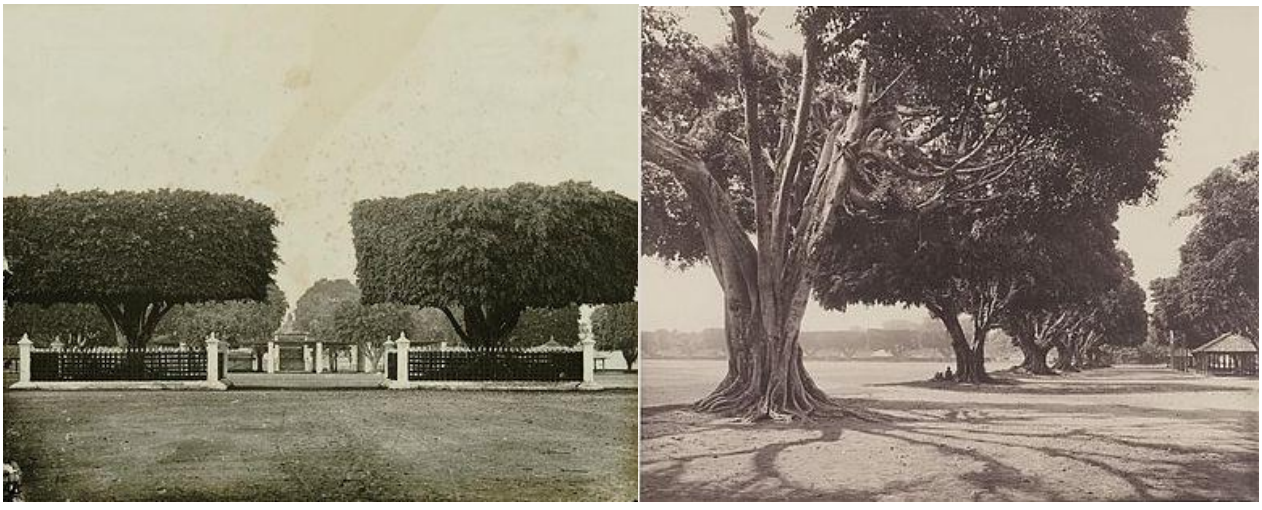

Figure 2. Banyan trees in northern alun-alun in year circa 1990. Source: Courtesy of KITLV/Royal Netherlands Institute of Southeast Asian and Caribbean Studies

Northern alun-alun was encircled with some important buildings in term of its size and function. The main building around northern alun-alun is pagelaran kraton (palace hall) which functioned as the main audience hall of the kraton and a transition space before entering a space for the throne of sultan. Along the western edge there is a complex which belongs to masjid agung (great mosque). Great mosque is separate component

of kraton compound but play strong role to legitimate king position where sultan as the representation of God is the head of religion. The square was surrounded by tall banyan trees and several pavilions called pekapalan which come from word kapal means horse or a place to tighten horse while the rider take a rest. Pekapalan was a rest place for bupati (regent) from Kasultanan Yogyakarta territory, when they had to face the king. Other buildings on the edge of northern alun-alun were tiger cage and pamonggangan, a place to store gamelan. King used to conserve wild animals like tiger and elephant, which symbolize his strong sovereignty (Lombard 2008).

Despite the strong presence of dominant power, historically alun-alun was central to both the physical and cultural lives of its people. Alun-alun was the only space of the palace that was publicly accessible. While it did not function as a democratic space, it nonetheless had a more civic nature than its surroundings, although this was rather symbolic. This space functioned as an arena for public activities sponsored by the ruler and the religious ceremonies to celebrate the ruling power of the king. Among various royal ceremonies, there were garebeg and sekaten.

The garebeg was a ritual of veneration, which includes praying, offering, and distribution of gifts and alms. It is held three times a year according to three major Islamic festivals that are Mulud, Poso and Besar. Garebeg Mulud commemorates the birthday of Prophet Mohammad, while other garebegs celebrate the end of the fasting months (Garebeg Pasa, Bakda or Shawal) and great Eid (Garebeg Besar). The ritual of garebeg consisted of a procession of royal troops, nobles and abdi dalems (retainers) bearing pusaka (heirlooms) and gunungan (a rice-mound) moved out of the inner complex of kraton towards the great mosque. Food offering are given to the mosque officials and other abdi dalem, and each of sultan subject should receive a portion of gunungan. The garebeg was importantly the occasion upon which taxes owed to the royal center were collected from all territories. It was on Garebeg Mulud that kraton claimed its share of harvest and collected taxes from the people. Hence, Garebeg Mulud could be considered as a symbolic form of sacrifice in which the farmers in hierarchical agrarian society would pay tributes to their ruler in exchange for divine blessing producing fertility in their crops. Garebeg was also a chance for people to see their king. Sultan appeared out of the place accompanied by high-rank royal families and officers sat on his throne while his subjects converged in northern alun-alun to worship their king. The coming of people in northern alun-alun implied loyalty and devotion of the people to their king, which in turn was also meant as recognition of king' power and authority over them. The combination of mystical union and the garebeg are thought to establish the prosperity, social and spiritual tranquility of the state and to define ideal social relationship in term of union of servant and lord.

Sekaten was the series of Garebeg Mulud held a week precede it. The fundamental parts of Sekaten was the appearance of two set of gamelan, Kyai Nogowilogo and Kyai Gunturmadu in the great mosque which are played simultaneously three times a day within a week. Besides the gamelan performance, sekaten is an annual event to provide public entertainment and a night fair runs enliven it for a month. Sekaten fair was not only to attract people from village, but also to provide entertainment to those who came to pay their taxes.

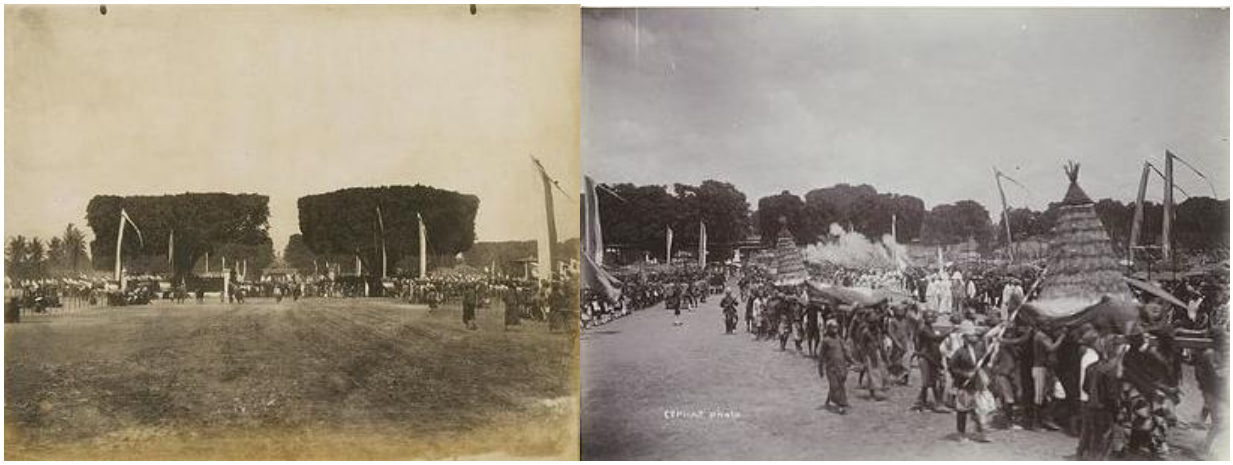

Figure 3. Garebeg procession in northern alun-alun Yogyakarta in the early 1990s Source: Courtesy of KITLV/Royal Netherlands Institute of Southeast Asian and Caribbean Studies

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In the eighteen and early nineteenth century, the participation of the troops in the procession was a clear symbol of the sultan's military power. The sultan troops were at the time more than a symbol. They provided security and posed a clear threat to real and potential rebels and to the Dutch. The celebration was marked by the obligatory attendances at court of all the provincial nobility and all the kingdom officialdom. Participation in the ritual was an act of political submission and those who refused to attend could be executed for treason (Woodward 2011). Garebeg in the eighteen century was also arenas for elite political competition precisely because all of the contending factions were required to appear at court. Indeed, it was at this celebration that the unity of the kingdom was determined and reaffirmed precisely by the differential attendance of the provincial elite alongside the elite of capital.

3 ALUN-ALUN IN THE ESTABLISHMENT OF COLONIAL STATE (1880-1940)

The role of both alun-alun was closely related to the role of kraton as the center of political, military and ritual activities of Yogyakarta Sultanate. The balance between these organizational principles has shifted along with the political fortunes of the Sultan. There were massive changes happened in Kasultanan Yogyakarta in the early 20th century. VOC (Dutch East India Company) went bankruptcy in year 1799 and Royal Dutch Government took the control over its colonies. The arrival of Daendels, the Dutch governor general in 1808 marked the start of new and more aggressive policy toward the court. It placed the court in clearly subordinate position to European government. Since then the inharmonious relationship between sultan and Dutch came into surface. The renovation of most buildings in kraton complex shows the attempt of sultan to restore his cultural dignity in the midst of his decreasing political roles. Bangsal Pagelaran became the façade of kraton and marked the changing orientation of kraton to be more open. It followed with the construction of Sono Budoyo Museum and Soboharsono Theater surrounding northern alun-alun. The sacredness of kraton as well as alun-alun is gradually decreasing and becoming more public.

The changing political role of sultan in early 19th was also evidenced in the activities, rituals and processions taken place in alun-alun. In earlier time, the role of southern and northern alun-alun was related to the role of kraton as the center of political and military activities of Yogyakarta Sultanate. By the early nineteenth century, many of the functions of royal bodyguard regiments were of a ceremonial nature, although they still take to the field. The demise of the political authority and military power of the sultanate in the nineteenth century led its military, political functions to be redefined as ritual.

As Dutch colonial power grew, Kasultanan Yogyakarta became more and more of a theater state in which ritual replaced military and economic power as the foundation of royal prestige and authority. These political changes also impacted on the role of alun-alun as the space for conducting and representing the grandeur of kraton Yogyakarta. This is evidenced in the activities, ritual and procession taking place in alun-alun which was still a place for holding kraton rituals such as garebeg and sekaten although their message was fundamentally changed. The Garebeg as the grand gathering is no longer a state rite that unites the entire regions through a ceremony of gratitude for a bountiful harvest and the spreading of blessing from their king. The ritual and procession had been simplified and military parade was just the part of ritual. It is rather a cultural ceremony that its symbolic role is limited to the religious realm and the preservation of tradition, although it is argued that during the colonial period state ceremonies were used as a mode of symbolic resistance of colonial hegemony. Royal ceremony and ritual could not be used to show his authority, when royal military troops was eliminated to be just a ritual during garebeg. This aspect of ritual is subject to almost constant change. The number of gunungan decreased which could be interpreted as the sign of decreasing wealth and teritory, although the obligatory attendance at the court of all the provincial nobility was maintained until 1939s. Kasultanan Yogyakarta lost most of his outer territories while inner territory was shared with other court, Pakualaman in year 1813.

The role of both alun-alun was closely related to the role of kraton as the center of political, military and ritual activities of Yogyakarta Sultanate. The balance between these organizational principles has shifted along with the political fortunes of the Sultan. There were massive changes happened in Kasultanan Yogyakarta in the early 20th century. VOC (Dutch East India Company) went bankruptcy in year 1799 and Royal Dutch Government took the control over its colonies. The arrival of Daendels, the Dutch governor general in 1808 marked the start of new and more aggressive policy toward the court. It placed the court in clearly subordinate position to European government. Since then the inharmonious relationship between sultan and Dutch came into surface. The renovation of most buildings in kraton complex shows the attempt

of sultan to restore his cultural dignity in the midst of his decreasing political roles. Bangsal Pagelaran became the façade of kraton and marked the changing orientation of kraton to be more open. It followed with the construction of Sono Budoyo Museum and Soboharsono Theater surrounding northern alun-alun. The sacredness of kraton as well as alun-alun is gradually decreasing and becoming more public.

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4 ALUN-ALUN IN THE EARLY INDONESIAN INDEPENDENT ERA (1940-1990)

Kasultanan Yogyakarta underwent significant changes during this period. Internal transformation had started after Hamengkubuwono IX ascended the throne in year 1940. Dutch authority on Yogyakarta was taken over by Japan in year 1942-1945. Although Japan did not explicitly take over the political agreement between sultan and Dutch government, the system of indirect rule over Yogyakarta was maintained. Kasultanan Yogyakarta had independent authority to regulate and manage its territory under the supervision of the colonial government. Dutch colonial government called these territory as zelfbestuurende lanschappen while Japan colonial government as kooti. Soon after the defeat of Japan, Indonesia declared its independence on 17 August 1945 and Kasultanan Yogyakarta joined to Republic of Indonesia on 5 September 1945.

During the early years of its independence, the position of this new republic was not yet fully stable, coupled with the intention of Dutch to recapture its former territories through military aggressions. Kasultanan Yogyakarta as a more well established court took important role in defending the sovereignty of Republic of Indonesia. In this revolution period, the center of Indonesian government who was formerly in Jakarta was relocated to Yogyakarta under warranty from Hamengkubuwono IX. Kraton Yogyakarta became the center of Indonesian revolution. In the early period of Indonesian independence, Yogyakarta also became a place for national revolution when it became the capital of Indonesian Republic in year 1946-1949. Yogyakarta became a special region in Indonesian Republic largely because of the central role that Hamengkubuwono IX played during Indonesian revolution. Northern alun-alun became a site for Indonesian independence movement and activities related to nation building were echoed from this square. Indonesian national army was formed in year 1946 and the parade was held in northern alun-alun led by first president Soekarno. Northern alun-alun was strategic place for mass mobilization such as political oration by Sukarno during the celebration of international Labor Day in year 1948.

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Figure 4. Indonesian national movements in northern alun-alun in year 1946 Source: Collection of IPPHOS, Indonesian National Archives.

The next transformation was on the royal ceremony and rite. Hamengkubuwono IX viewed splendor through party and ceremony as a colonial legacy, where Dutch colonial power let the king and nobility to be complacent in luxurious life (Soemardjan 2009). The important rites were simplified without reducing its cultural, religious and magical significances attended only by officials and members of royal families. Hence the essence of each ceremony is retained but its pomp and splendor had been uninstalled. Among others, jamas pusaka (ritual of heirlooms bathing) is maintained but conducting without lavish and outstanding ceremony as the earliest times. Even the luxurious garebeg has been reduced to normality. Its Offerings and praying remained to be conducted in accordance with tradition, without compulsion for the local officials to be present and pusaka was no longer displayed during the procession. Garebeg were continues to be held three times a year where a lot of people came to watch the procession from sitihinggil to great mosque and scrambled the gunungan as a sign of king' blessing (Figure 6-21). The absent of local officers attendance was a result of government system, where their presence and homage from were no longer a symbol of loyalty to the king.

The event of sekaten had also changed its form. During previous years, at least until the period of Hamengkubuwono VIII, sekaten was originally seen as a means of supporting garebeg. At the beginning of Japanese occupation in year 1942, sekaten was installed with other shows and government stands also took part. This night market and exhibition lasted until the Indonesian post-independent in year 1950 when sekaten was held for thirty days instead of seven days duration. Along with garebeg, the festive of sekaten provided popular entertainments for people where gamelan sekaten was played. Northern alun-alun turned into a night market, in where a variety of performances such as shadow puppet and magic shows were held. The crowd created opportunity for selling food, either selling in temporary tent or hawking. There are many food and beverage stalls and merchants selling goods ranging from agricultural tools to clothing, cooking utensils, toys and souvenirs. If there is a common rule concerning this element of Sekaten, it is that whatever form of entertainment is currently popular is included.

Under Hamengkubuwono IX, kraton Yogyakarta has opened its door to local as well as global changes. The kraton complex which for years could only be entered by the nobilities and high rank officials has been opened to public. It began with the use of bangsal pagelaran for student lectures. Gadjah Mada University was established in year 1949, the lectures were temporary held in bangsal pagelaran and in the buildings around it before it had an official campus on the southern part of the city. Allowing commoners, students and teachers, to enter a sacred area of sitihinggil was a radical departure of Hamengkubuwono IX's redefinition of the concept of kingship.

What had been considered sacred and private space became more profane and public space. Surrounding the square is encircled with two-way streets along with sidewalk adjacent to the series of buildings on the edge. These streets were paved in the mid 1970 to provide access for people to enter kraton complex and its surrounding kampongs. A space that once was sacred is becoming a mere part of a transportation network dominated by vehicles. Furthermore, some parts of kraton complex were opened to Indonesian and foreign tourist. Kraton began to attract visitors and daily visited by people from rural sides and surrounding town within Central Java (Soemardjan 2009). Cultural attraction, important royal ceremonies and rites, has been

installed and wrapped for tourist purposes. There are daily wayang show (shadow puppet), gamelan performances along with offering lessons in gamelan play and classical dances for free of charge.

Out of special events like garebeg and sekaten which was held only three times a year, other activities which attended by mass of people had appeared in northern alun-alun. This area became the center of public activities. Students used to have outdoor activities, such as exercising and scouting while civil officers used to have offices around the square. During daytime a lot of tourists come to visit kraton building and Sono Budoyo and they used northern alun-alun for parking. Along with the increasing number of visitor, people who live surrounding kraton took opportunities for earning additional income by selling goods or offering services. They sold their goods in temporary kiosks, tents or in peddlers while other became tour guide, becak driver or parking attendant.

5 ALUN-ALUN IN THE CONTEMPORARY ERA

Northern alun-alun is considered as a place which has historical and cultural significances. A site of massive rallies contributes significantly to the political development in local and national levels. During political crisis of May 1998, northern alun-alun, which had been a cultural space, became Yogyakarta and Indonesian political space. When the legitimacy of the government of republic Indonesia came into question, the sultan rethought his position and became a national political figure. He devotes to Indonesian nation and willing to employ traditional Javanese notions of kingship and authority when the republic is in danger. Indonesia was hit by economic crises that began in year 1997 led to widespread students demonstration, violence by mob and security forces and demand for an end to the New Order government. The kraton of Yogyakarta played significant role in averting violence that is more tragic and facilitating the end of New Order. Yogyakarta as the symbolic center of Indonesia, were combined in the political dramas of 1998 and 1999 that led to the fall of the Soeharto government and the rise of Sultan Hamengkubuwono X as an important and powerful national leader. Socio-cultural aspects of massive moral movement of Yogyakarta community gathered in the square in front of Sultanate Palace to meet with Sri Sultan Hamengkubuwono X demanding political reform in Indonesia without violence. On 20 May 1998, Hamengkubuwono gave oration to call Soeharto to resign. He stood in front of people in northern alun-alun and spoke of the need of reformation. . Although sultan had significant political role, being part of Indonesia has redefined kraton functions as cultural and ceremonial instead of political space. Kraton had appeared to rely on their rituals to project their significance and relevance as a cultural center and tourist attraction. Although the essence of royal ceremony and ritual has been preserved, they have been experiencing commercialization as the impact of tourism development.

Figure 5. Northern alun-alun in year 2011 Source: observation

Sekaten as a series of garebeg ceremony has been experiencing fluctuation in meaning. At first was intended to celebrate the birthday of Prophet Mohammad along with religious activities. At this stage has been converted into means of income generation for various parties, especially when duration of sekaten was extended from seven days to a month. In year 1991, sekaten is enlivened with kraton festival where the culture of kraton has been compromised by the existing nature of modernity. This effort is a logical consequence of the discourses of tourism development endorsed by city government and Kasultanan Yogyakarta. The format of sekaten was changed into cultural and handicraft exhibition in year 2004-2005, called JES (Jogja Expo Sekaten). A professional event organizer organized it and the purpose was to promote tourism as well as to attract potential buyers and investor. Northern alun-alun was transformed into a modern expo arena with luxury booths and air-conditions system. Visitors had to pay entry ticket and traditional merchants were excluded, which was protested by public since it was considered disrespectful to tradition. Sekaten was long believed to be a folk market, where traditional merchants were prioritized and every person

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has the right to come at no charge. Sekaten then has returned to its original format as a folk market. On sekaten fair 2011, the center of northern alun-alun became a bazaar area with numerous stalls and vendors, while government institutions also participated for socializing their programs. The spaces for sekaten event were divided into plots for merchants and for government institutions with different rates. The visitor also had to pay entry ticket of 3000 IDR (approximately 25 EUR). Space for sekaten has been commercialized, without changing the meaning of its ritual which takes place in the great mosque. This division led to assumption that garebeg was maintained as a sacred activity while sekaten is becoming more profane. Hence people who want to see garebeg or gamelan sekaten in the mosque were still free of charge, while those who want to see sekaten had to pay entry ticket. At the fair, there were rides such as Ferris wheels and mini train, which were simply meant to provide entertainment and fun. Joy rides and food stalls have become a feature in sekaten fair. Sekaten which was dominated by traditional merchandises, has been gradually replaced by popular entertainment and contemporary products. Traditional food traders are rarely seen and the nuance of tradition is almost imperceptible.

Figure 6. Gunungan and garabeg procession in year 2011 Source: observation

The major activities take place in northern alun-alun relate to the role of kraton complex as the major tourists destination in Yogyakarta. There are at least nine tourist objects inside kraton walls which consist of kraton main building, Tamansari water castle, old mosques, museums, birds market and traditional kampongs (Department of Tourism, Arts and Culture Yogyakarta 2007). Northern alun-alun becomes a gateway to kraton and surrounding tourist destinations. Thousands of people come to alun-alun to watch the garebeg procession and when many tourists come to visit kraton, alun-alun is used for parking. During tourist high season, the square is utilized for parking by private cars and tourist buses, while becaks (rickshaw) and horse-carriages are lined up next to the entrance of bangsal pagelaran (Figure 7-). All types of vehicles, ranging from bus, car, motorcycle, becak to horse-carriage are passing through the streets on its perimeter that becomes traffic artery and connects area inner to outer kraton wall. The atmosphere of alun-alun comes alive with growing number of people visiting during day and night and people began to take advantage from this festive by establishing their petty business. Street vendors are taking a chance by selling good to these visitors. Street vendors are visible almost everywhere in northern alun-alun where there is a high concentration of people- the streets, parking lots, street junctions, sidewalks and the center of the square. Various types of street vendors exist here (Figure 7-). Either some are stationary and operate in certain locations, with permanent structures such as warung or kiosk, or non-permanent structures such as gelaran (mat) and tent that are easy assembled and dissembled. Some street vendors are ambulatory which continuously moving about to a place where there are many people to sell their goods or offer their services. These ambulatory street vendors are using gerobag (pushcart), pikulan (yoke) or bakul (basket) which sometimes are installed on a bicycle or a motorcycle. Alun-alun has evolved into area where small-scale trading and bazaar occur. There are at least 470 street vendors and hawkers in northern alun-alun. Their informal status are not fit with the image of cleanliness and order which becoming the eyesore of alun-alun.

6 CONCLUSION

The aforementioned historical account visualizes how alun-alun has catalyzed the formation of collective urban images, which are transmitted from generation to generation creating a corpus of inter-subjectivity. This allows the square to maintain its role as a place for the collective expression of discontent and hope for better times.

The examination of alun-alun reveals of pattern of gradual change and transformation, which is tandem with the significant historical events and changes in cultural setting of the society. Changes are manifested in the

physical, social and symbolic pattern, which occur in response to events, actions or polices introduces in different historical periods. From physical perspectives, alun-alun has witnessed reorganization where some uses added and some modified, or eliminated along with the changes in political and major political holder. The reorganization of its morphological pattern resulting in the increase in density and shown in the changes of enclosure elements, building addition and general visual character. From social perspectives, alun-alun has witnessed changes in patterns of access and social character. It is however, from symbolic perspective that alun-alun has witnessed greatest changes. Alun-alun continues to be a venue for massive events ranging from cultural, social to political. Although alun-alun is still a venue for cultural ceremonies, the messages is fundamentally changed. They would rather a ritual, which symbolic roles are limited to the religious realm and the preservation of tradition. On other side they have experienced commercialization as the impact of tourism development. The agglomeration of commercial activities encouraged the growth informal sectors, which show the gradual decline of its importance divergence between the real lived space and the representation of space has increased.

Administration System	**Characteristic**		
	Arrangement of space	**Primary uses of space**	**Accessibility**
Traditional authority (1755-1880)	- Center is a sacred space - Periphery is profane	- Military activities - Royal ceremonies	- Restricted area and strictly controlled
Dutch colonial administration (1880-1940)	- Center is less sacred - Periphery is profane	- Royal ceremonies - Cultural activities - Social activities	- Partial restricted area and less controlled
Indonesian early independent (1940-1960)	- Center and periphery are profane	- Royal ceremonies - National movement activities - Economic activities	- Open area
New Order (1960-1990)	- Center and periphery are profane	- Royal ceremonies - Religious activities - More economic activities - More social activities	- Open area
Modern 1990- 2012	- Center and periphery are profane -	- Ritual ceremonies - Religious activities - Political activities - More economic activities - Social activities - Traffic thoroughfare	- Open area

Table 1. Characteristic of Public Space through Changing Administration System Source: Author

Alun-alun that was previously used only for a formal ceremonial meeting place between sultan and his subjects has evolved into area where small-scale trading and bazaar occur as well as special outdoor cultural events. The square that has an important historic and symbolic function, linking sultan and his people has evolved into a visitor attraction as many domestic as well as foreign visitors go there during the day and evening to browse among the stalls. On special occasion, elaborate court and religious ceremony take place in alun-alun, they have become cultural attraction in their own right.

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Mobility Pass for Residential Real Estate – An Online Tool for the Calculation of Mobility Costs and the Awareness on Housing Decisions

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1 ABSTRACT

The choice of location for a residence or a business is usually an important, long-term decision requiring a high level of investment of capital. With this in mind, such decisions should be considered together with their consequences, both for the individuals and the city as a whole. "Mobility Pass for Residential Real Estate" is an online tool which investigates the relationship between the selection of the location and the mobility behaviour, showing the effects of mobility time, mobility costs, CO_2 emissions and possible accident risks. Therefore the "Mobility Pass for Residential Real Estate" will be developed for the specific tenant or buyer, for the real estate agents (as a more specific marketing instrument) and for public administration, concerned with the allocation of housing subsidies.

The "Mobility Pass for Residential Real Estate" is designed as a free online tool available on the website www.mobilitaetsausweis.at. This paper deals with the multitier architecture, the basic data used and the routing network to calculate the trips which is the basis for the estimation of the mobility costs.

The project is funded within the IV2splus programme (ways2go initiative) of the Austrian Federal Ministry for Transport, Innovation and Technology (BMVIT). The programme management lies at the Austrian Research Promotion Agency (FFG). The project consortium consists of CEIT Alanova – Central European Institute of Technology, Institute for Urbanism, Transport, Environment and Information Society (lead partner), HERRY Consult GmbH (Consulting in Transportation Planning), Austrian Road Safety Board (Kuratorium für Verkehrssicherheit - KFV) and the University of Applied Science of WKW – Institute for Real Estate Management (Institut für Immobilienwirtschaft der FH Wien – Studiengänge der WKW).

2 RESEARCH BACKGROUND

In Austria, about 10 % of the population changes their home every year, in 2009 that was about 875,000 people. Nearly 80 % (680,000 people) residence changes occur within one or between neighbouring municipalities in Austria. Austria is a country greatly affected by urban sprawl; land purchase is much cheaper in not urbanised areas but infrastructure, from the school bus to the waste disposal, is paid by the public sector.

The population in Austria has increasingly moved outside the main municipalities. Located beside of the city centre most people move around by car and the commuting flows are increasing. It has been stated by the VCÖ (Verkehrsclub Österreich/Association for Transportation and Sustainable Mobility in Austria) that in all Austrian provinces transport is one of the main concerns as the emissions from traffic have increased since 1990 from 33 % to 71 %. The impacts of transport are also reflected in high economic costs, as in Austria every year more than 7.6 billion euro is spent in accident costs and infrastructure.

Looking at the individual scale, the location of the residence has a direct impact on the overall transport behaviour. Already in the 1970s, Torsten Hägerstrand dealt with an analysis of spatio-temporal behaviour of individuals and the depiction of human action in "time paths" (Hägerstrand 1975). The constraints identified by him through the spatial structure result in a manoeuvre, which are crucial to the design of the mobility possibilities and therefore to the possible needs. The "Mobility Pass for Residential Real Estate" shares the same theoretical approach and creates a more transparent and comparable free online tool for those looking for a new house and for the real estate business.

Direct and indirect costs follow the mobility trends, but so do time, CO_2 emissions and accident risk, all strictly related to the distances travelled. The medium and long-term consequences of most people's travelling patterns are still hard to estimate. Most times decisions are made on the basis of short-term decisions such as the price of the rent or for the purchase, the quality of the living according to the available

facilities and so on, without taking into account the costs associated to forced mobility related to going to work or to leisure activities.

While the prices of the rents or purchase and energy costs can be calculated rather easily, the costs and the CO_2 emissions related to the mobility are quite hard to estimate for most people, but often count up for a large part of the household's budget. It was estimated that in 2010 a household in Austria spends EUR 5,240 on average on mobility. A recent study by the VCÖ shows that compared to year 2005, that Austrian households spend EUR 330 more on mobility. The VCÖ indicates that people living in Vienna are paying the least on mobility (VCÖ, 2011). On the other hand, commuters who use public transport to work spend on average EUR 1,800 per year less on travel costs than those who travel by car.

This is why the "Mobility Pass for Residential Real Estate", with the calculation of mobility cost, mobility time and risk of accidents and giving a transparent view of the environmental impact by indicating the CO_2 emissions will help users rethink their habits in a more economic, safe and environmentally friendly way. In the following section the implementation of the "Mobility Pass for Residential Real Estate" concerning the 3-tier architectur and the tool itself will be explained.

3 IMPLEMENTATION

3.1 3-tier architecture

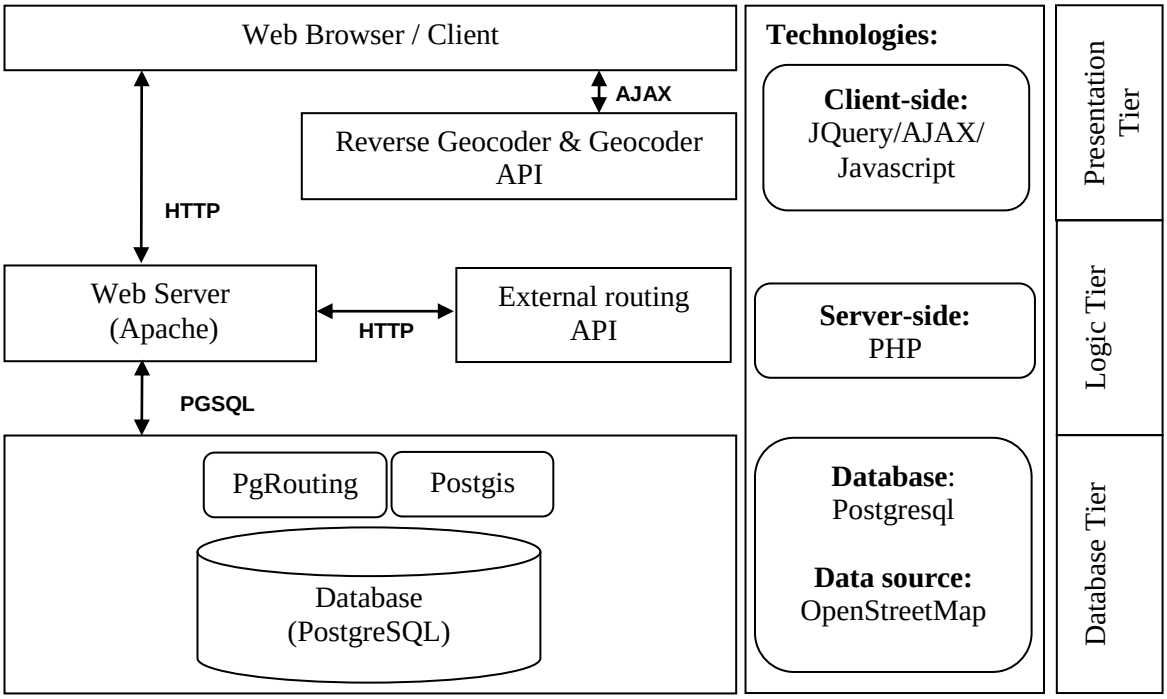

Fig. 1: 3-tier architecture of the "Mobility Pass for Residential Real Estate"

The presentation tier contains the web browser and uses a reverse geocoder and geocoder API to locate the different activities of the user. These interfaces are used to locate the activity places via a map or alternatively by street names. The used technologies for the dynamic components of the online tool are JQuery, AJAX and JavaScript.

The logic tier of "Mobility Pass for Residential Real Estate" provides the intelligence of the application towards the client. For this section the Apache web server with the server-side programming language PHP is used. An external routing API is used to get routing information in foot, bicycle or public transport, which are used to calculate the mobility costs.

The database tier contains the open source relational database management system PostgreSQL and its two extensions. PostgreSQL is extended by PostGIS, which enables the database to support and store geographic objects. With this extension it is possible to store Simple Features (points, lines, polygons) defined by the Open Geospatial Consortium (OGC). The second module PgRouting is used to extend the geospatial database with the functionality of routing.

3.2 Basic Data

The idea for the "Mobility Pass for Residential Real Estate" is to integrate an open and extensible data source. In a prototype version of this tool the individual vehicle transport should be calculated by the street data of Open Street Map (OSM). Open Street Map has the goal to collect all kind of data on a map, like streets, railroads, points of interests, rivers and topographic objects, which are collected under a public license domain. The main advantage of the Open Street Map data are the open source license and the community is updating the map continuously. Open Street Map uses a data model which makes use of topology.

The second data for calculation of the mobility behaviour, which is involved in this project, is the connection to the interface of AnachB.at. The interface is used for the calculation of the route trips of foot, bicycle and public transport and has a multimodal graph. The underlying routing graph of this interface is more detailed than commercial ones and includes live traffic information (Floating Car Data, Traffic Messages …). It gets permanently updated, because it was developed for E-Government and public administration (PRIKOSZOVITS, 2010). The figure 2 shows the online tool of AnachB.at.

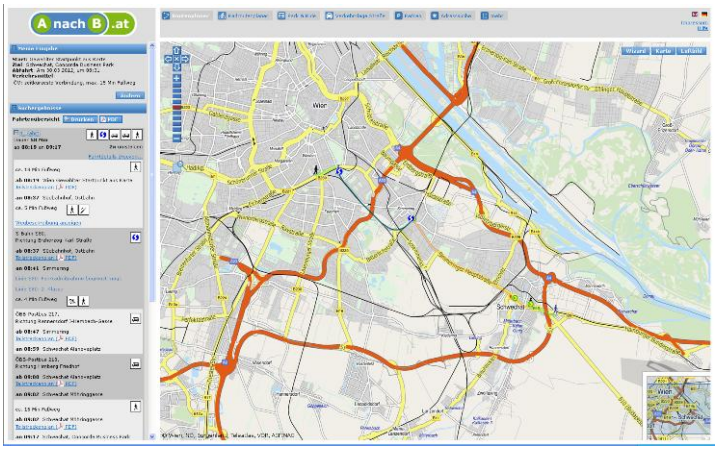

Fig. 2: AnachB.at online routing tool (http://www.anachb.at)

3.3 Routing network and algorithm

The basis for the calculation of the mobility costs are the driving distances between the different activity locations with their different modes of transports. For this the database of the "Mobility Pass for Residential Real Estate" includes a routing network, which consists of a weighted, directed graph. A graph is a non-empty set of vertices where the vertices are connected by edges. The extension of a directed, weighted graph means that every edge is represented by a direction and every edge has a weight assigned. The edges in the routing network represent the road segments and the vertices are made out of the intersections of the road network (DOMSCHKE, 1995).

The weights in the implementation of the routing network of the "Mobility Pass for Residential Real Estate" are defined as the time in seconds needed to pass the road segment, to get the fastest route from one node to another. The seconds are calculated based on the length of the segment and a defined travel time for the individual transport. The tag <highway> defines the different types of roads which exist in the Open Street Map dataset. In a first version only highway tags which are important for car routing are used to define the routing network (motorway, trunk, primary, secondary, tertiary, road, unclassified, residential, living street, service, track, path and the appropriate links). Therefore a travel time matrix was designed in according to the list of street categories.

In Austria, there are fixed general speed limits defined for the different types of road categories. These speed limits are not useful for route calculation, because in the real traffic it is not possible to reach them constantly. Therefore a travel time matrix was designed according to the reference point of the speed limits. Additionally there is a difference of these speed limits in the urban area, which has to be integrated in the routing graph of the "Mobility Pass for Residential Real Estate".

For this purpose, with the help of CORINE Land Cover 2006 data set, there is an attempt to have a delineation of inner-city and non-urban roads. The CORINE Land Cover data set consists of 44 classes (28

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of which occur in Austria). The delineation from the city streets, the main class of "built-up area" and its subclasses are used.

At the preparation of the OSM import data every road segment is spatially analysed via the database. The road segments are intersected with the CORINE Land Cover data set and the definition of an urban road in the "Mobility Pass for Residential Real Estate" is fulfilled if more than 50% of the length of this segment is within the built-up area. The results are all the road data, which exist within the built-up area. With this gain of information, the travel time within the road segments of the built-up area can be adapted for the urban area.

The algorithm which is used for the calculation of the route is the Dijkstra algorithm. This algorithm finds the optimal route between two vertices in a graph. That means the solution is based on the weights the graph is using. Weights can be the length, cost, time, or other things that can be defined on the edges. As above said the "Mobility Pass for Residential Real Estate" uses the time to pass one road segment, so it finds the fastest path from one vertex to another. The idea of the Dijkstra algorithm is to start at the source vertex and searches all next nodes for the fastest edge to the target vertex. The result node is saved permanently and to find the next fastest segment, only the next nodes from the source node or the permanently marked nodes are scanned. If the algorithm reaches the target node it finishes. This algorithm is useful to get the optimal path with a little effort. If the graph is extremely intermeshed, this route calculation algorithm is not the best solution, because it gets slow and it cannot use negative weights, this results into not optimal route outputs. (Universität Oldenburg, 2012)

But also the Dijkstra algorithm is only as good as the graph. For every routing algorithm the database must be defined accurately and updated. In the case of a street routing graph for example it is also important to handle the one-way streets in a pleasant way for the used algorithm. In the routing network of the "Mobility Pass for Residential Real Estate" the edges of one way segments are weighted with extremely high time costs, so that the algorithm never uses them to find a route.

The routing graph of the individual vehicle transport of the "Mobility Pass for Residential Real Estate" covers the whole region of Austria. For the other types of transport modes (foot, bicycle and public transport) the route calculation via the interface of AnachB.at is used.

4 ONLINE TOOL

There are two different versions of the online tool (basic; advanced) which provide different information about the mobility costs. The basic tool should give the user a very quick and rough estimation of the mobility costs and the other output results of an household. An advanced tool also uses the route calculation (Open Street Map, AnachB.at) to get more exact results on the mobility costs, time consumption, CO_2 emmissions and accident risks for an household for a potential new housing location.

The basic tool is designed for people who want to find a rough result with only a few input variables. This tool is only based on standardised statistical mobility patterns. For that reason, a lifestyle matrix was developed out of the micro-census gathering made by Statistics Austria. Based on these statistics, 7 different lifestyle-types could be identified for Austria. In relation to the 4 residential locations (urban, semi-urban, peripheral and 4 cities with special transport infrastructure), 28 lifestyle groups have been established. After that mobility patterns could be classified and assigned to the different lifestyle groups.

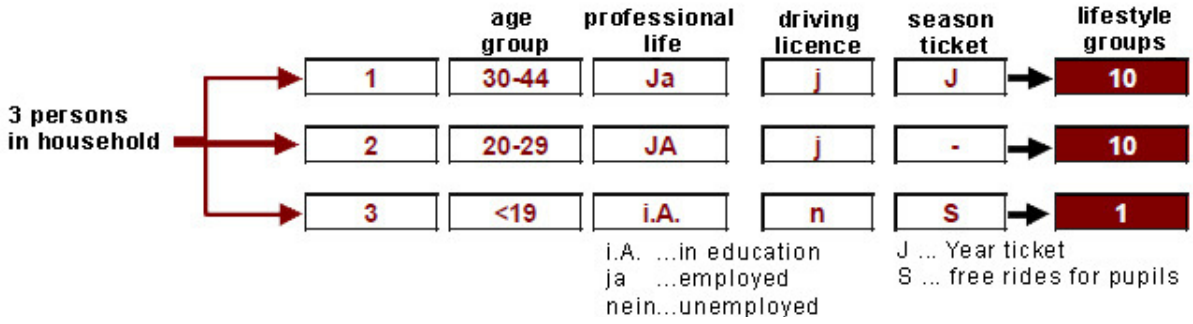

Fig. 3: Lifestyle group classification

Figure 3 shows an abstract assignment of the personal information to a lifestyle group.

The advanced tool of the "Mobility Pass for Residential Real Estate" consists of the created routing network and the external interface of AnachB.at. For the routing calculation, the user has to give information about the different work and weekly regular leisure sites of every person which lives in the household. The locations of the different places can be put directly onto a map or reference them through the input of an address. To any of these locations the user has to select the mean of transport. The kilometers of the different means of transport give the base for the calculation of the different output costs.

Additional in the advanced tool the user has to give some explicit information about the real estate of the household location. For the real estate information the user can choose between a rental object or an object of purchase. Due to this user inputs the tool calculates the annual costs of the object and the user has the possiblity to compare them with the mobility costs. (SEDLACEK N., 2012)

4.1 User Interface

The user interface of the simple tool only offers a few input parameters and a classification of them into three parts. The parts are the area for information about the household location, the mobility information area and personal information area of the household.

The user interface of the advanced module of the "Mobility Pass for Residential Real Estate" is shown in figure 4.

The website is divided into serveral areas. On the top of the tool there is the navigation. The user has the possiblity to calculate two different calculations and compare them against. The current selected site is marked in a different color. Furthermore the main part splits into two parts. The left part is reserved for the input parameters. For the clarity of the various input parameters the area for the information about the real estate location site and the household information are separeted by colors. The advanced tool makes use of a dynamic interface. Due to the inputs of the user new input areas are shown up, so that the user isn't overstrained by the great number of input variables.

The right side of the website contains a map, so that the user can see the different selected site locations.

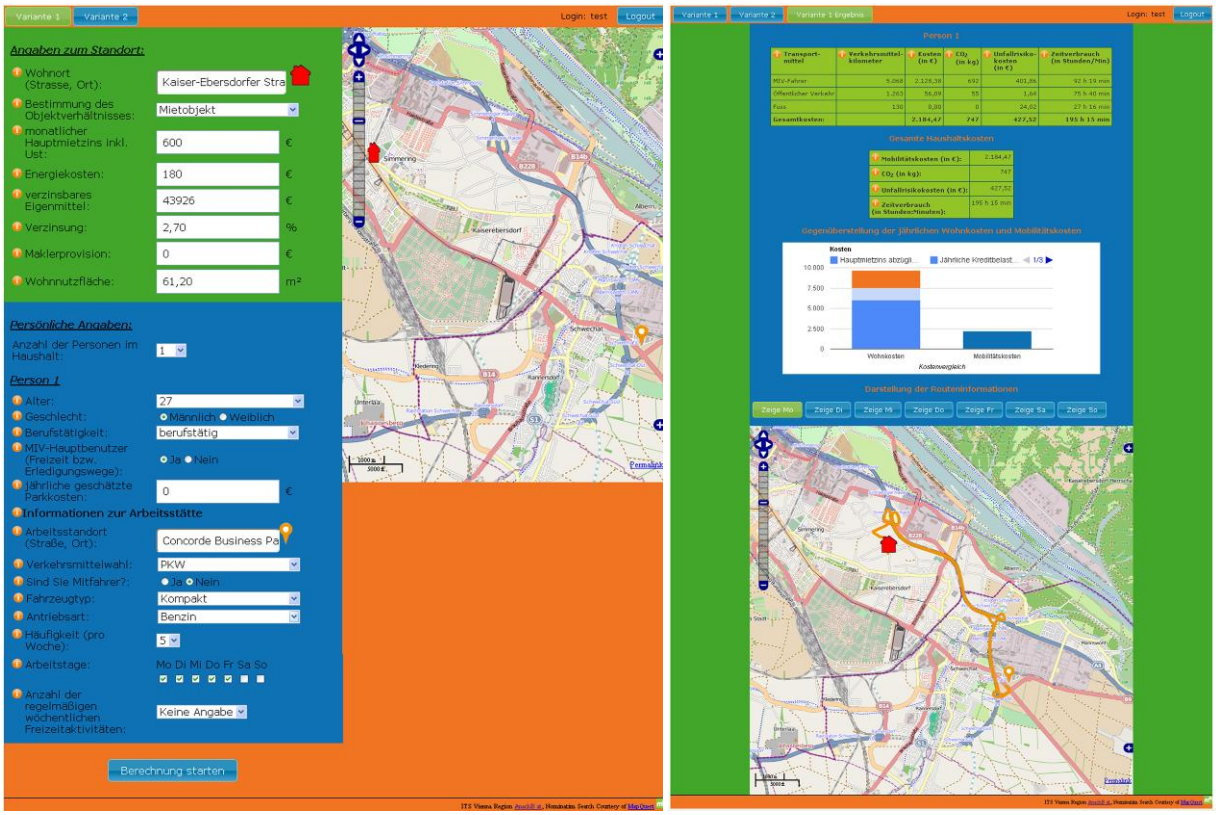

Fig. 4: User Interface (l.) and Result Interface of the advanced tool of the "Mobility Pass for Residential Real Estate" (r.)

4.2 Results

The result mask of the online tool gives information on distance traveled, transport costs, CO_2 emmisions, monitized accidential risk and transport time per transport mode in total for the household. The base for these

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types of costs are the covered kilometers of the overall day trips (work, regulary weekly leisure activities and every day ways) per year. The costs are divided into different groups of transport.

The accident risk describes the calculation of the probability of accidents of certain groups (stratified by age, gender and transport mode) and the determination of a risk score with the help of economic costs of accidents. The variables are not considered isolated but take into account their mutual interaction.

The estimation of the CO_2 emissions in the advanced tool will be calculated on the base of the used transport modality and the distance with the different means of transports. The calculation gives the user a better understanding for his own carbon footprint. Furthermore the advanced tool in addition calculates the annual real estate costs, which gives the user the possibility to compare annual mobility costs with annual real estate costs. The user has also the possiblity to have a look at the calculated routes of this result on an "on the fly" map. The different ways of the various person are colored on a map to get an overview of the ways split day by day (figure 4). The "Mobility Pass for Residential Real Estate" provides the opportunity to compare the result information based on different chosen residential locations and their different mobility costs.

5 CONCLUSION

The "Mobility Pass for Residential Real Estate" is a free online tool, where the results of this tool should give the user a comparison of the rental with the added energy costs of their living place and the user-defined mobility costs. Furthermore additional information about the mobility time, CO_2 emissions and possible accident risk costs are presented to the user. The use of OSM data offers a great source for creating a routing graph with the possibility to integrate continuously updated open source data and it gives the possibility to extend the routing graph to other different modes of transport.

In addition to the mobility tools the tool calculates the CO_2 emissions of the household. Carbon footprints and their calculations have recently drawn attention as they can limit CO_2 emissions of individuals and households based on house, car, and other consumption-related measures. When considering CO_2 emission related to mobility a very important factor to be considered is the residence location.

The important added value of "Mobility Pass for Residential Real Estate" is that it is a combination of a footprint calculator and the calculation on costs, time and accident risk based on mobility. The use of OSM data offers a great source for creating a routing graph with the possibility to integrate continuously updated open source data and it gives the possibility to extend the routing graph to other different modes of transport. The use of the external interface to AnachB.at gives the possiblity to get the calculate routes from a multimodal routing network which is planned to extend of the whole region of Austria. The further development of the "Mobility Pass for Residential Real Estate" can be the optimization of the OSM routing network, the integration of POIs in the map, the improvement of the geocoding service and the integration of ticket prices of public transport.

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Modelling the Coverage of Public Utility Providers

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1 ABSTRACT

The decreasing financial resources of many Styrian municipalities, particularly the small ones, lead policy makers to rethink funding allocations. Policy makers considered the inter-municipal use of public utility providers as well as the creation of regional authorities. These arrangements should provide for a more efficient and cost reduced usage of public utitlity providers. Due to these facts, the division 16 of the provincial government in Styria launched the project "Modelling the coverage of public utility providers". Within the scope of the project an ArcGIS Plugin was developed for modelling the coverage as well as for modelling the degree of capacity utilization of public utility providers in Styria. The results of the analysis provide transparent information about an optimized spatial distribution of public utility providers which creates the base planning criteria for the intended inter-municipal use of these facilities.

2 INITIAL SITUATION IN STYRIA

"Among all Austrian provinces, Styria has the smallest community structure: 76 municipalities have less than 500 residents, 196 fewer than 1000 and 407 municipalities have less than 2000 inhabitants. In 2009, approximately 200 municipalities attained negative annual accounts. This has to be equalised by funding allocations. The majority of these municipalities are small." (www.kleinezeitung.at, 16.12.2010).

Policy makers need to rethink funding allocations because of the decreasing financial resources of many municipalities in Styria. Already in 2006, the inter-municipal use of public utility providers as well as the creation of regional authorities were considered by different projects. Regional authorities are meant to consist of small adjacent municipalities with a corporate administration. In 2011, an administrative reform started with the scope to achieve sustainable cost and spending reductions. Until now, planning and spatial distribution of public utility providers was done by Styrian municipalities on their own. In the future it will be necessary to achieve planning as well as usage of public utility providers on an inter-municipal basis. This will lead to an optimized spatial distribution and furthermore to cost and spending reductions. An essential part to realise these reforms sucessfully is to actively involve the affected population as well as the policy makers in all major decisions. The results of the analysis provide transparent information about an optimized spatial distribution of public utility providers which builds the base planning criteria for the intended inter-municipal use of public utility providers. These transparent results should assure the arrangements will be widely accepted by the population.

3 MODEL FUNDAMENTALS

The model is based on the data of three main input parameters. The first parameter contains information about the capacities of public utility providers for different domains e.g. kindergarden, primary school, hospitals and so on. The second main parameter consists of demographic characteristics which are represented by a grid dataset with a spatial resolution of 250 m. The third main input parameter is a street graph which was exported from the GIP (Graph Integration Platform). There is one optional parameter for the analysis, i.e. named regions. These regions are used to distinguish between travel times depending on the spatial structure.

3.1 Public Utility Providers

This parameter contains information about the capacities of public utility providers for different domains which are a matter of public interest, e.g. kindergarden, primary school, municipal office, hospitals and so on. This information is provided by a component of the spatial information system Styria which is still under

construction and is stored in a point dataset. At present the capacities represent the current ones which are in use instead of the actual available ones.

3.2 Demographic Characteristics

This parameter consists of demographic characteristics which are represented by a grid dataset with a spatial resolution of 250 m. It is also necessary to use demographic characteristics with a spatial resolution on a local level for data preparation due to the data privacy policy. Both datasets are provided by Statistik Austria. On the level of the grid dataset demographic characteristics like age groups will be provided if there are more than 31 principal residences. In Styria the majority of the 250 m grid cells do not hold any detailed information about demographic characteristics. Due to this fact it is necessary to generate a hybrid dataset based on the grid dataset as well as on the local level dataset. The calculation of the number of people per age group and grid cell with less than 31 principal residences is shown in Figure (1).

$$A_{i,k_y} = \left(\frac{A_{i,y} - \sum_{l_y=1}^{n} A_{i,l_y}}{\sum_{k_y=1}^{m} H_{k_y}} \right) * H_{k_y}$$

A_i ... number of people per age group i
k_y ... grid cells < 31 principal residences of municipality y
l_y ... grid cells ≥ 31 principal residences of municipality y
H ... principal residences

Fig. 1: calculation of the number of people per age group and grid cell with less than 31 principal residences

3.3 Street Graph

The street graph represents the area-wide, homogeneous motorized as well as the non-motorized individual transport. This dataset was exported from the Graph Integration Platform (GIP). The street graph has to be slightly modified to be used within the model.

3.4 Regions

The spatial density of public utility providers depends on the area. In rural areas there are not as much public utility providers as located in urbanized areas. Because of this the spatial structure can also be involved for the calculation. There are three main areas: inner alpine, outer alpine and central area.

4 MODELLING THE COVERAGE OF PUBLIC UTILITY PROVIDERS

4.1 Model Algorithm

The model algorithm is based on the calculation of service areas for the different public utility providers and the spatial distribution of demography of the domain specific population group inside this calculated service areas. Depending on the reviewed domain it is important to distinguish between the accessibility and coverage of public utility providers. For example the domain “education” focuses on accessibility whereas the domain “public order” which covers the topics “police”, “fire departments” as well as “ambulances”, focuses on the coverage. As part of the model, service areas as well as origin-destination cost matrices are calculated on the base of the modified street graph. The calculation itself is based on the Dijkstra alogrithm (Dijkstra 1958). The centroids of the grid cells which provide demographic data are the origin or destination points, depending on the preselected domain. Another input dataset contains the point locations of public utility providers.

It is an iterative process. There are several steps:first, the algorithm chooses the grid cell with minimum travel time. Second the algorithm subtracts the number of people that need to be supplied from the total available capacity of the assigned public utility provider. Third, the remaining capacity is stored temporarily. Forth, the algorithm assigns the classification value of the coverage of public utility providers to the currently processed grid cell. The workflow of the algorithm is shown in Algorithm (1).

grid cells outside service area: coverage = not supplied
sorted cost matrix, travel time ascending
for travel time w = 1 to n of grid cells R of public utility provider I_y
if capacity of $I_y \geq$ *number of people need to be supplied in R: coverage = supplied*
else if capacity I_y *=0: coverage = inadequate supplied*
else: coverage = partially supplied

Algorithm 1: Assignment of the classification of the coverage of public utility providers per grid cell

The algorithm distinguishes between four different classification values: a grid cell is classified as "not supplied" if it is outside any service area. A grid cell is classified as "supplied" if it is inside of a service area and the public utility provider has enough capacities to supply this grid cell. If a grid cell is inside of a service area but the underlying public utility provider's capacity is equal to zero, the grid cell is classified as "inadequately supplied". Last but not least, if a grid cell is inside of a service area but the public utility provider has not enough capacities to supply this grid cell although the capacities are greater than zero, the grid cell is classified as "partially supplied".

4.2 Software implementation

With the release of ArcGIS® Desktop 10 the concept of Add-Ins was established. This concept allows easy distribution of self-developed Add-Ins via shared folders, e-mail or download link. The conceptual model was implemented as an ArcGIS Plugin for the release of ArcGIS® Desktop 10. The implementation was done in C# on the basis of the Microsoft.NET 3.5 Framework.

The calculations are mostly based on the functionalities of the ArcGIS® Geoprocessing library. The calculation and classification of the coverage of public utility providers is based on the self developed and implemented algorithm, shown in Algorithm 1. The methods and functionalities of the ArcGIS® Network Analyst library are used for the creation of the network dataset, as well as for calulation of the service areas and cost matrices. The service areas and the cost matrices are based on the GIP street graph which will be periodically updated.

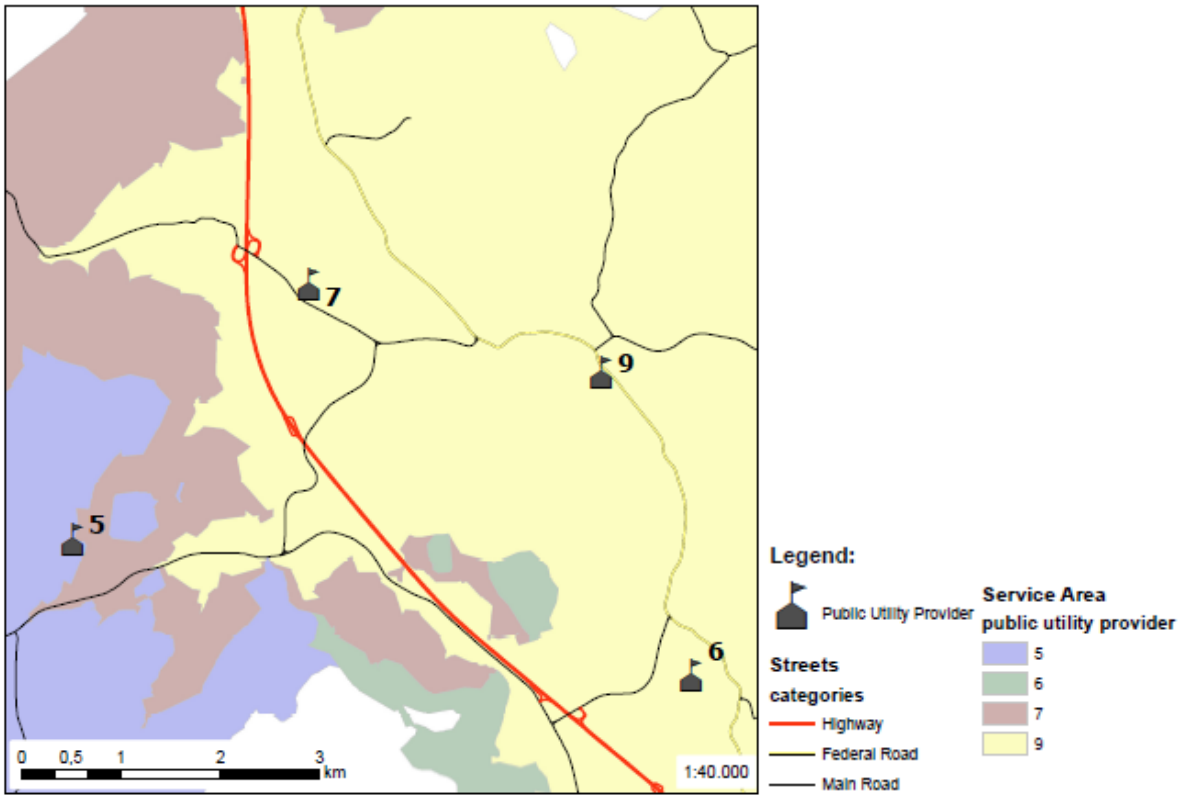

Fig. 2: Service Areas of kindergarden in Kalsdorf near Graz

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4.3 Results

The results of the executed algorithm are a grid dataset representing the degree of capacity utilization with a spatial resolution of 500 m, as well as the capacity utilization of each individual public utility provider. In addition, the service areas are also available. The following figures show the results of the calculations. The example is chosen from the domain "education" – "kindergarden". The region is located in Kalsdorf near Graz. The configurable parameters are: 5 minutes driving time (individual motorized traffic) without any regionalization. The result showing the calculated service areas is shown in figure 2. The result containing the degree of capacity utilization is shown in figure 3.

As shown in figure 2, the service areas are overlapping each other. Although, as shown in figure 3, not all of the demographic micro cells are supplied. Most of the micro cells have no demand which means that there are no children aged 3 to 5. These cells are shown in grey. Some of the demographic micro cells are inadequately supplied or partially supplied, shown in orange and yellow. The farthest micro cells are not supplied, shown in red.

Fig. 3: Classification of capacity utilization of kindergarden in Kalsdorf near Graz

5 CONCLUSION

First estimations and evaluations of the employees of the provincial government in Styria determined that the developed tool is feasible and offers new opertunities for the intended inter-municipal planning. Due to the fact that the spatial information system Styria is currently under construction, not all public utility providers are digitally represented yet. Furthermore, the recorded capacities represent the current capacities in use, not the available capacities. For this reason it is essential to analyze the results critically. However, the employees of the provincial government in Styria can use this interactive tool to generate transparent information about an optimized spatial distribution of public utility providers which builds the base planning criteria for the intended inter-municipal use of public utility providers.

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Möglichkeiten zum Einsatz von Augmented-Reality-Technologien in Verbindung mit WebGIS-Services in der urbanen Pflanzenverwendung

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1 EINLEITUNG

Trotz der Entwicklung neuartiger planungsextensiver Bepflanzungsstrategien, wie Staudenmischpflanzungen (z.B. BDS 2009; FENZL & KIRCHER 2009; LWG 2007), die ein geringeres Maß an Arten-/Sortenkenntnis voraussetzen, war und ist das Wissen über den grünen Baustoff der limitierende Faktor bei der Planung, Anlage und Unterhaltung von öffentlichen oder privaten Grünflächen. Eine von der Hochschule Anhalt durchgeführte Umfrage bei Landschaftsarchitekten, Ingenieurbüros dieses Fachgebiets, Garten- und Landschaftsbauunternehmen sowie Grünflächen-/Gartenämtern zum Thema Wissen und Erfahrungen in der Pflanzenverwendung zeigt ein deutliches Ergebnis: Die häufigsten Planungsfehler oder Probleme bei der späteren Unterhaltung von Grünflächen sind insbesondere auf Defizite hinsichtlich der fachgerechten (standort- und funktionsgerechten) Verwendung bzw. Auswahl von Pflanzenarten/-sorten (Pflanzentaxa) zurückzuführen. Fachliteratur, Leitfäden, Pflanzenenzyklopädien und „Gartenbücher" bieten jedoch heute für Profis und Laien eine umfangreiche Unterstützung bzgl. der für eine fachgerechte Pflanzenauswahl zu prüfenden Parameter (BÄRTELS 2001; BORCHARDT 1999; DUNNETT & HITCHMOUGH 2004; FLL 1999; HANSEN & STAHL 1997; ROBINSON 2004; SCAREFONE 2007 etc.).

Unzählige Gartenbesitzer in Deutschland wählen die Pflanzen für ihren Garten nach eigenem Geschmack und weniger nach standort- und funktionsgerechten Gesichtspunkten aus; und nicht wenige Gartenliebhaber erweisen sich diesbezüglich sogar als äußerst beratungsresistent. So erfolgt die Auswahl von Stauden, Sträuchern, Bäumen etc. meist im Werbeprospekt, Einzelhandel oder auch zunehmend im Internet, losgelöst vom eigenen Garten. Die Folge sind mitunter teure Fehlkäufe, denn der tatsächliche ästhetische Effekt oder die Größenwirkung von Pflanzen weichen im eigenen Garten häufig von der persönlichen Vorstellungskraft ab. Weiterhin treten bei der Kaufentscheidung die visuellen Kriterien gegenüber den zu beachtenden Standortfaktoren des Gartens in den Vordergrund, da sie unmittelbar erfahrbar sind. In vielen Fällen erzeugen die so erworbenen Produkte über kurz oder lang Unmut im eigenen Garten.

3D-Gartenplaner für den computeraffinen Hobbygärtner geben zwar eine einfache Hilfestellung, doch sind fotorealistische Darstellungen ebenso unmöglich wie die fachgerechte und produktgenaue Auswahl von Pflanzentaxa. Branchenapplikationen für den Garten- und Landschaftsbau erlauben eine fotorealistischere Visualisierung von Vegetation und Gartenausstattung mittels Fotomontagen. Ihre Erstellung erfolgt jedoch losgelöst von der fachgerechten Auswahl der Pflanzentaxa, die hier nur teilweise durch externe Pflanzendatenbanken unterstützt wird. Fotomontagen stellen nur spezifische Ansichten des zukünftigen Gartens dar. Für jeden Blickpunkt muss eine neue Fotomontage erstellt werden, was die Kosten für Planung und Beratung steigen lässt. Der Aufwand wird in vielen Fällen nicht durch die nach HOAI üblichen Sätze vergütet bzw. sind Visualisierungen eine „Besondere Leistung" (WERNER & WALTER 2009). Der erforderliche Ressourceneinsatz macht die Erstellung von 3D-Visualisierungen im Rahmen einer durchschnittlichen Planungsaufgabe im Verhältnis zum erwarteten Gewinn schnell unrentabel.

Aktuell verfügbare Profisysteme zur Planung und 3D-Visualisierung von Vegetation, wie CAD-Fachapplikationen für die Landschaftsarchitektur (z.B. 3ds Max) sind in der Anschaffung sehr teuer und ihre Bedienung erfordert Spezialkenntnisse, möchte man akzeptable Ergebnisse erzielen. Das Gleiche gilt auch für die RealTime-Visualisierung von Vegetation mit entsprechenden RealTime-3D-Engines, wie Quest3D oder LandXplorer. Zwar bieten RealTime-3D-Visualisierungen zahlreiche Vorteile für die Planungskommunikation, da sich der Anwender frei in einem 3D-Modell bewegen kann, jedoch ist diese Technik momentan noch sehr zeit- und kostenintensiv. Denn das komplette Modell inklusive Bestandsobjekten muss als 3D-Modell konstruiert werden. Außerdem ist die Verknüpfung von Visualisierungstechniken mit Mechanismen zur fachgerechten Pflanzenauswahl in Softwaresystemen für Laien oder Professionelle bisher in den wenigsten Fällen realisiert oder fachlich schlecht umgesetzt.

2 ZIELE

Ziel des geplanten Forschungsprojekts der Hochschule Anhalt soll daher die Entwicklung und Erprobung eines „mobilen Planungs- und Beratungssystems für die Pflanzenverwendung“ (MobiPlant) sein, indem zur Unterstützung einer funktions- und standortgerechten Pflanzenarten-/-sortenauswahl neueste Techniken zur Visualisierung (Augmented-Reality) und weitere aktuelle Informations- und Kommunikationstechnologien (IKT) zum Client-Server-basierten Informations- bzw. Datenaustausch miteinander verknüpft werden (siehe Abbildung 1 und 2). Hierbei wird der Anwender jederzeit in die Lage versetzt, den Grad und die Tiefe der gewünschten Entscheidungsunterstützung selbst bestimmen zu können.

Die wirtschaftliche und anwendungsorientierte Nutzung von Augmented Reality (erweiterte Realität/ Filmtechnik) und mobilen, internetgestützten Technologien sind derzeit sowohl für Profis als auch für Laien in der Pflanzenverwendung unterrepräsentiert. Durch die innovative Kombination bzw. Verknüpfung von Augmented Reality mit web-basierten Geographischen Informationssystemen (WebGIS), Global Positioning System (GPS), Online-Datenbanken und weiteren Internettechnologien kann ein System geschaffen werden, welches mittels einer mobilen Benutzerschnittstelle, z.B. in Form von Tablet-PCs, Handheld-PCs und Handys mit GPS, Videokamera und Internetanbindung, bedient werden kann.

Abbildung 1: Prinzipskizze zur Funktionsweise eines Planungs- und Beratungssystems (vereinfachte Darstellung): v.l.n.r. Der Anwender plant auf einer Grünfläche Gehölze zu pflanzen (1); über die Kamera eines mobilen Endgeräts wird das Live-Video aufgenommen, mittels GPS und weiterer präzisen AR-Tracking-/Registrierungsverfahren werden Position und Ausrichtung der Kamera ermittelt (2), der Anwender wählt Pflanzenarten aus, Billboards/3D-Modelle der gewählten Pflanzenarten/-sorten werden maßstabsgerecht in das Videobild projiziert (3). Der Anwender hat nun die Möglichkeit, die Pflanzenauswahl aus visuell-ästhetischer Sicht zu beurteilen.

Dazu müssen die aktuellen fachwissenschaftlichen und fachpraktischen sowie informationstechnischen Belange des Bereichs Pflanzenverwendung interdisziplinär und praxisnah analysiert und zur programmtechnischen Umsetzung aufbereitet werden. Sie fließen unter Beachtung aktueller Normen und Standards in die Konzeption, das Prototyping und die Erprobung des mobilen Planungs- und Beratungssystems für die Pflanzenverwendung ein. Alle ermittelten und analysierten Maßgaben des Fachgebiets Pflanzenverwendung sind einerseits textlich und grafisch zu fixieren, andererseits erfolgt die Dokumentation des Systems und seiner Komponenten (für Tablet- oder Handheld-PCs sowie Mobiltelefone, die mit GPS und einer Videokamera ausgestattet sind) plattformunabhängig durch die Unified Modeling Language (UML) und die Nissen Information Analysis Method (NIAM). Dadurch werden die notwendigen Voraussetzungen für die zukünftige Nutzung der Forschungsergebnisse durch IT-Unternehmen geschaffen, gleich auf welchen konkreten Technologien ihre bisherigen Produkte basieren.

Der Fokus der fachwissenschaftlichen Fragestellungen liegt dabei auf der:

- Ermittlung und Analyse aller relevanten fachwissenschaftlichen und fachpraktischen Maßgaben und Parameter, die bei der Umsetzung von Programmroutinen und Funktionalitäten zur Unterstützung der Anwender bei der fachgerechten Pflanzenarten-/-sortenauswahl zu beachten sind und die Umsetzung und Evaluierung ihrer korrekten Implementierung;
- Entwicklung einer benutzerfreundlichen und intuitiven Benutzeroberfläche einschließlich einer fachgerechten und ansprechenden AR-Visualisierung von Pflanzenarten/-sorten verbunden mit der Durchführung von Anwendertests zur Praxistauglichkeit und Benutzerfreundlichkeit des Systems; sowie auf der

- fachspezifischen Nutzung verschiedener Technologien (AR/VR, GIS/WebGIS, Web-Services, verteilte Systeme etc.) bzw. ihre technische Verknüpfung zur Umsetzung von IKT-gestützten Komponenten zur Unterstützung der Anwender bei der Pflanzenarten-/-sortenauswahl.

Durch die Nutzung moderner IKT und der gleichzeitigen Verknüpfung aktuell getrennt gehaltener Daten zu nutzbaren Informationen kann das System zukünftig als Werkzeug zur Unterstützung einer funktions- und fachgerechten Pflanzenauswahl und zur Optimierung von Planungs- und Beratungsprozessen in der Pflanzenverwendung geeignet sein.

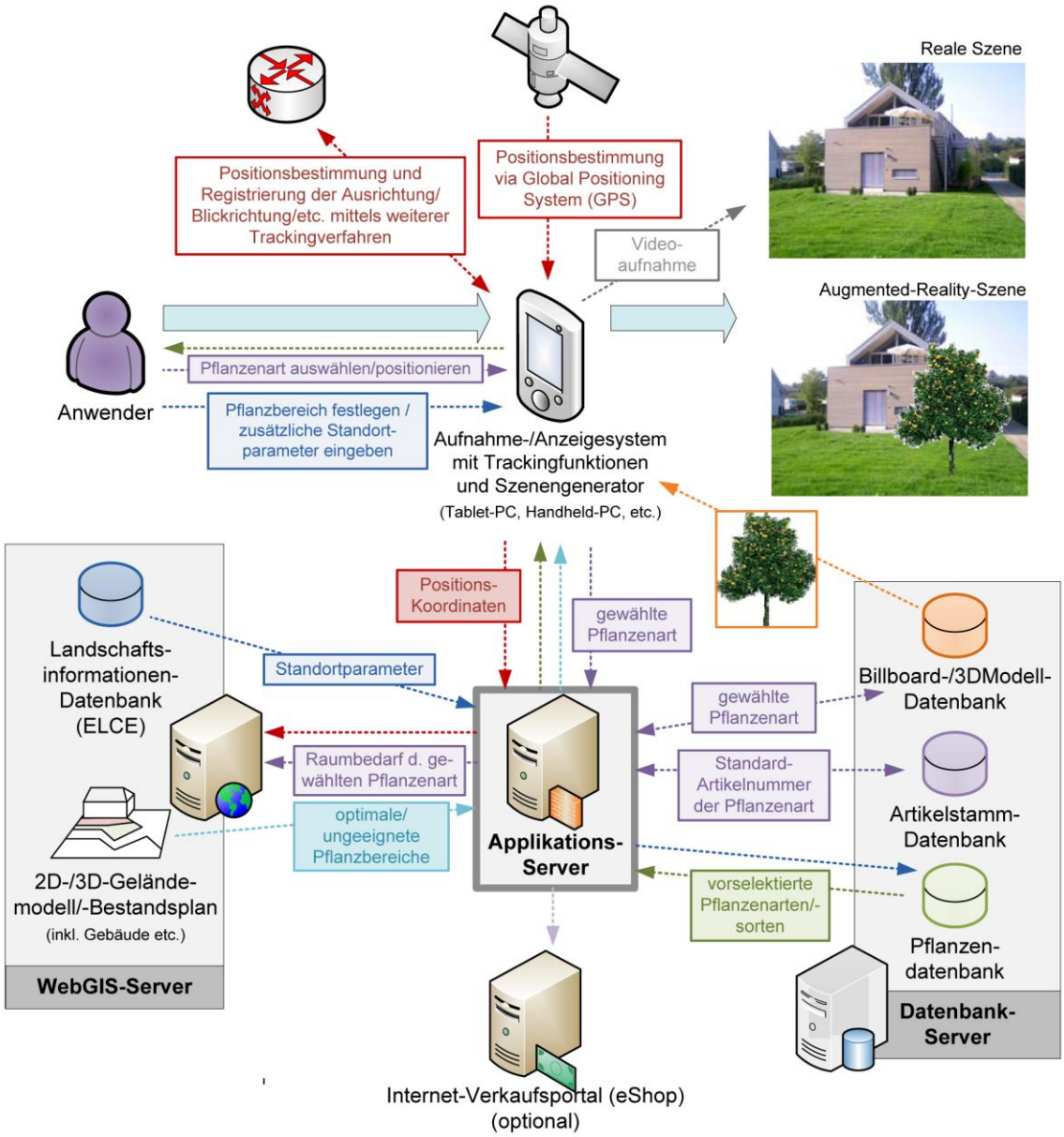

Abbildung 2: Vereinfachte Systemskizze zur Darstellung der Funktionsweise des mobilen Planungs-/ Beratungssystems für die Pflanzenverwendung, sowie das Zusammenspiel der einzelnen Systemkomponenten (ohne Auswahl der Lieferqualität einer Pflanzenart durch den Anwender, z.B. Hochstamm 12-14 mit Ballen, etc.).

3 FUNKTIONSWEISE

Die Unterstützung des Anwenders des mobilen Planungs- und Beratungssystems bei der Auswahl der Pflanzenarten und –sorten wird durch die Kombination von verschiedenen Technologien und die Verknüpfung von aktuell weitestgehend getrennt gehaltenen Daten und Informationen realisiert. Der Fokus sollte dabei auf der Umsetzung von drei Funktionalitäten/Komponenten (s. u.) zur Unterstützung bei der Auswahl der Pflanzenarten und sorten liegen, die in einem Gesamtsystem kombiniert werden und sich wechselseitig beeinflussen. Zur Umsetzung der Komponenten zur Entscheidungsunterstützung müssen die

jeweiligen fachlichen Maßgaben und Parameter ermittelt, analysiert, aufbereitet und programmtechnisch implementiert werden. Ihre fachlich korrekte Implementierung wird begleitet und abschließend evaluiert.

1) Visuell-ästhetische Entscheidungsunterstützung

Mittels der Umsetzung einer Visualisierungskomponente auf Basis der AR-Technologie wird der Anwender in die Lage versetzt, die Eignung von Pflanzenarten/-sorten aus visuell-ästhetischer bzw. gestalterischer Sicht durch Inaugenscheinnahme zu beurteilen. Via GPS, digitalem Kompass und weiterer präziser optischer Tracking- bzw. Registrierungsverfahren aus dem Bereich der AR-Technologien (z.B. Marker) werden die Position und die Ausrichtung des mobilen Endgerätes bestimmt. Optische Trackingverfahren liefern die Positionsdaten, indem per Echtzeit-Bildverarbeitung aus speziellen Bildmerkmalen im Videobild der Kamera die relative Lage des mobilen Endgerätes bezogen auf die reale Bildszene ermittelt wird. Hierbei werden Genauigkeiten im Zentimeterbereich angestrebt.

Im Moment der Aufnahme werden virtuelle Daten (sogenannte Billboards oder 3D-Modelle der gewählten Pflanzenart/-sorte, Markierung von geeigneten/ungeeigneten Pflanzbereichen etc.) in das aufgenommene Live-Videobild der Freiraumsituation maßstabsgerecht und in Echtzeit an die gewünschte Position projiziert. Es wird also ein kombiniertes Bild aus Wirklichkeit und künstlicher Umgebung auf dem Bildschirm des mobilen Endgeräts angezeigt (siehe Abb. 1). Bei Kamerabewegungen werden die virtuellen Modelldaten ständig aktualisiert. Dadurch erfolgt eine permanente und lagerichtige Anpassung der generierten AR-Visualisierung im Videobild an den realen Raum, d.h. an die Position und die Blickrichtung des Anwenders oder besser die Aufnahmerichtung der Videokamera.

Die Daten zur maßstabsgerechten Projektion des Pflanzen-Billboards/-3D-Modells werden aus einer Pflanzendatenbank ermittelt, sodass automatisch eine Anpassung des Pflanzen-Billboards/-3D-Modells hinsichtlich Wuchshöhe/-breite in verschiedenen Lebensstadien ermöglicht wird. Durch die Bereitstellung und Projektion unterschiedlicher Billboards können auch notwendige Differenzierungen hinsichtlich des spezifischen Habitus einer Pflanzenart in unterschiedlichen Lebensstadien vorgenommen werden. Für den Benutzer wird es somit auch möglich sein, unterschiedliche Entwicklungszustände im Lebenszyklus (langfristige Dynamik) und darüber hinaus im Jahresverlauf (kurzfristige Dynamik) der Pflanzenart/-sorte auszuwählen, um diese in das Live-Videobild zu projizieren und zu beurteilen.

Durch die AR-Visualisierungskomponente wird der Anwender bei der Entscheidung für eine bestimmte Art/Sorte aus visuell-ästhetischer Sicht unterstützt. Er wird in die Lage versetzt zu beurteilen, inwieweit die zuvor ausgewählten Pflanzenarten/-sorten aus visuell-ästhetischer bzw. gestalterischer Sicht für die Freiraumsituation geeignet sind. Dabei können die Pflanzenarten auch synchron geändert oder ausgetauscht werden, um verschiedene Varianten zu vergleichen.

2) Berücksichtigung des notwendigen Raumes zur art-/sortenspezifischen Entwicklung von Pflanzen

Eine weitere umzusetzende Funktionalität des mobilen Planungs- und Beratungssystems unterstützt den Nutzer bei der Beachtung des notwendigen Platzbedarfs von Pflanzenarten/-sorten, damit sich diese hinsichtlich ihres Wuchses art-/sortenspezifisch entwickeln können. Dazu wird ein Modell/Plan des Geländes (inkl. Gebäude, Grundstücksgrenzen bzgl. Nachbarschaftsrecht, bereits vorhandene oder geplante Vegetation und weitere Objekte) auf einem WebGIS-Server bereitgestellt (siehe Abb. 2: 2D-/3D-Geländemodell/-Bestandsplan).

Wählt der Anwender eine Pflanzenart aus, so wird auf Basis der Daten aus einer Pflanzendatenbank (Wuchsgröße/-breite, Wuchsform etc.) ein 2D- oder 3D-Modell der Pflanzenart/-sorte berechnet. Mittels GIS-Operationen bzw. Geoverarbeitungsfunktionen (z.B. Buffer, Select etc.) werden auf einer zuvor ausgewählten Fläche die Bereiche ermittelt, an denen eine Pflanzung der gewählten Art/Sorte mit dem Ziel einer art-/sortenspezifischen Entwicklung nicht sinnvoll ist oder aber Bereiche ermittelt, die geeignet sind. Die so ermittelten Bereiche werden dann als AR-Visualisierung, z.B. als halb-transparente Einfärbung in Echtzeit, in das Live-Videobild projiziert (siehe Abb. 3).

Der Anwender wird somit bei der Auswahl der Pflanzposition unterstützt. Optische Trackingverfahren liefern zentimetergenaue Positionsdaten der Kamera als Grundlage zu einer sehr genauen AR-Visualisierung der Pflanzbereiche im Live-Videobild. Die Position der Kamera wird per Echtzeit-Bildverarbeitung aus speziellen Bildmerkmalen im Videobild der Kamera, bezogen auf die reale Bildszene, ermittelt.

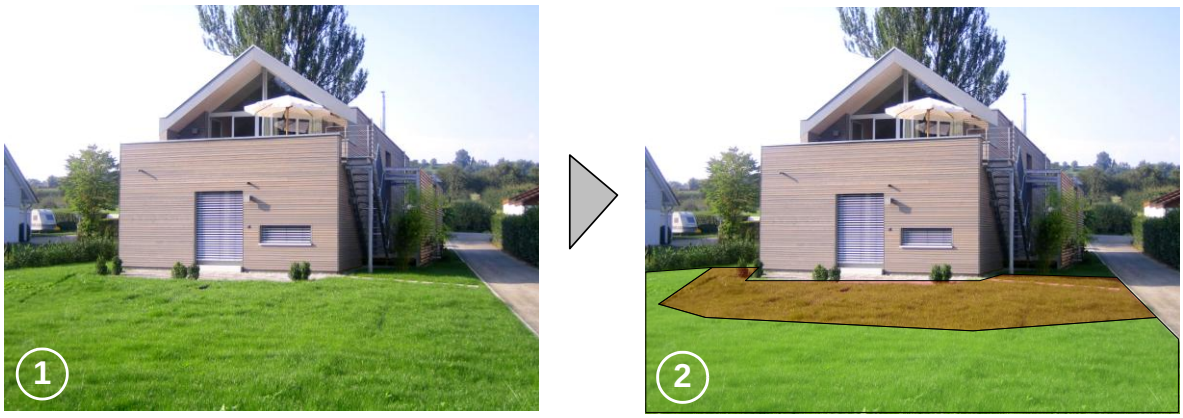

Abbildung 3: Prinzipskizze zur Funktionsweise einer Funktionalität, die den Anwender bei der Positionierung einer Pflanzenart hinsichtlich der Berücksichtigung des art-/sortenspezifischen Wuchsraumes unterstützt. Bild 1 zeigt das mit der Kamera des mobilen Endgerätes aufgenommene Live-Videobild. In Bild 2 werden dann nach der Auswahl einer bestimmten Pflanzenart in Echtzeit die Bereiche markiert, die hinsichtlich einer Positionierung der Pflanzenart geeignet (grün) oder ungeeignet (rot) sind. Der Anwender kann nun, unterstützt durch das System, eine geeignete Pflanzposition für die gewählte Pflanzenart bestimmen. Danach wird ein Billboard/3D-Modell der Pflanzenart an der gewählten Pflanzposition eingeblendet (siehe Abb. 1)

Wählt der Anwender des Systems einen Pflanzbereich aus, der hinsichtlich seiner Größe und seines Zuschnitts grundsätzlich nicht für bestimmte Pflanzenarten/-sorten geeignet ist (z.B. ist der Bereich zum Pflanzen einer Baumart zu knapp bemessen), so können bestimmte Arten/Sorten nicht mehr ausgewählt werden. Diese Funktionalität kann durch den Anwender wahlweise aktiviert werden, da in bestimmten Fällen ggf. auch wissentlich die Pflanzung einer Art/Sorte geplant wird, auch wenn diese dann nicht den optimalen Platz-/Raumbedarf vorfindet. Die so bestimmten Pflanzpositionen können dann als 2D-Bepflanzungsplan an einen ausführenden Betrieb übergeben oder zur weiteren Bearbeitung in ein CAD-System importiert werden. Für die Umsetzung der Komponente zur Unterstützung des Anwenders bei der Beachtung des notwendigen art-/sortenspezifischen Wuchsraumes liegen bereits einschlägige Erfahrungen und Ergebnisse aus einem abgeschlossenen FuE-Projekt vor, die entsprechend angewandt und/oder weiterentwickelt werden können.

3) Standortgerechte Auswahl von Pflanzenarten/-sorten

Die Funktionalitäten zur Unterstützung einer standortgerechten Auswahl von Pflanzenarten/-sorten werden bei Bedarf ebenfalls auf dem AR-Aufnahmesystem angezeigt, d.h. als Benutzeroberfläche zur Verfügung gestellt. Mittels GPS, digitalem Kompass und weiteren, noch präziseren optischen Tracking- bzw. Registrierungsverfahren aus dem Bereich der AR-Technologien werden die Position und die Ausrichtung des mobilen Endgerätes bestimmt. Die Genauigkeit von AR-Verfahren zur Positionsbestimmung liegt im Zentimeterbereich, somit sind diese für ein derartiges System geeignet (TÜMLER et al. 2008). Durch die bestimmte Position des Endgerätes in Kombination mit der Landschaftsinformationen-Datenbank (WebGIS-Services) erfolgt der Zugriff auf standortspezifische makro- und mesosystemische Informationen über die Klima- und Bodenverhältnisse (Winterhärtezone, durchschnittliche Niederschlagswerte, Lufttemperatur etc.) bzw. Informationen über die ökologischen Raumklassen.

Zusätzlich hat der Anwender die Möglichkeit, manuell weitere Standortinformationen für bestimmte Bereiche einzugeben/zu ergänzen (Lichtverhältnisse, Lebensbereiche nach HANSEN und STAHL 1997 oder KIERMEIER 1995, Bodenart etc.), die im Videobild markiert werden und dadurch als Attribute, z.B. von GRID-Zellen oder Vektoren in ein 2D-/3D-Modell übertragen werden, das auf einem WebGIS-System bereitgestellt wird. Die makro- und mesosystemischen Informationen können so bei Bedarf präzisiert werden, sollten die durch das WebGIS automatisch bereitgestellten Standortinformationen nicht genügen.

Diese dann im System vorhanden Informationen bilden die Grundlage zur standortgerechten Vorselektion von Pflanzenarten und -sorten durch eine weitere Systemkomponente – einer Online-Pflanzendatenbank.

Durch die internetbasierte Verknüpfung des Planungs- und Beratungssystems mit der Artikelstamm-Datenbank (siehe Abb. 2) können die Produktdaten der ausgewählten Pflanzenarten/-sorten an ein ebenfalls mit dem System verknüpften Warenwirtschaftssystem oder Internet-Verkaufsportal gesandt werden. Sollen Pflanzenarten/-sorten verwendet werden, die hinsichtlich ihrer Standortansprüche von den bestehenden

Standortverhältnissen abweichen, könnte ein derartiges System zukünftig auch dazu befähigt werden, Maßnahmen zur Standortverbesserung oder -anpassung (Substrataustausch, Mulch, künstliche Bewässerung etc.) vorzuschlagen und die dazu erforderlichen Leistungen als GAEB-konforme Daten auszugeben/weiterzuleiten oder Bestelllisten für die dazu benötigten Produkte zu generieren.

4 ARBEITSPROGRAMM

Zur Strukturierung des geplanten Vorhabens wurden zwei Arbeitsprogrammschwerpunkte (APS) formuliert. Durch die Kombination der Ergebnisse der APS entsteht ein Gesamtsystem, welches die Funktionalitäten zur Unterstützung einer funktions- und standortgerechten Pflanzenauswahl bereitstellt und dazu die in Abbildung 2 dargestellten Systemkomponenten bzw. entsprechende Daten/Informationen Web-basiert verknüpft. Im Folgenden werden die wesentlichen Aspekte der zwei APS kurz umrissen.

APS 1: Pflanzenverwendung und verteilte Web-basierte Informationssysteme

Der Fokus des ersten APS liegt auf der Bearbeitung der fachwissenschaftlichen und praxisbezogenen Fragestellungen innerhalb der Themen Pflanzenverwendung bzw. funktions- und standortgerechte Pflanzenauswahl sowie der Nutzung aktueller Informations- und Kommunikationstechnologien (IKT) zur Umsetzung und Web-basierten Verknüpfung der notwendigen Systemkomponenten. Im Vorhaben sind die fachlichen Maßgaben zur Umsetzung von Programmroutinen zur Entscheidungs-unterstützung (Unterstützung bei der fachgerechten Auswahl von Pflanzenarten/-sorten) zu ermitteln (Statusanalyse), durch eine Expertenbefragung zu verifizieren und als Maßgaben für die Entwicklung und Erprobung des mobilen Systems in einem Pflichtenheft zu definieren.

Die technischen Parameter zur Einrichtung und/oder Verknüpfung der folgenden Systemkomponenten: Applikations-Server, Pflanzen-datenbank (Kopie), Artikelstamm-Datenbank, Billboard-/3D-Modell-Datenbank, 2D-/3D-Geländemodelle/-Bestandspläne (WebGIS), Landschaftsinformations-Datenbank (ELCE, WebGIS) sind zu ermitteln. Dazu werden entsprechende Recherchen (Statusanalyse) sowie Expertenbefragungen durchgeführt und die Ergebnisse ebenfalls in einem Pflichtenheft dokumentiert. Weiterhin umfasst dieser ASP neben der Einrichtung/Anpassung/Verknüpfung von Systemkomponenten auch die Programmierung von Funktionalitäten zur Unterstützung der Pflanzenarten-/-sortenauswahl, sowie die technische und fachliche Evaluierung der Umsetzung der im Pflichtenheft definierten Kriterien und Parameter bei der Entwicklung des mobilen Systems.

APS 2: Visualisierung und Interface-Design

Der zweite APS umfasst die zu betrachtenden Aspekte der Visualisierung in der Landschaftsarchitektur bzw. speziell von Vegetation und widmet sich der Konzeption und Realisierung der AR-Umgebung und eines benutzerfreundlichen und intuitiven AR-Userinterface. Dazu werden im Vorhaben durch eine Statusanalyse alle fachlichen Parameter zur Visualisierung sowie zur Gestaltung und Bedienung der Benutzeroberfläche des AR-Aufnahme-/-Anzeigesystems ermittelt, durch eine Expertenbefragung verifiziert und in einem

Pflichtenheft als Konzeption zur Entwicklung und Erprobung (Evaluierung) definiert. Der Fokus liegt auf einem anwenderzentrierten Design von benutzerfreundlichen und intuitiven Interfaces (Schnittstellen, Interaktion, Benutzeroberflächen etc.) zur Administration der Systemkomponenten und insbesondere zur Bedienung des mobilen Planungs- und Beratungssystems.

Weiterhin sind Arbeitspakete zur Aufbereitung von Billboards und/oder 3D-Modellen sowie beispielhaften 2D-/3D-Bestandsplänen und ihre Bereitstellung durch die dafür vorgesehenen Systemkomponenten geplant. Weitere Schwerpunkte liegen auf der Begleitung der Programmierarbeiten und der Evaluierung des AR-Aufnahme-/-Anzeigesystems (AR-Umgebung) hinsichtlich einer fachgerechten sowie den Nutzeranforderungen entsprechenden Visualisierung von Vegetation sowie bzgl. der Umsetzung eines benutzerfreundlichen und intuitiven AR-Userinterface. Zur Ableistung der notwendigen Programmierarbeiten (Umsetzung des AR-Aufnahme-/-Anzeigesystems und des AR-Userinterface) ist eine entsprechendes Unternehmen in das Vorhaben einzubinden.

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Partizipationstool – Tool zur Überwindung von prozessbedingten Barrieren in Infrastrukturprojekten

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1 ABSTRACT

Der Anteil der Bevölkerung, der an der Planung und Entwicklung des eigenen Lebensumfelds mitgestalten und mitbestimmen möchte, ist in den letzten Jahrzehnten stetig gestiegen. Die Realisierung von Infrastrukturprojekten ist nur noch möglich, wenn möglichst gute Lösungen erarbeitet werden, die auf ausreichende Akzeptanz bei allen betroffenen und beteiligten Akteurinnen und Akteuren treffen – und dies bedarf eines professionellen, effizienten und konstruktiven Partizipationsprozesses.

Mit Hilfe des Partizipationstools (entstanden aus einem ways2go-Forschungsprojekt, bmvit) wird erstmalig ein optimales Zusammenspiel von technischen und nicht-technischen Methoden in Partizipationsprozessen über ein technologiebasiertes Planungswerkzeug zur Reduktion von planungs- und prozessbezogenen Barrieren und zur Unterstützung bzw. signifikanten Verbesserung der Bürgerbeteiligung in Planungs¬prozessen ermöglicht. Das Partizipationstool baut auf den existierenden Methoden der Partizipation, dem rechtlichen und wirtschaftlichen Rahmen, den Erkenntnissen aus der Praxis der Partizipation und den Anforderungen aller in Partizipationsprozessen beteiligten Personen, Personengruppen, Institutionen, Unternehmen etc. auf.

Das Partizipationstools besteht aus zwei Teilen: Das Frontend enthält sämtliche Online-Applikationen, die direkt im Partizipationsprozess eingesetzt werden können. Diese umfassen die Darstellung von Dokumenten jeder Art, von Personen, Gruppen und Terminen, ein Kommunikationsforum, die Möglichkeit zu Stellungnahmen etc. - das Frontend entspricht damit dem im Partizipationsprozess nach außen sichtbaren Teil des Partizipationstools. Das Backend stellt die Verwaltungsebene des Partizipationstools und damit des gesamten Partizipationsprozesses dar. Hier wird die Gesamtarchitektur der Partizipation verwaltet, werden alle Online-Applikationen betreut sowie alle Offline-Methoden und die Schnittstellen zwischen „online“ und „offline“ organisiert. Das gesamte Tool ist modulartig aufgebaut, um damit (je nach Bedarf eines Partizipationsprojekts) unterschiedliche Varianten bezogen auf Methoden und Umfang realisieren und anwenden zu können. In Summe wird mit dem Partizipationstool bidirektionale Kommunikation zum jeweiligen Projekt ermöglicht und im Kern die Komplexität von Partizipationsprozessen eingefangen, systematisch dargestellt und damit greif- und bearbeitbar gemacht.

Vom Einsatz des Partizipationstools profitieren alle beteiligten Personen Personengruppen, Institutionen, Unternehmen: Beteiligungsverfahren werden konstruktiver und effizienter (Zeit- und Kosteneinsparungen), die Planungssicherheit steigt, die Planung und Durchführung von Partizipationsprozessen wird klarer und professioneller und die Akzeptanz für erarbeitete Lösungen und die Barrierefreiheit im Zugang zu Partizipationsverfahren wird deutlich erhöht. Das Partizipationstool kann in Beteiligungsverfahren im Rahmen von Infrastrukturprojekten auf kommunaler, regionaler, nationaler aber auch internationaler Ebene eingesetzt werden. Neben der öffentlichen Verwaltung und der Politik zielt das Partizipationstool auch auf Infrastrukturprojekte ab, die von privaten Unternehmen umgesetzt werden.

2 AUSGANGSLAGE

Infrastrukturprojekte stellen einen wesentlichen Konjunkturmotor dar und sind entscheidend für die langfristige Lebens- und Standortqualität. Der Anteil der Bevölkerung, der an der Planung und Entwicklung des eigenen Lebensumfelds mitgestalten und mitbestimmen möchte, ist in den letzten Jahrzehnten stetig gestiegen. Die Stufen bzw. Ebenen der Information oder Konsultation werden jedoch seitens großer Teile der Bevölkerung als nicht mehr ausreichend erachtet – die Forderungen nach Kooperation, nach einer professionellen Mitgestaltung und Mitbestimmung, sind in nahezu allen öffentlichkeitsrelevanten Projekten sicht¬bar.

Die Realisierung von mobilitätsrelevanten Infrastrukturprojekten bedarf nicht nur bei der betroffenen Bevölkerung einer ausreichenden Akzeptanz. In vielen Fällen stellt sich die Herausforderung, mit Ziel- und Interessenskonflikten zwischen der Öffentlichen Hand, projektwerbenden Unternehmen, Interessengruppen und Verbänden, Planungsbüros und den betroffenen Bürgerinnen und Bürgern umzugehen. In der Praxis der

Partizipation lässt das Maß an konstruktivem Miteinander noch sehr viel Spielraum zur Verbesserung. Oft wird die Möglichkeit der Mitgestaltung und Mitbestimmung als Plattform des Widerstands um jeden Preis genutzt. Die Konsequenz daraus ist, dass viele Infrastrukturprojekte kaum noch eine Chance auf Realisierung haben und die Bereitschaft seitens Unternehmen, Politik und Verwaltung zu einer ehrlichen Einbindung der Bevölkerung teilweise wieder rückläufige Tendenzen aufweist. Einen beträchtlichen Anteil an diesem Umstand hat die Art und Weise, wie Partizipation in vielen Fällen von Infrastrukturvorhaben in der Praxis umgesetzt wird. Die Entwicklung (und darauf aufbauend der Praxiseinsatz) eines Partizipationstools sollte hier die Möglichkeit schaffen, planungsprozessbezogene Barrieren zu reduzieren und damit eine signifikante Verbesserung der Bürgerbeteiligung in mobilitätsrelevanten Planungsprozessen hin zu einem konstruktiven, ehrlichen und effizienten Miteinander zu erreichen.

Es gibt eine sehr große Anzahl und Vielfalt unterschiedlicher Methoden der Partizipation. Diese teilen sich auf in traditionelle (nicht technologiebasierte) Methoden wie Konsensuskonferenz, Planungszelle, Zukunftswerkstatt, Kooperativer Diskurs, Mediation, Runder Tisch, „Open Space“, Neo-Sokratischer Dialog, Workshops jeglicher Art, Bürgerforen, Bürgerversammlungen, Bürgerbeiräte etc. und internet¬basierte e-Partizipationsmethoden wie Online-Befragungen, Internetforen, Chats, e-Petitionen etc.

In der derzeitigen Praxis hängt die Auswahl der Methode vom jeweiligen Projektvorhaben, der Erfahrung und dem Wissensstand der Projektverantwortlichen und der gewünschten Intensität der Partizipation und Mitbestimmung ab. Dies führt dazu, dass nicht immer die „optimalen“ Methoden aus dem Pool existierender Methoden Anwendung finden und sehr selten eine „Gesamtarchitektur“ aus „Online-“ und „Offline-Elementen“ eines Partizipationsprozesses erstellt wird. Welche Methoden wann optimal zum Ein¬satz gebracht werden können, bedarf einer genauen Analyse der jeweiligen Situation resp. der Beachtung relevanter Auswahlkriterien.

Technologiebasierte Methoden werden in den meisten Fällen gar nicht oder nur sehr eingeschränkt eingesetzt. Als Gründe dafür werden meist die Nachteile von unpersönlichem Kontakt und das Nicht-Erreichen von Teilen der Bevölkerung (Coverage-Probleme) genannt. Ein umfassender und jeweils optimierter Einsatz von bereits bekannten und erprobten technologiebasierten Methoden sowie innovativen Ansätzen, findet somit derzeit nur selten statt. Die Konsequenz daraus ist, dass jeweils eine nennenswerte Anzahl an planungsprozessbezogene Barrieren nicht oder nicht ausreichend überwunden werden können und damit keine optimalen oder oft auch gar keine Lösungen erarbeitet werden.

3 INTERNATIONALER KONTEXT

Beteiligungsverfahren werden bei Infrastrukturprojekten weltweit durchgeführt. Allerdings werden hier auch international selten bedarfsgerechte Kombinationen aus Methoden (online- und offline Services) angewandt, auch wenn insgesamt die Nutzung von e-Partizipations-Services weltweit auf dem Vormarsch ist. Bereiche, in denen e-Partizipations-Services von Bürgerinnen und Bürgern besonders genutzt werden, sind Umwelt, Gesundheit und Bildung. Laut dem aktuellen „United Nations E-Government Survey 2010“ steht im Vordergrund zwar das Verbreiten von Informationen, doch immer mehr Regierungen nutzen auch Web 2.0 Anwendungen und soziale Netzwerke wie facebook oder twitter um Bürgerinnen und Bürgern die Möglichkeiten zu geben, am politischen Gestaltungsprozess teilzuhaben – und dies vor allem auf lokaler Ebene. Wenn es darum geht, Entscheidungsprozesse mit zu beeinflussen, sind Regierungen noch zurückhaltend. Nur 9% aller Länder erlauben und nutzen e-Petitionen – führend ist hier Großbritannien.

Wie in „United Nations e-Government Survey 2010“ betont, ist es für den Erfolg von e-Partizipation wichtig vor allem auf Sprache, Form, Inhalt und Zugangsmöglichkeiten zu achten. Um hier alle Bevölkerungs-segmente zu erreichen, sollte ein Methodenmix angewandt werden. Laut dem Bericht hat sich gezeigt, dass Top-Down Ansätze oft erfolglos bleiben. Bürgerinnen und Bürger nutzen dann e-Partizipation, wenn sie bereits in den Planungsprozess vor der eigentlichen Umsetzung des e-Services eingebunden sind. Auch zeigt sich, dass eine gleichberechtigte Teilhabe von Männern und Frauen nur möglich ist, wenn gender mainstreaming ernst genommen und entsprechende Ziele und Strategien bereits im Planungsstadium sowie in der weiteren Durchführung berücksichtigt und verankert werden. Dies gilt genauso für Strategien des Diversitätsmanagements.

Zu ähnlichen Schlüssen kommt auch die europäische Kommission. Im Rahmen des EC „e-Participation Programme“ werden verschiedene Projekte innerhalb der EU gefördert. Ziel ist es neue Verfahren zu

entwickeln und innerhalb der EU zu verbreiten. Ein Blick auf die geförderten Projekte zeigt jedoch, dass keines der Projekte versucht ein Verfahren zu entwickeln, dass es ermöglicht bedarfsgerecht Methoden (online oder nicht online basiert) auszuwählen und anzuwenden. Es werden hauptsächlich vereinzelte Methoden getestet und dies vor allem im Bereich der Gesetzesentwicklung. Thematisch scheinen Umweltthemen, vor allem Klimawandel und die spezifische Beteiligung von Jugendlichen von Interesse zu sein. In der Entwicklungszusammenarbeit werden seit Jahrzehnten partizipative Methoden getestet und erfolgreich angewandt. Auch wenn die Nutzung konventioneller Methoden (offline) im Vordergrund steht, gibt es hier verschiedene interessante e-Partizipation Pilotprojekte.

Österreich ist weder auf EU-Ebene noch in der internationalen Debatte führend - laut der UN-Studie scheint es hier noch einiges an Nachholbedarf zu geben. Während Österreich 2008 im e-Participation Ranking noch auf Platz 20 lag, hat es sich 2010 nicht unter den Top 20 halten können, weder bei e-Government, noch bei e-Partizipation. Das Ranking wird von Südkorea angeführt. Von den EU Ländern befinden sich mit Spanien (Platz 3) und Großbritannien (Platz 4) zwei unter den ersten 5. Weiterhin sind Estland, Dänemark, Deutschland, Frankreich, Niederlande, Belgien, Litauen und Slowenien unter den Top 20.

4 DIE ÜBERWINDUNG VON BARRIEREN – EINE HERAUSFORDERUNG

Das Überwinden folgender Barrieren muss Ziel jeder Partizipation sein – damit sollte auch das Partizi¬pations¬-tool hierzu einen wichtigen Beitrag leisten.

- Die Einbindung einer kleinen Minderheit von Betroffenen (aktiv Beteiligte) ohne die Sicherheit, die Meinung, Bedürfnisse und Interessen möglichst aller Betroffenen im Verfahren vertreten zu haben;
- Keine ausreichende Barrierefreiheit im Zugang zum gesamten Partizipationsprozess;
- Keine zeitlich und räumlich unabhängige Möglichkeit der Mitgestaltung innerhalb des Partizi¬pations-prozesses;
- Der Missbrauch von Partizipationsverfahren als Forum des Widerstands gegen nicht projektrelevante Personen, Einrichtungen, Parteien, Haltungen, Werte etc. und damit eine destruktive Haltung im Verfahren selbst;
- Geringe zeitliche und finanzielle Effizienz der Partizipation, vor allem auch über die Möglichkeit, das Partizipationsverfahren zeitlich zu „verschleppen“;
- Keine ausreichende Übersicht und Klarheit über alle projektrelevanten Daten und Informationen (Ausgangslage, Zielsetzung und einzelne Sichtweisen dazu, Handlungsspielräume, Planungs-grundlagen, Planungsstand, Planungsunterlagen, beteiligte Gruppen und Interessen, einzelne Sicht-weisen und Standpunkte zum Projekt selbst, Planungsabläufe, Entscheidungsabläufe, rechtlicher Rahmen etc.)
- Keine oder unprofessionelle Begleitung von Rückbindungsprozessen von Delegierten in die jeweiligen Herkunftsgruppen;
- Keine ausreichende Trennung zwischen den Interessen und Bedürfnissen von Privatpersonen bzw. Vertreterinnen und Vertretern von Gruppen;
- Ineffiziente Schnittstellen zwischen dem Partizipationsverfahren und dem jeweiligen formellen Verfahren (Verwaltungsverfahren zur Genehmigung etc.);
- Keine ausreichende Planungssicherheit für Projektwerber;
- Keine ausreichend repräsentative Erhebung des Meinungsbilds aller Betroffenen als Grundlage für eine Entscheidung bzw. demokratietheoretisch bedenkliche oder nicht transparente Entscheidungs-prozesse.

Die Herausforderungen in der Erarbeitung des Partizipationstools lagen vor allem auch in dem Zusammen-spiel von technischen und nicht-technischen Methoden für mögliche Anwendungsfälle einer Partizipation, um damit möglichst einen Beitrag zur Überwindung der genannten Barrieren zu leisten.

5 PARTIZIPATIONSTOOL – DER AUFBAU

Das Partizipationstool soll als ein technologiebasiertes Planungswerkzeug ein optimales Zusammenspiel von technischen und nicht-technischen Methoden in Partizipationsprozessen zur Reduktion von planungs- und prozessbezogenen Barrieren und zur Unterstützung bzw. signifikanten Verbesserung der Bürger¬beteilung in Planungsprozessen ermöglichen. Diese Unterstützung sollte nicht nur in der Durchführung des Beteiligungs-prozesses, sondern einerseits auch in der Planung, der Dokumentation und dem Monitoring stattfinden und andererseits auch die Analyse und Evaluierung eines Prozesses begleiten (siehe Abbildung 1).

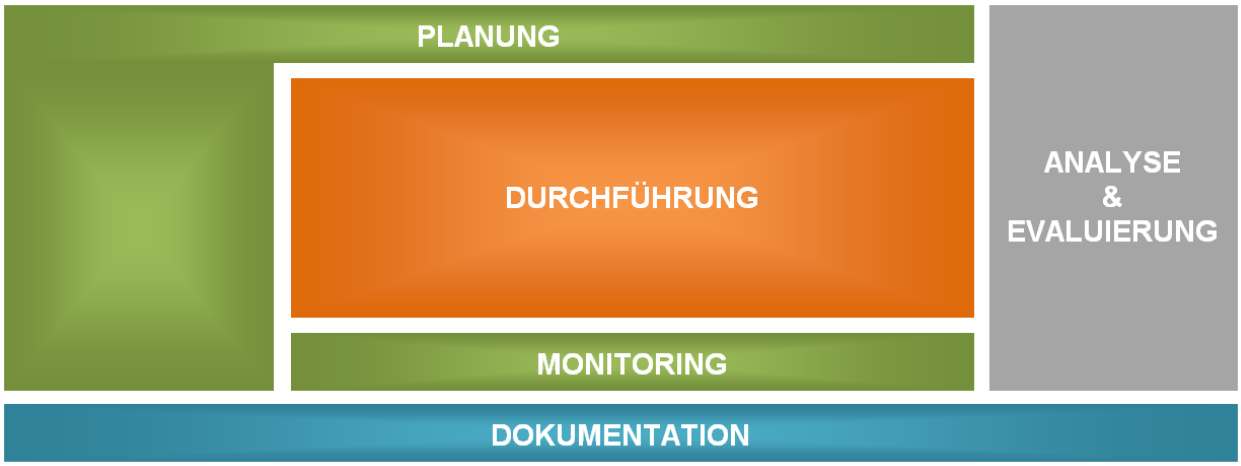

Abbildung 1: Einsatzbereiche des Partizipationstools im zeitlichen Ablauf einer Beteiligung

Das Partizipationstools besteht aus zwei Teilen: Das Frontend enthält sämtliche Online-Applikationen, die direkt im Partizipationsprozess eingesetzt werden können. Das Frontend entspricht dem im Partizi¬pations-prozess nach außen sichtbaren Teil des Partizipationstools und umfasst unter anderem ein inteligentes Dokumentenmanagementsystem, die Möglichkeit der Darstellung von Personen und Gruppen, von Ereignissen (Begehungen, Versammlungen etc.), Kommunikations-, Mitbestimmungs- und Mitgestaltungs¬tools etc. – im Kern wird dies über die vier Teile/Elemente „Personen“, „Gruppen“, „Events“ und „Dokumente“ abgebildet (siehe Abbildung 2), die jeweils untereinander verknüpft sind. Das Backend stellt Verwaltungsebene des Partizipationstools und damit des gesamten Partizipationsprozesses dar. Hier wird die Gesamtarchitektur der Partizipation verwaltet, werden alle Online-Applikationen betreut sowie alle Offline-Methoden und die Schnittstellen zwischen „online“ und „offline“ organisiert. Das gesamte Tool ist modulartig aufgebaut, um damit (je nach Bedarf eines Partizipationsprojekts) unterschiedliche Varianten bezogen auf Methoden und Umfang realisieren und anwenden zu können. In Summe wird mit dem Partizipationstool bidirektionale Kommunikation zum jeweiligen Projekt ermöglicht und im Kern die Komplexität von Partizipationsprozessen eingefangen, systematisch dargestellt und damit greif- und bearbeitbar gemacht.

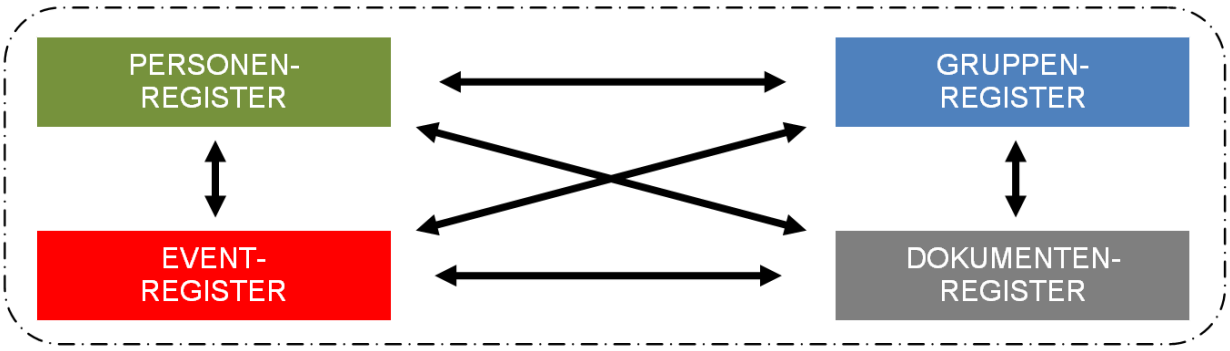

Abbildung 2: Grobstruktur / Elemente des Partizipationstools

6 PARTIZIPATIONSTOOL – DER NUTZEN

Der Einsatz eines Partizipationstools soll auf jeden Fall das Erreichen folgender Ziele unterstützen bzw. erleichtern:

- Einbindung von Meinungen, Bedürfnissen und Interessen möglichst aller Betroffenen in Planungsprozessen, unter besonderer Berücksichtigung von Gender und Diversitätsaspekten;
- Barrierefreiheit im Zugang zum gesamten Partizipationsprozess und zeitlich und räumlich unabhängige Möglichkeit der Beteiligung;
- Reduktion des Missbrauch von Partizipationsverfahren als Forum des nicht-projektbezogenen Widerstands hin zu einem konstruktiven, gemeinsamen Gestalten
- Erhöhung der zeitlichen und finanziellen Effizienz der Partizipation;
- Verbesserung der Übersicht und Klarheit über alle projektrelevanten Daten und Informationen;
- Passende Trennung zwischen den Interessen und Bedürfnissen von Privatpersonen bzw. Vertreterinnen und Vertreten von Gruppen;
- Ermöglichung effizienter Schnittstellen zwischen dem Partizipationsverfahren und dem jeweiligen formellen Verfahren sowie der Planungssicherheit für Projektwerber;
- Darstellung eines repräsentativen Meinungsbilds aller Betroffenen bzw. demokratie-theoretisch unbedenkliche und transparente Entscheidungsprozesse.

Damit kann einerseits eine bessere Daten-, Interessen- und Bedürfnisgrundlage für Planungsanwendungen ermöglicht werden und andererseits ein Werkzeug eingesetzt werden, das in Partizipationsprozessen zu einer optimierten Wissensbereitstellung und Wissensanwendung sowie zu einer besseren bidirektionalen Kommunikation beitragen kann. Das Partizipationstool kann in Beteiligungsverfahren im Rahmen von Infrastrukturprojekten auf kommunaler, regionaler, nationaler aber auch internationaler Ebene eingesetzt werden. Neben der öffentlichen Verwaltung und der Politik (Bund, Land, Bezirk und Gemeinde) zielt das Partizipationstool auch auf Infrastrukturprojekte ab, die von privaten Unternehmen umgesetzt werden.

Aufgrund der Online-Applikationen des Partizipationstools und der effizienten Verwaltung der Schnittstellen zwischen den Online-Applikationen und den Offline-Methoden ergibt sich außerdem eine verstärkte Effizienz, Kosten- und Zeitersparnis. So erlaubt es das Internet z.B. umfangreiche Planungsunterlagen, unabhängig von Öffnungszeiten und ohne Kopier- und Versandkosten bereitzustellen. Fragen, Meinungen, Anregungen, Petitionen etc. können von den Betroffenen/Beteiligten einfach online eingereicht werden oder auch direkt in die Planungsunterlagen eingetragen werden. Die Beteiligten können die Online-Applikationen des Tools nutzen, wann immer es ihre Zeit erlaubt. Damit können breitere Bevölkerungsschichten erreicht werden, was zu einem Abbau der genannten Barrieren führt. Weiters können bestimmte Bevölkerungs- bzw. Interessensgruppen wie Migrantinnen und Migranten, Jugendliche etc. gezielt angesprochen, ihre Meinungen abgefragt und in den Planungsprozess einbezogen werden.

7 WICHTIGES ZUM SCHLUSS

Das Partizipationstool kann und soll immer nur eine Ergänzung und Unterstützung von physischer Begegnung sein. Ein guter Planungs- und auch Beteiligungsprozess steht und fällt mit der Qualität des Planungs- und Moderationsteams – das Partizipationstool alleine kann und „will“ gar nichts leisten. Die Begleitung und Unterstützung des Gesamtprozesses über das Partizipationstool kann jedoch zur Förderung von Kontinuität, Vertrauensbildung und Transparenz beitragen und damit einen wichtigen Beitrag zur Verbesserung der Beteiligung von Bürgerinnen und Bürgern in Infrastrukturprojekten leisten.

8 QUELLEN

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„Pedestrianize Your City“ – Elemente und Vorteile einer Fußgängerstrategie sowie eines Fußgängerchecks für Ihre Stadt

Dieter Schwab, Martina Strasser

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1 ABSTRACT

Eine Stadt, die sich der Nachhaltigkeit und „(Wieder)-durchmischung“ widmet, ist eine Stadt die, Fußgängerstrategien schon heute umsetzt, eine Tradition darin hat und bzw. oder gewillt ist den Anforderungen in der Zukunft gut gewachsen zu sein.

Welche Elemente eine effiziente Fußgängerstrategie beinhaltet und welche Vorteile dies bringt, und was es für die Lebensqualität in einer zukunftfähigen Stadt bedeutet, wird im Rahmen dieses Beitrags aufgezeigt und im Referat behandelt. Aus den Projekterfahrungen von walk-space.at – dem Österreichischen Verein für Fußgänger/-innen können unter anderem Ansätze für ein Strategie-/ einen Masterplan Gehen/Fußverkehr vorgestellt werden. Internationale Beispiele, so wie die Fußverkehrsinitiativen in Deutschen Städten oder die schweizer Strategie zur Forcierung des „Langsamverkehrs“ geben Anregungen für nachhaltige Stadtstrukturen.

New York:. If you can do it there, you can do it everywhere (vorher/nachher).

Fußgänger/-innen beleben den urbanen Raum – stärken die Nahversorgung und sind ein großes Potenzial verstärkt zu lokalen Kreisläufen zurückzukehren. Sparsam im Flächenverbrauch, nahezu lautlos und sehr CO_2-neutral trägt der Fußverkehr wesentlich zur Wohn- und Lebensqualität einer Stadt bei. Urbane Räume, die qualitätsvolle Fußwege bieten und öffentliche Räume als „Wohlfühloasen“ in Mitten des oft hektischen Alltags, tragen zu einem lebenswerten Wohn-, Arbeits- und Erholungsumfeld bei. Straßenraumumgestaltungen wie beispielsweise die Begegnungszone mit Tempo 20 nach Schweizer, belgischem und französischem Vorbild, oder „Shared Spaces“ sind erfolgreiche Beispiele für ein positives Miteinander aller Verkehrsteilnehmer/-innen.

2 WICHTIGE ELEMENTE EINER FUSSGÄNGERSTRATEGIE

Fußgängerfreundliche Strukturen: bringen alle Gelegenheiten – ob Versorgung, Erholung, soziale Beziehungen, Dienstleistungen, etc. wieder in die Nähe!

Mit dem demographischen Wandel, den Auswirkungen des Klimawandels und des Mobilitätsverhaltens als auch des Gesundheitszustandes jetziger und künftiger Generationen kommt eine zunehmende Bedeutung

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dem Fußverkehr zu. Die Schweiz hat dies schon frühzeitig erkannt und bereits 1979 Grundlagen zur Förderung des Fußverkehrs geschaffen und auch beschlossen (Verfassungsartikel für die Planung und Erhaltung von Fuß- und Wanderwegen). Eine der wesentlichen Gleichstellung des Fußverkehrs zum motorisierten Individualverkehr ist das Modell der Begegnungszonen und das Agglomerationsprogramm, welches nur dann das Förderfüllhorn öffnet, wenn das Fußwegenetz klar ersichtlich und Teil der Gesamtplanungsvorhaben sind.

Auch in Deutschland will man künftig den Fußgängern/-innen mehr Aufmerksamkeit zukommen lassen. So wurde 2011 eine Fußverkehrsstrategie für Berlin beschlossen (siehe dazu Wohlfahrt von Alm in www.walk-space.at/images/stories/projekte/seminare/CD_Fachkonferenz_2011_Salzburg.pdf).

Im Rahmen des Vortrags bei der CORP werden internationale Beispiele aber auch Prinzipien und Maßnahmen für den Fußverkehr für Österreich vorgestellt. Aufgrund der umfangreichen Thematik einer Fußverkehrsstrategie für Österrreich seien im Folgenden einige wichtige Elemente dargestellt.

2.1 Bewusstsein-(sbildung)

Neue Transformationsprozesse des öffentlichen Raumes wecken einen Trend zum zu Fuß gehen durch die räumlichen Qualitäten und Verbesserungen in Form von Koexistenz statt Dominanz einer Mobilitätsform.

Pilotprojekte in Österreich, wie „Begegnungsraum Maxglaner Hauptstraße“, „Shared Space“ in Gleinstätten oder Neugestaltung des Sonnenfelsplatzes in Graz (siehe dazu auch Newsletter 3 2011 Walk-space.at) sind für diesen Entwicklungsprozess wichtig, weil sie u. a. durch positive mediale Berichterstattungen eine Öffentlichkeitswirkung erreichen und einen Umdenkprozess in Gang setzen bzw. verstärken. Konzepte wie die Begegnungszonen (www.begegnungszonen.ch) aus der Schweiz, oder das Koexistenzprinzip (http://www.bve.be.ch/bve/de/index/strassen/strassen/berner_modell.html) stellen für Fußgänger/-innen gute Lösungen einer qualitätsvollen Stadtgestaltung dar.

Besonders in urbane Räume ist der Fußverkehr effizient, energiesparend, umweltgerecht, gesund und kostengünstig, dennoch wird sein Stellenwert oft noch unterschätzt. Werden allerdings die Anzahl der Wege (Etappen) betrachtet, so sind die Anteile des Fußverkehrs am Modal Split am höchsten.

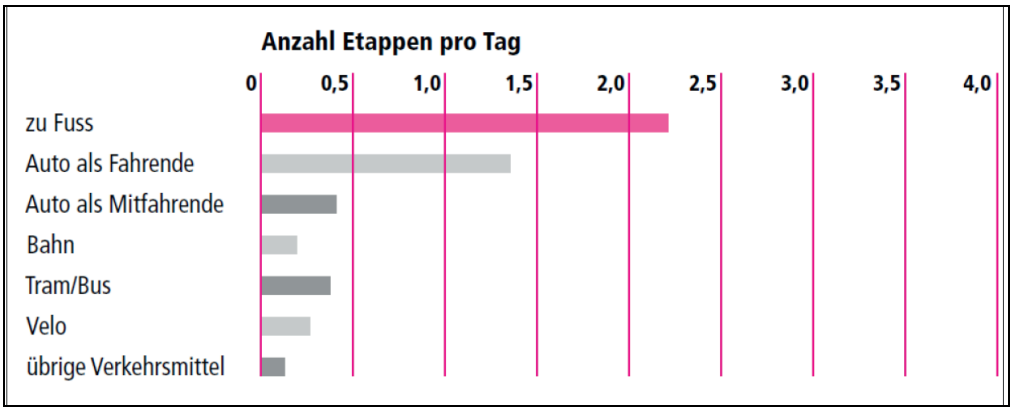

Fig. 1: Unterwegszeit in der Schweiz; Bucheli, D., „Elemente einer Strategie zur Förderung des Fussverkehrs in der Schweiz”, 5. österr. Fußgängerfachkonferenz „Green Mobility – zu Fuß im Alltag“ 10.11.2011.

Um Fußgängerstrategien realisieren zu können, muss daher in erster Linie ein Bewusstsein auf politischer Ebene und in der Öffentlichkeit geschaffen werden. Gehen ist nicht etwas, dass v.a. arme Leute tätigen. Gehen sowie die dafür notwenigen Komfort- und Qualitätsausstattungen gehören zu einer zukunftsfähigen Stadt, die sich durch Wohlfühlfaktoren kennzeichnet und nicht durch Staus und verparkte öffentliche Räume. Dazu ist es wichtig, dass ein Bewusstsein für die Relevanz und Notwendigkeit in der Umsetzung in Verwaltung und bei politischen Vertretern existiert oder durch **laufende Informationsprozesse** auch in der Bevölkerung geschaffen wird. Konferenzen**, Tagungen und Projekte sowie Netzwerkinitiativen** können im Sinne eines „State oft he Art-Austausches" diesen Prozess in der Fachöffentlichkkeit gut unterstützen.

2.2 Image-(kampagnen)

Angesichts der klaren Vorteile, die der Fußverkehr im Rahmen der Möglichkeiten (Streckenlängen, Infrastruktur, in der Wegekette) mit sich bringt, ist Gehen in vielen Fällen, die am klügsten gewählte Fortbewegungsart. Dieses Bewusstsein gilt es bei Politik, Verwaltung, Kommunen aber auch der allgemeinen Öffentlichkeit zu schaffen und zu erhöhen. Fußgängerfachtagungen (http://www.walk-space.at/fussgangerseminar/fussgaengerseminare.html) aber auch Preisauszeichnungen wie der „Walk-space AWARD für gute Fußgängerlösungen" (http://www.walk-space.at/Walk-Space-Award/der-walk-space-award.htm l) tragen in Österreich bereits dazu bei. Kampagnen, die die Vorteile des Gehens kommunizieren und die Zusammenhänge bewusst machen, erhöhen nicht nur die Chance zum Umsteigen vom Kfz auf das Gehen (+ÖV+Rad) sondern leisten auch einen Beitrag zur Gesundheitsprävention.

Kreative Imagekampagnen wie das Projekt „Die Stadt liegt Dir zu Füßen" der Stadt Graz, die Schülerrkmpagne von Perchtoldsdorf oder die südtioler Kampagne „Innichen – gut zu Fuß" wecken die Lust auf das zu Fuß gehen. Weitere Beispiele sind die niederösterreiche 10.000 Schritte Aktion „Los geht's! Jeder Schritt tut gut!" oder die Straßenmalaktion "Blühende Straße" im Rahmen der Europäischen Mobilitätswoche aber auch verschiedenste Beispiele vieler Straßenraumfeste in Österreich, die den Verkehrsraum in einen (grünen) Freiraum temporär transformieren.

2.3 Dialog und prozesshafte Maßnahme

Ein gutes Fußwegenetz orientiert sich an den Bedürfnissen von Frauen und Männern, jungen und älteren Menschen wie auch mobilitätseingeschränkten Personen.

Ein wichtiges Ziel ist daher, Qualitätsverbesserungen im öffentlichen Raum bereit zu stellen, insbesondere hinsichtlich:

- Lebenswerte Straßenraumgestaltungen
- Verweilmöglichkeiten (auch ohne Konsumzwang)
- Ruhemöglichkeiten, Sitzgelegenheiten
- Sozialraum: Begegnungen
- Freiraumqualitäten, Schatten, Pflanzen
- Sicherheit, Sichtverbindungen
- Wegeverbindungen, Orientierung
- Schnittstellen mit Qualitäten zu anderen Verkehrsmitteln v.a. zum öffentlichen Verkehr, Radinfrastruktur

Um möglichst vielen Menschen das Gehen zu ermöglichen – vor allem auch jenen Zielgruppen, die auf das Gehen angewiesen sind (Kinder, ältere Menschen, etc.) braucht es Voraussetzungen bezüglich Komfort, Sicherheit, Ästhetik, Leichtigkeit und Flüssigkeit. Es ist daher wichtig die Bedürfnisse der Nutzer/-innen des lokalen Fußwegenetzes einzubeziehen.

Ein wirkungsvolles Instrument dafür stellt der „Fußgänger-Check“ dar.

Der „Fußgänger-Check“ für Städte und Gemeinden

Wer viel zu Fuß unterwegs ist, ärgert sich über Schwachstellen des Wegnetzes. Bei fehlenden Straßenübergängen oder Behinderungen des Weges kann es zu gefährlichen Situationen kommen. Der „Fußgänger-Check“ für Städte und Gemeinden zeigt die Möglichkeiten zur Verbesserung der Qualität um für die Fußgänger/-innen das Umfeld so attraktiv und sicher wie möglich zu gestalten.

Eine qualitätsvolle Fußgängerplanung bezieht nicht nur punktuelle Verbesserungsmaßnahmen ein, sondern schafft ein engmaschiges Fußwegenetz ohne Hürden und Unterbrechungen. Verbesserte Querungen, geöffnete Durchgänge, kurze Wege und gute Orientierungsmöglichkeiten sind einige der wesentlichen Anforderungen an ein gutes Wegenetz für Fußgänger/-innen. Mit ununterbrochenen Fußgängernetzen und dem Mut, Straßenfläche für Fußgänger/-innen umzuwidmen, kann nicht nur das Gehen, sondern auch die Verkehrssicherheit, die Umwelt und das gesamte urbane Leben, gefördert werden.

Der „Fußgänger-Check“ bringt Fußgänger/-innen mit verantwortlichen Behörden zusammen und schafft so den Rahmen für einen Dialog und Maßnahmensetzungen. Mit der Einbeziehung jener Personen, welche das Gebiet täglich als Fußgänger benutzen, können lokale Erfahrungen und regionales Wissen in den Prozess einfließen.

Herzstück des Vorgehens ist eine gemeinsame Begehung, bei der die spezifischen Bedürfnisse im Wegenetz der Fußgänger/-innen vor Ort gesammelt werden. Die gemeinsame Arbeit mit der jeweiligen Nutzergruppe ermöglicht klare Prioritäten festzustellen. Ziel dieses Prozesses ist, gemeinsam realisierbare Maßnahmen zu finden und eine rasche Umsetzbarkeit erster Resultate zu erreichen. Das Instrument bietet eine „maßgeschneiderte Vorgehensweise“, um den finanziellen und personellen Aufwand gering zu halten.

Bis zu 50 Prozent der Kosten (des Fußgängerchecks selbst – aber auch der Umbaumaßnahmen!!) sind via klima:aktiv mobil, in Abhängigkeit von den erzielten Umwelteffekten, förderbar. Die bisherigen Projekterfahrungen u. a. aus Salzburg, St. Pölten, und anderen Gemeinden, wie z.B. Perchtoldsdorf in Niederösterreich oder in Graz zeigen die Chancen und Potenziale des „Fußgänger-Check“ für Städte und Gemeinden auf. Details dazu: http://www.walk-space.at/service/fusscheck.html

Einbeziehung besonderer Gruppen – es geht um die Menschen

Angesichts der demografischen Entwicklung in den Kommunen Österreichs und der zunehmenden „Überalterung“ der Bevölkerung, sollte bei Maßnahmen für den Fußverkehr der Zielgruppe „ältere Menschen“ besondere Bedeutung zukommen. Die Zahl der Menschen im höheren Alter wird mittel- und langfristig stärk ansteigen, weshalb dieser bevorstehende Alterungsprozess eine der größten gesellschaftlichen Herausforderungen der Zukunft darstellen wird. Je älter wir Menschen werden, desto mehr

sind wir auf das Transportmittel „Füße“ wieder angewiesen. Damit steigt jedoch auch der Anspruch an eine qualitätsvolle Verkehrsinfrastruktur, an ein gutes Fußgängernetz.


Doch das zu Fuß gehen im Alter hält auch fit! Eine umfassende Übersicht über die daraus folgenden Veränderungen und Anforderungen an ein Verkehrssystem der Zukunft, sowie Verkehrssicherheitsaspekte und das Mobilitätsverhalten älterer Menschen ist in der Broschüre "Zu Fuß im höheren Alter" im Detail dargestellt: http://www.walk-space.at/zu-fuss-im-hoheren-alter/zu-fuss-im-hoeheren-alter.html

Dialog Rad /Fuß

Dialog ist insofern dort besonders bedeutsam, wo es um das Erlernen von Mobilitätsmustern oder ein verbessertes Miteinander der Verkehrsteilnehmer/-innen geht – wie beim Thema Radfahren und zu Fuß gehen. Der „FAIRness AKTIONstag“ am Donaukanal in Wien bot unterschiedliche Angebote für ein faires Miteinander. Walk-space.at sammelte gemeinsam mit IGF u. a. Verbesserungen zur Begegnung von Radfahrern und Fußgänger/-innen.

Aufgrund der Erfahrungen aus dem Pilotprojekt „Gut Zu Fuß in St. Pölten“ - Fußnah wird die Bedeutung von Mobilitätssensibilisierungen von Schülern/-innen samt deren Eltern deutlich. Siehe auch: http://www.walkspace.at/pages/projekte.htm

3 SCHLUSSFOLGERUNGEN/CONCLUSION

Fußläufige Qualitäten sind die Voraussetzung für zukunftsfähige Städte und eine (Wieder)-Durchmischung, - die für alle Akteure zu einem lebenswerten Leben nötigen Ziele (Versorgung, Erholung, Beegnung, Sozialräume, etc.) werden wieder in die Nähe gerückt.

Im Vortrag werde ndazu internationale und österreichische Good-practice vorgestellt, werden Fragen diskutit wie es optimal gelingen die Stadt der kurzen & qualitätsvollen Wege zu realisieren – den menschlichen Maßstab wieder gut herzusellen.

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People Articulating "the Urban" in Serbia: On-line Platform for the Dialog about Public Spaces, their Availability and Public Usage

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1 ABSTRACT

This paper elaborates on the collaborative on-line platform for spatial resources in Serbia. This is an existing solution for the bottom-up involvement of stakeholders and communities in the revivification of non-functioning public spaces, a hideous legacy of the communist past and transitional present times. This idea of collaboration by means of a virtual resources data base actively uses the technological advances of modern times and enables a passive spectator-urban actor to take an active part in the creation of their environment. This thus provides them with an adequate framework for their spatial and social endeavours with regard to existing built structures in the current urban context.

Generally speaking, any built environment always reflects political and economic processes, especially in turbulent social times such as the disintegration of Yugoslavia's socialist system. These circumstances led to the destabilization of the institutions and the social value system in Serbia, depriving an average citizen of sufficient information about "the urban" and the possibilities and tools for action in their immediate surroundings. In this respect, this sort of on-line, participatory, user-friendly activity constitutes an incessant quest to examine and evaluate urban structures and related practices. It motivates inhabitants to develop an understanding of public spaces, the built environment and a variety of urban settings and trends, which thus become endowed with clear meaning and a positive purpose. This process means that public spaces are therefore eventually adapted to meet human needs.

This collaborative on-line platform launched a website in 2009 as a community-driven initiative to challenge uniform and centralized decision-making processes regarding the availability of special resources. The objective was to gradually and systematically change policies and attitudes within Serbian society, to raise people's awareness of their spatial needs and to enable them to engage in the public life of their cities. In other words, this exposes inhabitants to the reality of urban problems and encourages them to take an active part in the decision-making process of their cities' genesis. Moreover, this campaign ensures direct cooperation among urban stakeholders and informal groups concerning space utilization data, procedures, and practices. Every single case is tackled so as to have a clear and actualized presentation of each urban conflict. The site contains sections for mapping, two-way collaboration and discussion on focal spatial issues. To date, this service contributed to reviving more than 1500m2 of space in Belgrade. Similar initiatives have spread in 20 other towns in Serbia.

In short, this introduction of "the urban" as a tool for action-orientated public critique through modern means of communication such as the Internet, places urban patterns and structures in a positive flux. Citizens are stimulated to react to spatial conflicts. This then galvanizes them into positive action by proposing social practices to invest the space with beneficial social purposes. This activity transforms urban structures which are examined once again and subject to initiative-driven change. The question of space customization becomes a dynamic circle, forming a common meeting ground between actors and space. The rise of urban conflicts in daily life that are beyond the citizens' grasp can thus be prevented.

2 INTRODUCTION

2.1 Public Space in terms of the Serbian Transitional Arena

As in other post-socialist, transitional societies in Central and Eastern Europe, the urban transformation of Serbian cities witnessed dramatic social, economic and political deterioration at the end of the 20th century. The abrupt shift from a communist regime to that of a neo-liberal economy hindered urban development in Serbia and led to political instability, convergent socio-economic forces and inconsistent planning systems. Top-down urban planning procedures and strategies, inherited from the communist era, were rendered inefficient in addressing urban conflicts at all spatial levels. If you add to this the failure of successfully replicating more advanced models of western neo-liberal economies, it became clear that a fragmented,

small-scale approach to spatial and social conflict could achieve more long-term consistent and far-reaching results. An informal, problem-solving strategy will thus focus on public space. This is not only an essential prerequisite of social cohesion but also a common denominator of urban issues in a broader context.

Public spaces in Serbia nowadays suffocate under the weight of the neo-liberal dictates of profit as people strive to implement western models, fulfil market economy targets and redefine their national identity. Conversely, in socialist Yugoslavia, public space was defined as a venue for actions and interactions among individuals, yet it was controlled by one actor only: the state, the sole decision maker and executor of spatial strategies and actions. When the dismantlement of the socialist regime in Yugoslavia and Serbia started at the end of the 1980s, and when widespread public space became instrumentalized and reduced to a source of profit; leading to the collision of public and private interests in the 1990s, the most powerful economic actors usurped public space.

Within such a confusing social and political system, citizens are neither well informed about their rights nor conscious of their responsibilities towards the public and social good. Citizens are not aware that they should be the actual builders of the city. Their activities in public spaces could be practical examples of individual expressions of freedom and responsibilities. They would thus rise up beyond the negative influences of transition to build their immediate surroundings and take an active part in the development of their city, impacting on its overall constitution and appearance. Thriving public space allows the formation of social capital, the rooting of participative democracy and the determination of economic development. In other words, public space provides a solid base and an active framework for intensive, durable and mature social interactions in the city.

3 PEOPLE ARTICULATING "THE URBAN" IN SERBIA

Started as a small-scale joint action between social activities and virtual networking and collaboration, the "Openly about Public Spaces" campaign and on-line platform for dialog about public spaces aimed primarily to increase the citizens' awareness of public spaces, to give them the tools and information to address each case and officially claim their right to use these spatial resources. Tending to gradually impact the distribution of power and influence with regard to public space in a confusing transitional period aggravated by the ugly sequels of a 40-year period of socialism and totalitarianism, this carefully coordinated action not only increases the consciousness and democratic potential of Serbian society, but also brings it closer to modern trends by its use of low-budget, popular technological means and gimmicks (such as the Internet).

The idea was to create a virtual register of all public spaces in public ownership so as to map their distribution, identify the interest of urban actors or civic groups in using them, and define legal procedures to obtain them. This collaborative approach is particularly important as a community-driven initiative to allow informal groups to obtain access to spatial resources obstructed by blurred procedures, conditions, institutional responsibilities and lack of information. Citizens can therefore increase their awareness of public space in general, local initiatives to access this space can be strengthened, and information can be spread to all interested parties, enabling them to form a common front to pressurize institutions into addressing the largest number of focal points.

3.1 The Campaign: Dialog about Public Spaces, Their Availability and Public Usage

After the Law on Free Access to Information of Public Importance was enforced in 2004, and the Law on Public Ownership was proposed in 2009, the Civic Initiatives Youth Programme launched an official appeal to all municipalities and cities in Serbia, asking about the assets they had and how young people could access them. This campaign aims to ensure:

- Direct cooperation with NGOs and local communities to raise awareness of the issue of space utilization
- Dialog and cooperation with institutions concerning the collection of data, procedures and practices
- Public discussion on every single case in order to acquire a clear and updated presentation of every urban and spatial conflict.

The official record of municipal assets was the first hurdle to be overcome. It turned out that all property was owned by the government authorities, and that municipalities and cities were the sole administrators of said

property. On the other hand, before the adoption of the Law on Public Ownership (September 2011), a great many assets and public spaces were 'lost' and became privatized.

The Civic Initiatives Youth Programme first had to focus on areas where different groups and organizations (youth in particular) had already started an initiative to obtain space. By constant connection, dissemination of information, workshops, official and unofficial meetings, presentations of regional experiences, they tried to inaugurate another campaign pillar and bolster all formal and informal groups, organisations and individuals, who had started space acquisition initiatives.

Thanks to consulting, directing, helping in strategy making, negotiating with local authorities, and conducting actions for the revival of public spaces, the positive results of good practices started to emerge. Once a group has identified the public space which they want to 'conquer', they start to negotiate with the local authorities or they appropriate the space immediately (by arranging it, gathering in it, conducting various artistic activities in that space). It is most important not to give up in case of defeat, failed negotiations or disapproval, because it requires continuous action, ideas and persistence to unlock public space and obtain it for public usage.

3.2 The "Openly about Public Spaces" On-line Platform

The initiatives described above revealed that the local authorities (municipalities) do not have an official register of the public property in their ownership. "Openly about Public Spaces" supports the idea of giving abandoned or non-used public spaces to citizens, artists, youth organizations and NGOs. To classify the information obtained and better manage the development of the project, it was agreed that the abundance of information on different public spaces be gathered in a register. This would include mapping the spatial distribution of „public spaces", and collecting relevant data about public spaces, the legal framework to obtain them, their physical state and social interest in their revival.

Current trends of virtualizing social life via the World Wide Web and Web 2.0 bring into perspective the production of an on-line platform to enable average urban actors to discuss these issues., Two key elements/factors have modernized and simplified the participation of citizens in matters of spatial resources in Serbian cities: the fact that this information can be accessed through Internet, and that users can instantly communicate regarding eventual focal points.

While preparing the on-line platform, it was important to achieve maximum impact and to develop an effective map with a minimum of expended funds. The technical platform itself is set up with free software (Ushahidi) and free editable Google Maps. Ushahidi is an open-source platform designed for different types of mapping and data collection. Due to the needs of the local community, the software has been translated into the Serbian language and implemented in a very simple and clean graphical interface.

The platform is very simple, to allow the average user to better understand its content. It consists of informative and communicative parts. The informative section contains a virtual map of Serbia, where all identified public spaces are located and marked according to the category to which they belong, and a data base of textual, graphical and legal information about each space. Communication within the platform is enabled through a message-contact option, news feed and blog.

New public spaces are added to the map as soon as the information about them is validated and they are classified. To date, the platform has identified public spaces in more than 30 cities and towns in Serbia. According to physical and functional characteristics, these public spaces are divided into 3 categories:

(1) Unfinished urban structures

(2) Abandoned buildings and places

(3) Public spaces which have been partly used with non-used facilities

These categories were defined to clarify and streamline the actions to obtain the public spaces thus defined, which are themselves subcategorized in the same manner depending on their physical state: good, bad or very bad physical condition. The latter helps potential users of the space to plan their actions and the specific usage of the selected space.

In addition to mapping, the communication part of the platform is concentrated around a dialog box in which site visitors can type in locations and receive information should anyone else enter data on the map related to that particular location (comments and discussions). The overall idea is to carefully examine, tackle and

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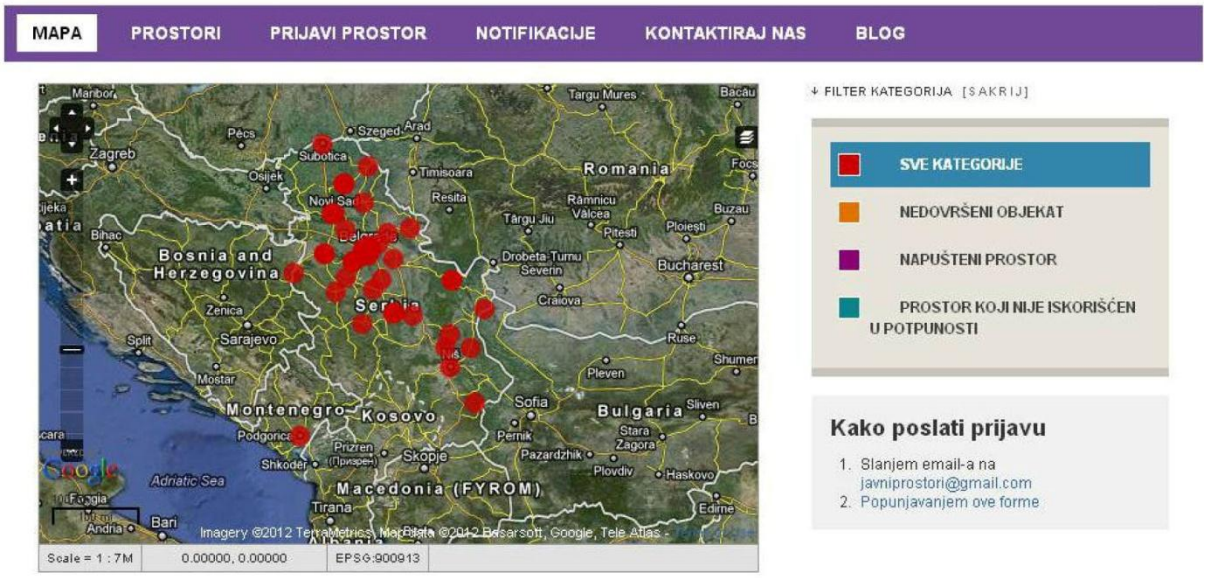
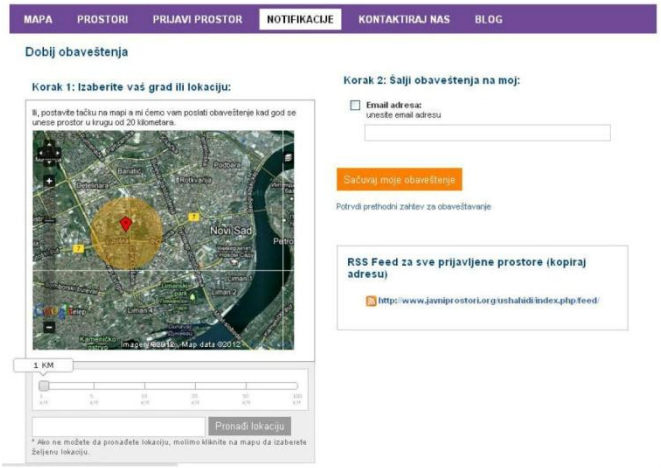
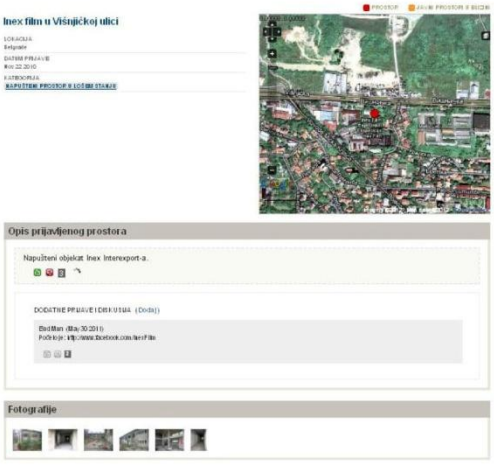
eventually solve each case. * in the text under the map: ... platform customised for the "openly...../welcome/home page



Ushahidi open-source platform accustomed to "Openly about Public Spaces" project - welcoming page



Entering location - communication tool



Public space facility - data page

Figure 1: On-line environment of the "Openly about Public Spaces" platform

3.3 Activities in Concrete Space: Solved cases

The platform's on-line activity resulted in practical commitment through the Civic Initiatives Youth Programme's "Openly about Public Spaces" campaign. Armed with collected, classified data and willing to collaborate with institutions and diverse stakeholders, this programme gained significant success in its first 2 years of existence.

One of the first cases was the 100 m2 public space in the "Studentski Grad" local community in New Belgrade. This was successfully allocated to the "Context" and "ApsArt" associations and the "Carina" informal scene, which belong to "Cultural Network of New Belgrade" Association (NBKM), for their artistic activities from September 2011 until February 2012. What is more, they are released from having to pay all the costs related to the space. The associations decided to furnish the Municipality of New Belgrade and NBKM with quality artistic programs and advanced cultural activities. The broader social purpose was to create new cultural value at the local and municipal levels through an independent cultural scene.

The other project was the "Bezistan" Street Gallery, launched by the "MicroArt" organization, which highlighted the problem of abandoned space and its untapped potential. It was an abandoned and devastated street passage in the city center of Belgrade - and "MicroArt" proposed its reconstruction as a venue for cultural and artistic productions. "Bezistan" Street Gallery is a unique project in the way in which it refers to

the physical disposition of the elements in space as well as in its program of gallery activities, which consists of engaged art that addresses vital social issues. The cooperation of city authorities, municipality and citizens' associations established a new model of dealing with neglected public spaces in order to set up the innovative and unique principle of the displacement of the Arts in public spaces for cultural purposes.

All of these actions were launched by individuals, informal groups and associations ,through coordinated action with the Civil Initiatives Youth Programme using the "Openly about Public Spaces" campaign and on-line platform. These actions respond to the lack of public space for individuals and groups involved in community, educational, cultural, artistic, recreational and social activities, and to the lack of venues for interaction among these individuals and groups.

4 CONCLUSION

Encouraging the average urban actor to take an active part in social affairs can be but positive, for it reduces their passive roles as mere consumers of a growing, global mass culture, and endows their urban existence with an active purpose: the design of their urban environment and the control of their urban experiences. Therefore, the idea of collaboration on public space issues strengthens the social impact of these organizations and individuals, thus extending the influence of all urban actors, and calls for the legal responsibility of all institutions and stakeholders involved in the process.

To sum up, the objectives reached by this campaign may be identified as follows:

- Demystification of public space issues
- Relocation of issues about public space from the spheres of business, politics and potential corruption, to the spheres of public interest and the common good
- Enabling public accessibility to information and data about public space, real estate ownership, state property and their status and the possibility of leasing
- Increasing the availability of public space for citizens and associations, with an emphasis on youth organizations, groups and initiatives
- Increased transparency regarding the work of institutions and public authorities in relation to public spaces
- Increasing awareness by citizens of their opportunities, rights and responsibilities with regard to public space in general

Finally, this virtual participation tool represents a new interpretation of cities, their design, social and spatial development. The importance and expressive power of culture and the arts have been revealed in the hitherto undertaken actions of the "Openly about Public Space" project on spatial resources, their revival and design. Art in public spaces has always had the power of transmitting the message of the community, promoting social and cultural values, and embodying the ideas of a collective consciousness. In other words, this project proves that a set of prepared, organized cultural and artistic activities, supplied with the very resources for their implementation, is also a tool for political promotion and communication between the authorities and the public in order to establish a new and improved social order.

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Recognition of Sustainable Approaches in Urban Structure of Historical Cities in Iran

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1 ABSTRACT

Throughout history, most traditional cities and building practices evolved out of necessity and not a supply-driven ideology. Therefore, their sense of sustainability emerged from having found resonance with nature, human-environment interaction, its pace and cyclical progression and that's why they have withstood the test of time and appealed to a variety of functional needs. Much of their charm was a product of the way they related to the character of the neighborhood and allowed for democratic expressions.

The patrimony of indigenously designed and developed urban places and spaces is a clear fact; built environments which are culturally rooted, locally produced, and technologically adapted in time and space. Their potential responsiveness to the needs of a changing social and functional world was achieved through mixed activity patterns, organic geometry and human-environment interaction.

Historic cities of Iran were no exception and have evolved out of an unique sustainable ideology allowing resonance with nature, human-environment interaction as well as creating socio-cultural patterns for a satisfactory urban life. This sustainable approach has been manifested in characteristics such as direction to prevailing wind and sun, utilization of vegetation and other natural elements, vernacular materials and so on.

In this paper the intention is to analyze the conceptions of sustainability in urban structure of Iranian historical cities.

2 INTRODUCTION

Cities can be seen as expressions of mankind's cultural, economic and social evolution, and at the same time they are the stage on which people develop their own futures and in this process, urban life will exert pressure to evolve physically by expansion outwards, upwards, downwards or in increased density [1]. Cities of the great early civilizations which developed by incremental growth from a historic nucleus adopted common spatial or physical features with orientation to the path of sun and prevailing wind as well as encircling fortifications. Hierarchy, geomancy and cosmology were among the most influential planning and design concepts that were seen in almost all ancient civilizations. Besides, since the earliest of times, political, religious and other vested interests have been glorified in cities and, often, physically raised [2]. The 'historic center' of city encompasses architectural, social, urban, environmental expressions which are recognized as relevant and which express the social and cultural life of a community. From an urban point of view, historic center or district is the oldest nucleus of a city which has evolved in centuries and contains best examples of most precious monuments of the city.

The concept of sustainable development is steadily approaching recognition, if not full disciplinary autonomy, becoming the focus of new theoretical and normative reflection. However, the same cannot be said of a more specific field of application of that same concept - the urban environment. In our opinion, this has been hindered until recently by some unresolved problems - of definition, methodology and epistemology - intrinsic in the more general concept, and also by some specificities of the urban case especially the historic district of city that have not been sufficiently borne in mind. A city is, by nature, a manufact, an almost entirely artificial object, constructed for historical goals of socialisation, synergy, increase of knowledge and social wellbeing. A weak concept of sustainability, which permits ample substitutability between production inputs and utility function inputs, is almost impossible to avoid. When considering the problem in its entirety from an urban point of view, we must combine the socio-cultural, economic and environmental elements, which all go towards the construction of that complex set of relations we call city. Sustainable urban development may be defined as a process of synergetic integration and co-evolution among the great subsystems making up a city and its history (economic, social, physical and environmental), which guarantees the local population a non-decreasing level of wellbeing in the long term, without compromising the possibilities of development of surrounding areas and contributing by this towards reducing the harmful effects of development on the biosphere.

With the current size and foreseen increase of the world's population living in urban areas, supplemented by insufficient policies to recognize and facilitate sustainable use of heritage assets, pressures on historic cities

will continue to rise, making historic urban landscape conservation one of the most daunting tasks of our time. As a direct consequence, the time allocated at World Heritage Committee sessions to debating the impact of contemporary development in or adjacent to World Heritage designated cities has increased dramatically. Ranging from traffic and tourism pressures, to high-rise constructions and inner city functional changes, the issues negatively affecting the protection and conservation of World Heritage sites are numerous and often inter-related. However, in the case of threats to the universal value and integrity (physical or visual) of historic urban landscapes, and as opposed to uncontrolled urban development or large-scale planned development, there's a clear emphasis on urban heritage and urban landscape in historic center of cities to attract attention, investment and visitors.

Urban areas act as population centres providing goods and services not only for its population, but also for populations worldwide. Urban ecosystems can no longer be considered as a separate entity to the environment as they have direct and indirect impacts on the immediate and wider environments. Many of the environmental problems faced today (eg global warming, water and air pollution and inadequate access to safe drinking water) can be traced back to cities and lifestyle choices. With urban population levels expected to reach 60% in the next 30 years and the majority of urbanisation to occur in developing countries, urban environmental management is being increasingly important.

Ministries of Culture across the world and Organization of Cultural Heritage, Handicrafts and Tourism in Iran have been the pioneers to establish and monitor the norms, regulations, strategies and actions regarding identification, registration, conservation and restoration of historic buildings and quarters. In Iran, historic centre of 90 cities with a total area of 16000 hectares have been identified and registered by the organization of cultural heritage, handicrafts and tourism revitalization projects with diverse characters and frameworks have been planned and implemented in these areas which are in different stages due to historical, cultural and political priorities.

Historic centers of cities in Iran which had been built during history in response to economic and social life of this territory were considered as dominant pattern of their frames until the late Ghajar era. Primary changes in these centers were accomplished when Iran was settled in the world capitalism chain in the last years of Ghajar era. Entrance of the first automobile and propagation of western culture were two important factors to change the structure of Iranian cities environmentally. Some of major characteristics of historic urban environment in Iran which contribute to urban sustainability are as follows.

2.1 Existence of Cultural Heritage

Historic district of each city possesses the best examples of cultural, historical, urban and architectural heritage of the city. From this perspective urban heritage exposes itself mainly as a collection of monuments and landmarks: honourable relicts of the past, symbolizing our history, giving meaning to our cultural identity and embellishing our lives. In most cities of Iran, most precious examples of mosques, tombs, palaces, public bathes, urban squares and Bazaars, symbolizing historical, cultural and architectural identity of the city are located in the historical centre of each city. These monuments along with some visual and/or verbal documents about past can provide us with enough information enabling simulation of ancient urban characters. Besides, the built heritage of each city creates the best opportunities for tourist attraction leading to economic benefits to the area. In Iran, more than 27000 monuments located in historical center of cities have been registered as national heritage by organization of cultural heritage, handicrafts and tourism. Most of these monuments are symbols of old architectural and urban design styles and are considered to be major sources of urban tourist attraction. Existence of these monuments which are always located in inflection points of urban texture, make any intervention a challenging one. Since these monuments can not be replaced or displaced, the geometry of new interventions and urban projects, especially streets and intersections need to be aligned with the location of monuments which in some case makes almost impossible to reach and acceptable level of intervention. In most case, location of a monument in historic district has made new intervention incapable of providing suitable vehicular access into the area.

2.2 A Source for Continuity of Culture

Historic urban environments and spaces sustain social structures of human societies and ensure their continuity. Environment plays a significant role in socialization: from the very babyhood, individuals experience an impact of the native settings. Specific environmental characteristics – geomorphologic

features, spatial structures, scale, rhythms, textures, light, colors and similar – are gradually imprinted in human mind, creating a sense of sympathy with the native environment, as well as preferences for specific spatial and other physical patterns. This way environment transfers culture of an ethnic, a nation, a class, or a similar social group from generation to generation. Sometimes 'a silent language' of environment is more suggestive than words, because it is less intrusive and does not moralize, as it sometimes happens with verbal socialization. Thus, historic urban environment plays a significant part in cultural development – it acts as a carrier, a sustainer, and a transferor of traditions. Factually, this is the main role of historic environment, and local people understand this perfectly well – intensifying grass-roots movements or spontaneous resistance of local population against a new development – are clear evidences of this phenomenon. It is always very hard to disconnect a community from its cultural identity.

2.3 Pedestrian Spaces and Environments

In the ancient city, pedestrian circulation was the dominant mode of circulation and therefore, dimensions of all public spaces were adjusted for pedestrian movement. The human dimensions and scale of these spaces led to sense of safety and comfort for pedestrians creating opportunities for pedestrian activities [3]. On the other hand, a major layer of urban structure that has developed in the recent decades can be defined as the network of motorways and other high speed traffic routes. The development of this layer has had a clear impact on both the global structure of the city and on the local urban systems. The new structural layer, emphasizing on car based global movement, has not improved overlapping and interconnection of the local urban areas. The continuity of the older urban texture has been further interrupted, resulting in a vulnerable global urban structure characterized by very low integration and intensive dependence on limited links of a network of highways. In this process the self-contained housing estates developed in the previous periods have become more segregated in the global spatial system of the city [6]. In cases with no urban intervention, due to dimensions of open spaces, lack of enough space for vehicular circulation and parking has created lots of problems and inconvenience for residents.

2.4 Climatically Responsive Spaces and Environments

In traditional cities of Iran, like other old civilizations, overall configuration of city was organized depending upon orientation, sun light and prevailing winds of each area and the effects of urban morphology on the urban microclimate and, therefore, on energy consumption can not be ignored. The physical parameters that could affect the urban microclimate were size of city, density of built-up area, land coverage, building height, orientation and width of streets, and building-specific design details affecting the outdoor conditions [4]. There exist enough documents indicating that designers and builders of ancient cities in Iran were well aware of strong correlations between urban street configuration and wind flow and sunlight direction, therefore, pollution dispersion and human comfort. This direction was called Roon. Besides, there was a subtle knowledge in street design which aimed to maximize ventilation, dispersion of pollutants and solar access, while not compromising shelter and urban warmth. They were based on relationships between these factors and urban geometry towards finding a 'zone of compatibility' for all inhabitants. Uniform structures of contemporary city regardless of local climate and natural ecosystems of each city have disrupted the traditional and organic harmony of natural and built environment leading to a sense of discomfort for occupants of new buildings.

2.5 Visual Integrity

The intimate and cohesive quality of the urban spaces in old city depended on homogeneous building materials and on the uniform proportions and heights of the buildings. These elements come together in a subtle interplay between the occasional landmarks and the simple and uniform residential structures, the walled and covered alleyways (called Sabat) and well-organized open public spaces (called Arsan), and the striking climatic features integrated into built elements, for example Badgir (wind catcher) in central regions of Iran creating a delicate balance, and one that can be easily thrown off [5]. In historic center of most cities in Iran, many traditional buildings, particularly along the main routes have maintained their architectural features and details. Many others, however, were shelled and have been left in a state of ruin, or hastily and poorly reconstructed, or radically transformed during the immediate aftermath of the deterioration. Lack of visual relationships between old buildings and new constructions has disrupted the integrity. New building design, height and bulk relationship of facade parts, scale and massing of large buildings an urban projects,

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size and massing of new additions, cornice heights, roof shapes, reconstruction of building components, prevailing setbacks, building widths and spacing, stoops and porches, garages and driveways al have led to a visual chaos in most historic cities of Iran. New buildings need to be designed to strengthen the unity of the existing streetscape, and should follow the design principles of historic architecture. But in some cases, these buildings which merely imitate the forms and materials of historical buildings dilute the quality of existing historic structures.

3 CONCLUSION

In the case of urban sustainability dealing with historic centers of cities in Iran, it has been recognized over the last decades that these areas are not constituted only by material and physical heritage – buildings, streets, squares, fountains, arches, and sculptures – but also include the natural landscape, and above all, its residents, customs, activities, economic and social relations, religious ceremonies, beliefs, and urban rituals all of which must be considered in any restoration or revitalization project aiming at urban sustainability. Due to high complexity of revitalization in historic centers it is necessary to compile comprehensive strategies covering diverse aspects of the task. Therefore, existing processes and methods applied to heritage cities, while helpful, are insufficient to meet contemporary and emerging needs. In response to these needs the following strategies can provide the basis for a comprehensive sustainable approach.

- Improving the conditions of pedestrian access with the least intervention with vehicular circulation by provision of suitable street network, intersections, parking lots and public transportation facilities.
- Improving and rehabilitating old residential buildings and motivating residents to live there while improving and upgrading basic infrastructure and municipal service.
- Promoting and selecting a variety of economic and commercial activities that are compatible with the historic context and can meet part of the maintenance and development costs of new projects and conservation of historic monuments, the cultural and urban heritage, making, if necessary, adaptive re-uses for adequate maintenance and economic gains.
- Modifying and easing the regulatory, administrative frameworks for land use and use of open spaces for new constructions and projects while respecting old architectural and urban texture of the area.
- Planning and executing tourism attraction policies and visitation to reinforce sustainable and human development by enhancing and protecting monuments and archaeological sites.

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Re-Mixing City vs. Re-Mixing the Cities: Interactive Cities, Zipped Regions and Regional Coalition Model. The Case of Orange County as a Successful Illustration of Regional Coalition Model

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1 ABSTRACT

Social and urban stratification can pose a serious threat on attracting the masses into urban spaces, hence on sustainable existence of urban fabrics. This can further develop into possible safety and security risks on their dwellers and users. It may happen directly or indirectly by intensifying the visible or invisible boundaries between the cities and their outskirts, as well as those between the districts, boroughs, and neighborhoods within the cities. This is because those intensified boundaries physically restrict future developments and predispose them to failure even before gestation.

Traditionally authorities in larger cities have learned to deploy 'inclusiveness' so that the development plans can be carried out under a larger yet more unified umbrella of planning and managerial tasks. Quite the contrary, the smaller cities in most cases cannot come into the same point of agreement to make a coalition work, due to decentralization prescriptions along with many other reasons e.g. limited human resources, budget and time.

This paper aims to investigate Orange County in Southern California as one of the most successful regions in overcoming the aforementioned problem. The paper starts with an analytical history of demographic and geographical changes in the region. Contemplating on potentials of the region, it will then discuss how the entire region has been shaped based on the coalition at the scale it was formed. Finally, it concludes with a coalition model for regional planning and suggests its application to the similar situations for acquiring a record of success in regional developments.

2 INTRODUCTION

Social and urban stratification can pose a serious threat on attracting the masses into urban spaces, hence on sustainable existence of urban spaces and urban fabrics likewise. This can further develop into possible safety and security risks on their dwellers and users. It may occur as a result of assimilationist policies and urban gentrification, intensifying the visible or invisible boundaries between the cities and their outskirts, as well as those between the districts, boroughs, and neighborhoods within the cities. This is because those intensified boundaries restrict future developments and predispose them to failure even before gestation.

More recently, social and urban sustainability debates have concentrated on issues related to the terms incorporation and multiculturalism – or as a normative precept: mixed societies. Conversation about multiculturalism is of particular significance as a mode of inclusion (Kivisto and Faist, 2007); thereby having (re-)mixed city. Despite varied and contested meanings of multiculturalism, there is a general consensus that involves valorizing ethnic, cultural diversity, accessibility of resources, social mobility and avoidance of social stratification. Glazer (1997) asserts that 'we are all multiculturalists now' – even if it has not been translated into official policies (Favell, 1998, Modood, 2001, Pearson, 2001, Kivisto, 2002, Joppke and Morawska, 2003, Kymlicka, 2003). Kivisto and Faist (2007) however believe that 'more recently the view has been challenged by those who contend that the multicultural moment is over as state policy, social practice, and perhaps as theoretical construct as well' (See Delanty, 2000, p.104; and also Barry, 2001; Kelly, 2002; Wolfe, 2003; Joppke, 2005).

Mixed society and mixed city in practice go beyond implementing and maintaining mere social practice, cultural features, and state policy. It is a complex, multi-layered and multi-dimensional practice which engages every social structure of city actively and effectively. The mixed city could be achieved, even if partially, by giving weight to diversity of economy, ethnicity, language, etc. This diversity can be reached by adopting diversifying policies in all respects including spatial and physical planning.

Contrary to the fact that the United States is accused of being an *assimilationist model of melting pot*, State of California's Orange County with 34 cities, is a highly demanded and a growing county, which can pride itself on embracing diversity and multiculturalism. This county has successfully enhanced the idea of

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diversity through what we shall call *'mixing the cities'*; by mixing many social, cultural, economic, and spatial aspects of planning within urban contexts. The post 1994 bankrupt Orange County is now considered a successful model not only for attracting investments or for its flourished urban attractions, but for making the proper and balanced urban atmosphere – where almost everyone could feel at home; what is crucial for social sustainability and a sustainable growth.

This paper aims to provide an analysis of the current condition of the County, portraying the success of this region that stems from its diversity beyond its mere geopolitical and climate advantages. The paper starts with the regional and demographic analysis that points out the diversity of the region. Investigating the potentials of the region, it will then discuss how the spatial planning has facilitated the diversification within the entire region through the coalition between the cities of the county, each of which playing a crucial but complementary role to the others which is substantial to the success of the County. Finally, to achieve diversity successfully, it concludes that, in similar cases, the idea of 'mixed city' ought to be replaced by an all-inclusive region including 'mixed cities' which utilizes a model of regional coalition; a model of Mixed-Cities Coalition and Competition (MCCC).

3 URBAN PLANNING AMBIANCE IN THE UNITED STATES

"Every time Treasury changes the Tax Code, every time Congress alters a welfare program, every time the Defense Department awards a military contract, urban policy is being made" (Donna Shalala). According to US Bureau of the Census (1997) 87504 units of government were identified and listed in 1997 in the United States. In that year, there were 3043 counties, 19372 municipalities, and 16629 townships. Increasing number of the government units has led to intergovernmental problems (Cullingworth, 2003).

On the other hand, not only hardly do American cities make comprehensive plans, but they also never lend themselves to carrying out those plans. Moreover, in the planning system neither does the country come to an agreement with its organizations upon the content of 'public interest', nor does it permit the centralization needed to carry a plan into effect (Banfield, 1961). However, Campbell *et al.* (1976), amongst many others, proclaim that citizens' familiarity with current political events and issues is severely limited.

The institutional framework, that defines the legislative body responsibilities, 'blurs the distinction between policy making and policy applying, and so enlarges the role of the administrator who has to decide a specific case' (Mandelker, 1962).

Domination of the law and lawyers over planning issues, limited allowance for discretion, zoning as the focus point of planning actions, regulatory barriers etc. are just a few problems facing the planning agencies in the United States. Furthermore, those agencies are facing a myriad of social and technical problems e.g. decayed inner-city, urban sprawl, urban and environmental contamination, along with problems of race, sex, social class and poverty, which in turn call for public policy, new regulations, and regulatory and control mechanisms at federal and states levels.

In such a complex planning system, where discretions should be kept to bare minimum, decision making is a tough job. Orange County and its associated cities are no exception. The demographic and related information, which follows in this paper however, support the hypothesis that multiculturalism in this region is historically very well-established. The subsequent analysis of findings will help cast light on more facts which will help argue for this hypothesis. The following section will discuss the demographic and monetary diversity for which the region is renowned. Despite what was just pointed out there are some exception which will help prove the rule; some cities lacking some of what attributes as multiculturalism. In other words, some cities in OC are providing diversified urban context that fills the existing gap in other cities, for unified multicultural region.

4 INCORPORATIONS, DEMOGRAPHIC AND AVERAGE INCOMES IN ORANGE COUNTY

Orange County (OC) is located in Southern California and has more than 3 million populations, 34 incorporated cities and is spread over a total area of 947.98 square miles (2,455.3 km^2), as of March 2012 (see Fig 1).

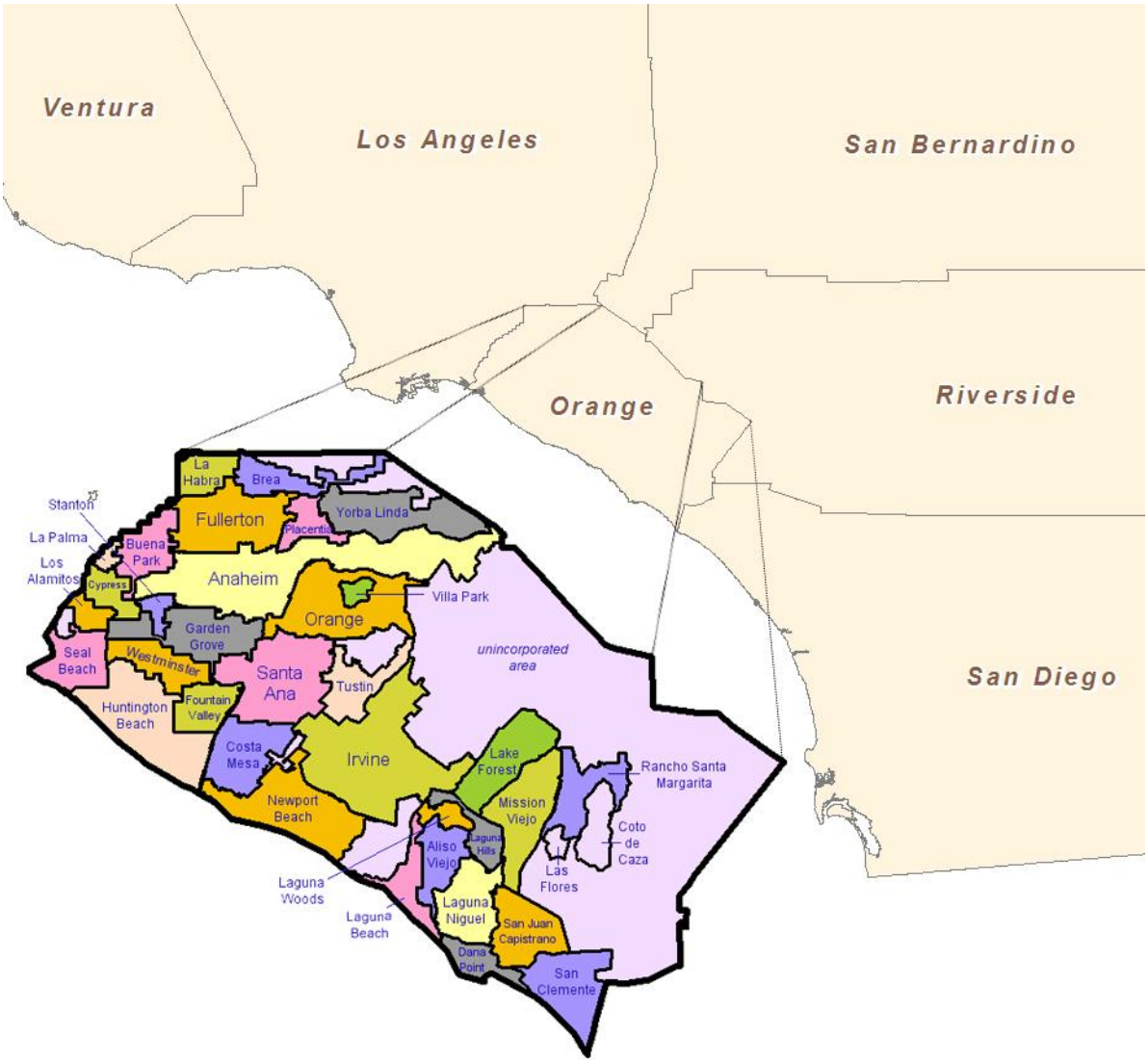

Fig. 1: Orange County and its neighboring counties

The county was incorporated in, but received separate political entity from Los Angeles County in 1889, based on three cities: the city of Anaheim established in 1870; Santa Ana in 1886; and Orange in 1888. In chronological order, Fullerton, Newport Beach, Huntington Beach (originally known as Pacific City), Seal Beach, Brea, La Habra, Placentia, Laguna Beach, Tustin, San Clemente were incorporated and joined the county between 1904 and 1927; and the rest between 1953 and 2001. The newest city is Aliso Viejo. The city of Santa Ana accommodates the governmental bodies of the county (see Fig 2).

According to County of Orange (2012), the county consists of 5 districts; each of which is overseen by a board of supervisor elected by the voters of their district for a four-year term. The general mission of the board is described as "Making Orange County a safe, healthy, and fulfilling place to live, work, and play, today and for generations to come, by providing outstanding, cost-effective regional public services" (County of Orange, 2012).

4.1 OC Chronological Development Provides Specific Characteristics for the Cities

Enough free land ready to be used for new developments with no major environmental risks or any other serious limitations has provided the county with an opportunity to expand in different periods for the past 110 years. The County records show that, in every major period prior to and during the twentieth century, a number of cities have been established and officially joined the county. This implies that incorporated cities have had ample of time not only to be developed and adapt, but also to find their unique role in the region, and to develop the characteristics of their own. The core cities have maintained the very sense of their downtowns and in their further development phases, some new characteristics have adjoined what was already present there. Anaheim, for example, as the oldest city in the region, by hosting Disneyland Park in

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fifties, has gradually turned into a tourist hub of the region and beyond. City of Irvine, renowned as a preplanned city in the entire United States, has hosted the prestigious *University of California Irvine (UCI).* Subsequently accommodating numerous entrepreneurs, businesses, and headquarters, over the last three decades, Irvine has announced herself as a reliable economic region, serving Southern California and creating numerous jobs. This chronological development allowed the county to take the opportunity to contain a variety of cities providing people with various atmospheres, and lifestyles, with different living budgets.

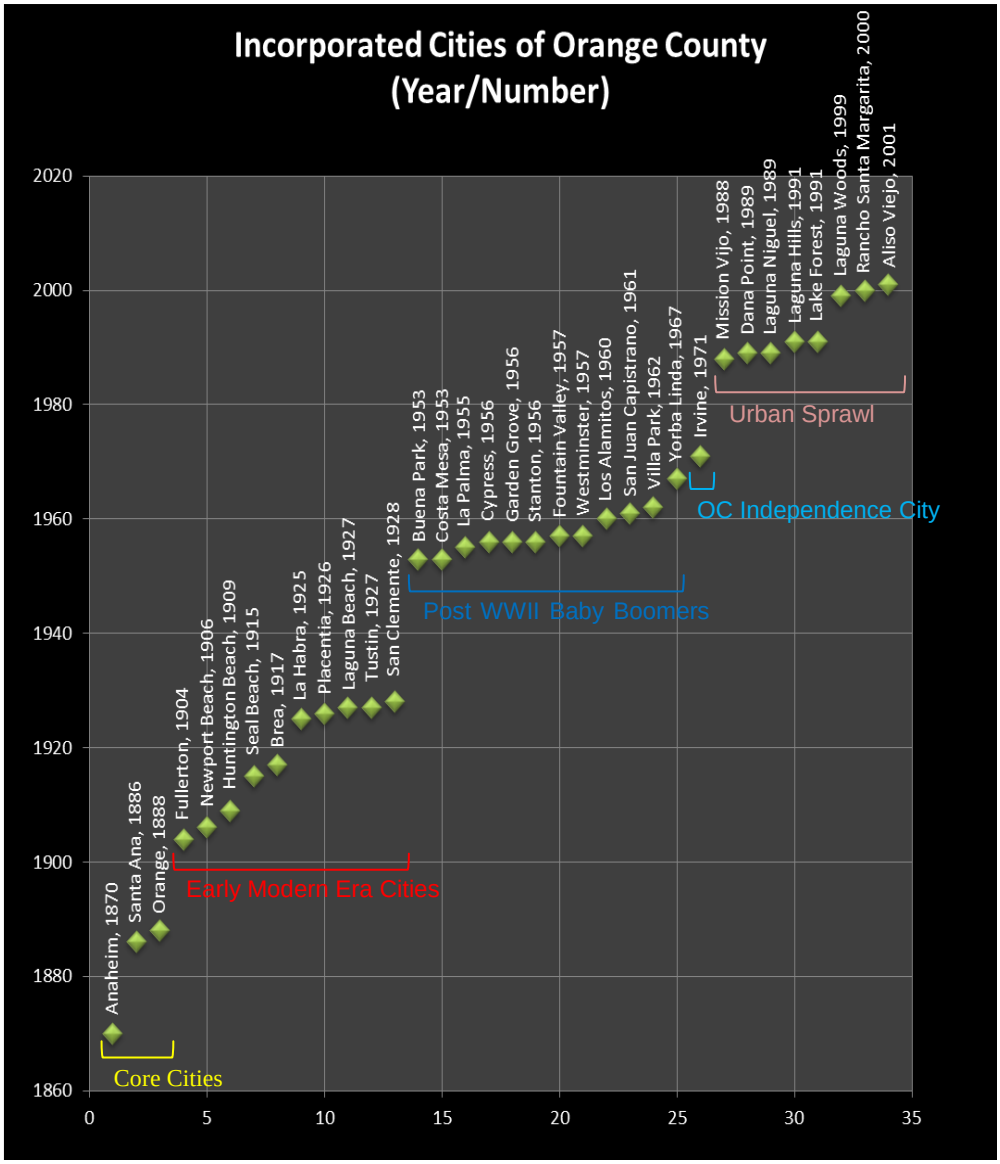

Fig. 2: Incorporated cities of Orange County

4.2 Diversity of Incomes

The high cost of living in OC —from property and gas high prices through to sales tax, and maintenance costs—, certainly, makes the residents to think about their expenditure carefully. However the differences are obvious from place to place. The fact is that in a number of urban parcels —urban segments with specific income, race, education or age characteristic— in the area even families in lower incomes bands can reside. The accommodation and other costs, in such parcels, dramatically are lower than the others. In fact, although the overall income of the region is higher than average in the United States and also higher than the neighboring counties, the statistics derived from census 2010, show that the county contains a variety of parcels where household incomes range from the lowest to the highest in the country. This is considerable

because some cities like Newport Beach and some districts —which are not part of any other cities yet like Coto de Caza —are free from some parcels with families in lower income brackets.

In fact, most parcels with higher incomes (per household) are concentrated in a limited number of cities and independent areas. The average household income of the county in shown in Fig. 3.

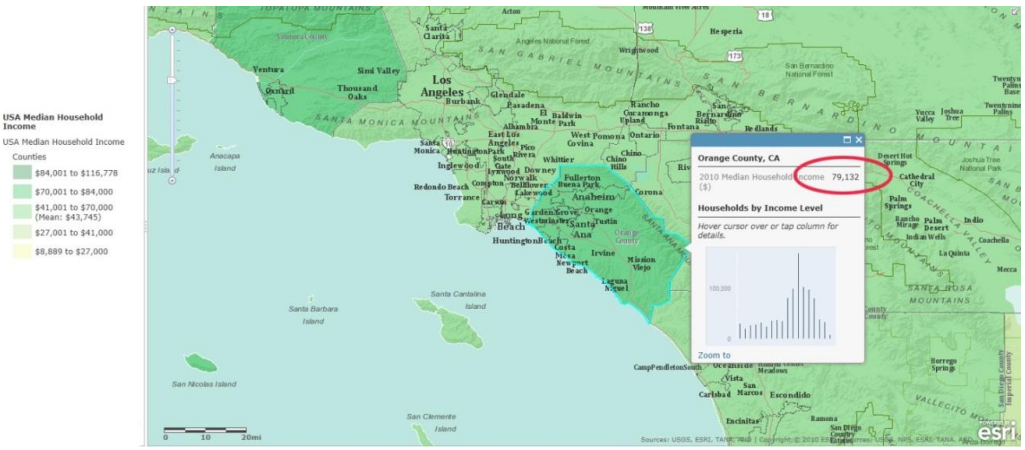

Fig. 3: Average household income of Orange County (and the counties around)

Color-coded inspection of income bands shows the distribution of household income with their sample parcels in Figs. 4 to 8. This reveals that the parcels accommodating families with varied incomes spread throughout the county with 25 cities already accommodating more than 2 brackets. However this range varies from city to city.

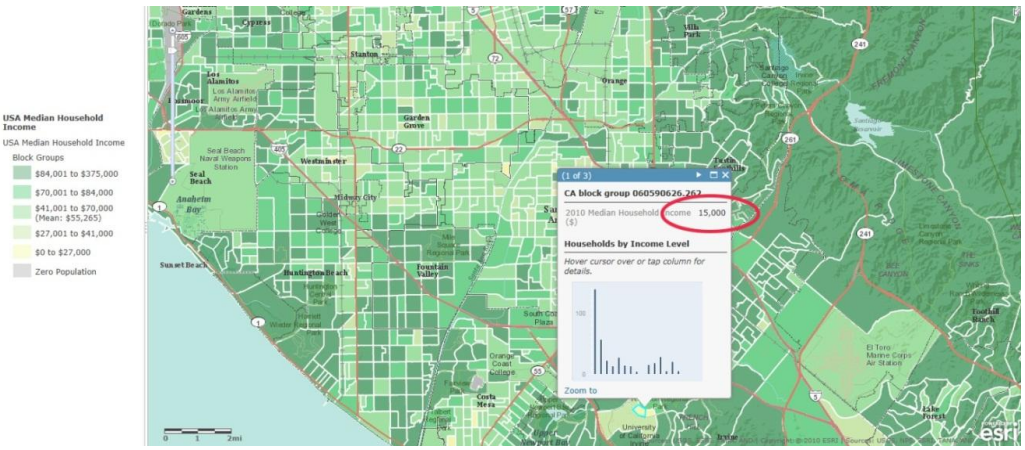

Fig. 4: Sample parcel with average of lower household income

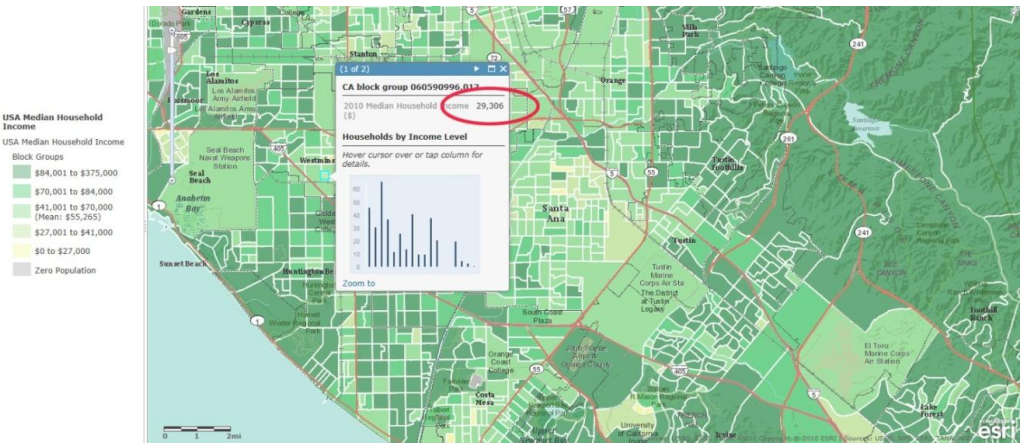

Fig. 5: Sample parcel with average of lower-middle household income

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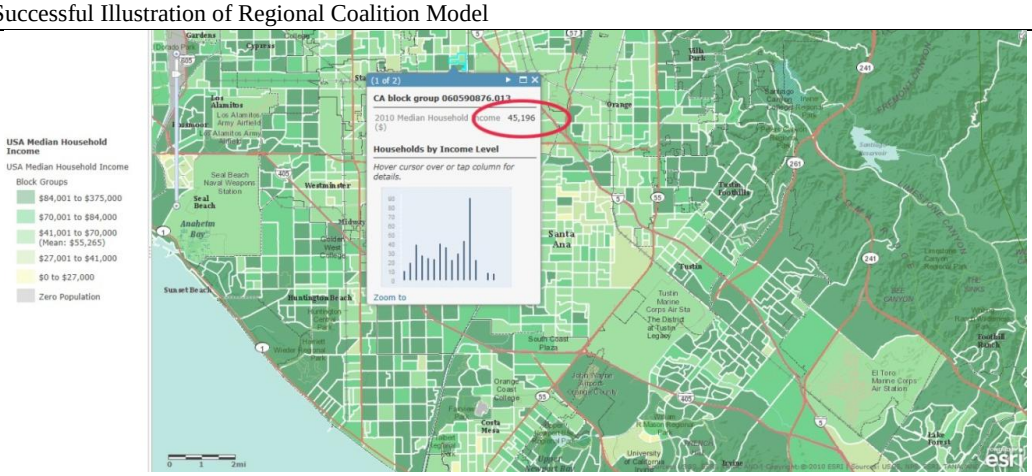

Fig. 6: Sample parcel with average of middle household income

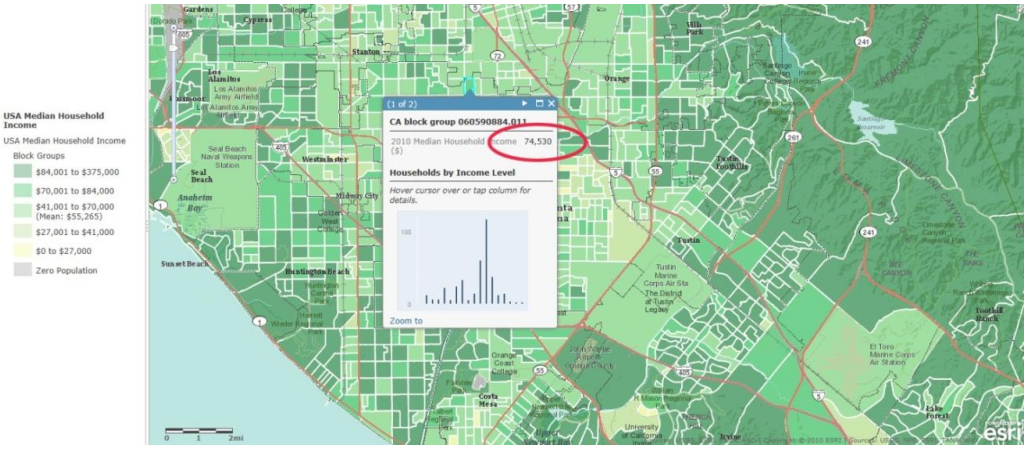

Fig. 7: Sample parcel with average of upper-middle household income

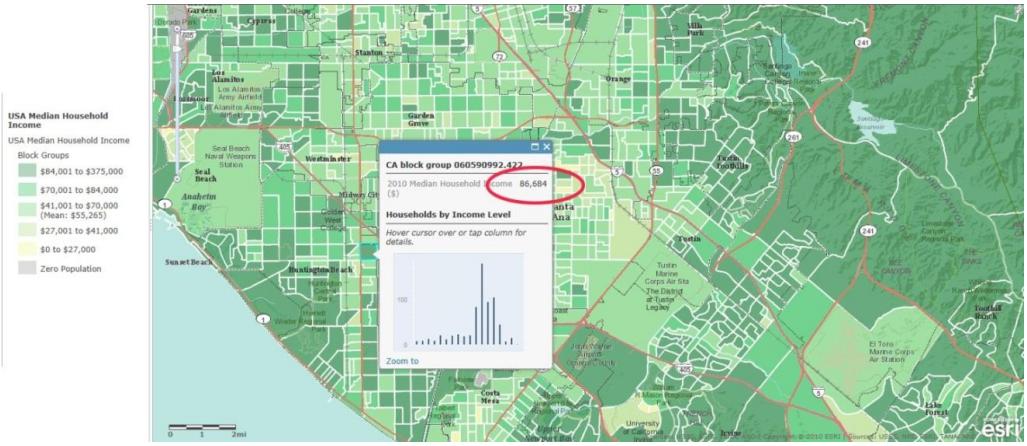

Fig. 8: Sample parcel with average of upper household income

Although the cost of living in this area is fairly high, there are a number of urban parcels carrying different costs of living. They can suit a wider range of families with various incomes. Even if the household income changes, the family can still find a place in the region to fit their budget to stay in, should they choose to. In other words, if cities like Irvine, Newport Beach or Laguna Niguel are accommodating middle-upper and upper class families, there are still other cities which comprise urban parcels accommodating lower and middle-lower class families.

4.3 Home to Diverse Ethnicities

About 60 percent of the population in OC has white backgrounds. However, the adjacency of California to Mexico and some other historical and geopolitical ties have given the county a unique ethnical diversity. A considerable one third of the population is of Hispanic —or Latino— backgrounds settled in different areas

of the state, specifically in the south. They form the first majority in cities like Santa Ana, Anaheim, and Stanton.

Adding to this, the county is also very well-known for being the home to a large population of people with Asian backgrounds. According to census 2010, more than one sixth of the county's population has Asian ethnicity. In Westminster and La Palma, Asian communities are the most populous communities in the cities. In Irvine 40 percent; Garden Grove 37 percent; Fountain Valley 33 percent; Cypress 31 percent of the cities' populations are having Asian backgrounds (See Fig. 9 for more Information).

Despite the overall majority of white backgrounds in the county, people from various ethnicities can still find the communities where they feel at home: the cities with multicultural nature. This diversity helps various ethnicities to gradually become a part of a larger society by experiencing mixed-culture cities and communities.

Apart from these major ethnicities, a considerable portion of population belongs to other ethnicities in the region, e.g. African Americans, Native Americans, Pacific Islanders, as well as people from two or more major ethnicities. This mixture of people from various backgrounds makes the communities and the entire county more viable and livable place for a larger spectrum of citizens than any other single-ethnicity society. This represents an alternative way towards a more sustainable society that can properly and proactively responds to the needs and wants of any multicultural region not only in California but throughout the entire country.

5 MIXING THE CITIES OF MIXED CITIES

The aforementioned analyses along with many others —like age and education— imply that the diverse atmosphere of the county has formed, been fostered and flourished over the years. This is because of the socio-historical sequences, and was reinvigorated by exerting official policies; a mixture which has proven to work effectively. In fact, what is obvious is that the *mixed cities* which accommodate and serve the people from various backgrounds, race, sex, and age and attempt to respond to their dwellers properly and proportionately, cannot be achieved by simple and single urban task forces in a limited time frame and in a single city with such a size. It means at township scale attaining an all-inclusive urban functionality is possible neither rationally nor practically, unless the city —or town— scales up enough for taking up such a task. One of the benefits of mixed city is to keep people visiting different places of the city. This helps people to get more familiar with various places of the city and keep involved with each other. Logically and rationally, small cities cannot contain all different types of buildings and complexes — also known as urban functions – for keeping their dwellers and spatial users satisfied. Lack of enough space for such ambitious intentions, the unreasonable cost of maintenance that imposes to the city, and the occupancy/use rate, are only some major reasons.

Therefore, to properly achieve the objective of a mixed city, depending on the scale, sometimes combining the cities and achieving mixed city at a higher scale may be inevitable; what we shall call *mixing-cities*. At a regional scale, this act should be considered to maintain and enhance a multicultural society.

But the question remains to be "how this is achievable and if spatial organization of urban functions within a city can facilitate the concept of 'mixing the cities'"?

5.1 Competition

Every city in Orange County, like any other city in the country, has a unique budgeting mechanism, and city management system as well as its very own priorities, concerns, problems and needs. This means the cities are in a hidden-and-obvious competition with each other. They attempt to attract young professionals and families form higher incomes brackets as a major driver for change and a long-term reliable source for further urban development, at a rate comparable or higher than their other rival cities.

While larger cities have logically, traditionally and organizationally been familiar with centralized decision making for each borough/district, the smaller cities, even those incorporated with a region/county, have been engaged with intracity competitions and in many cases have struggled. Under such circumstances, wasting financial resources on rework and duplication, as a result of lack of attention to the already developed opportunities within close or neighboring cities, is very likely and prevalent. In addition, successful patterns of development and popular characteristics and functions in a city can stimulate duplication and

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multiplication of the processes in other cities; what in return, can lead to unjustified results or weakens the potentials of development based on any other intact characteristic within the region.

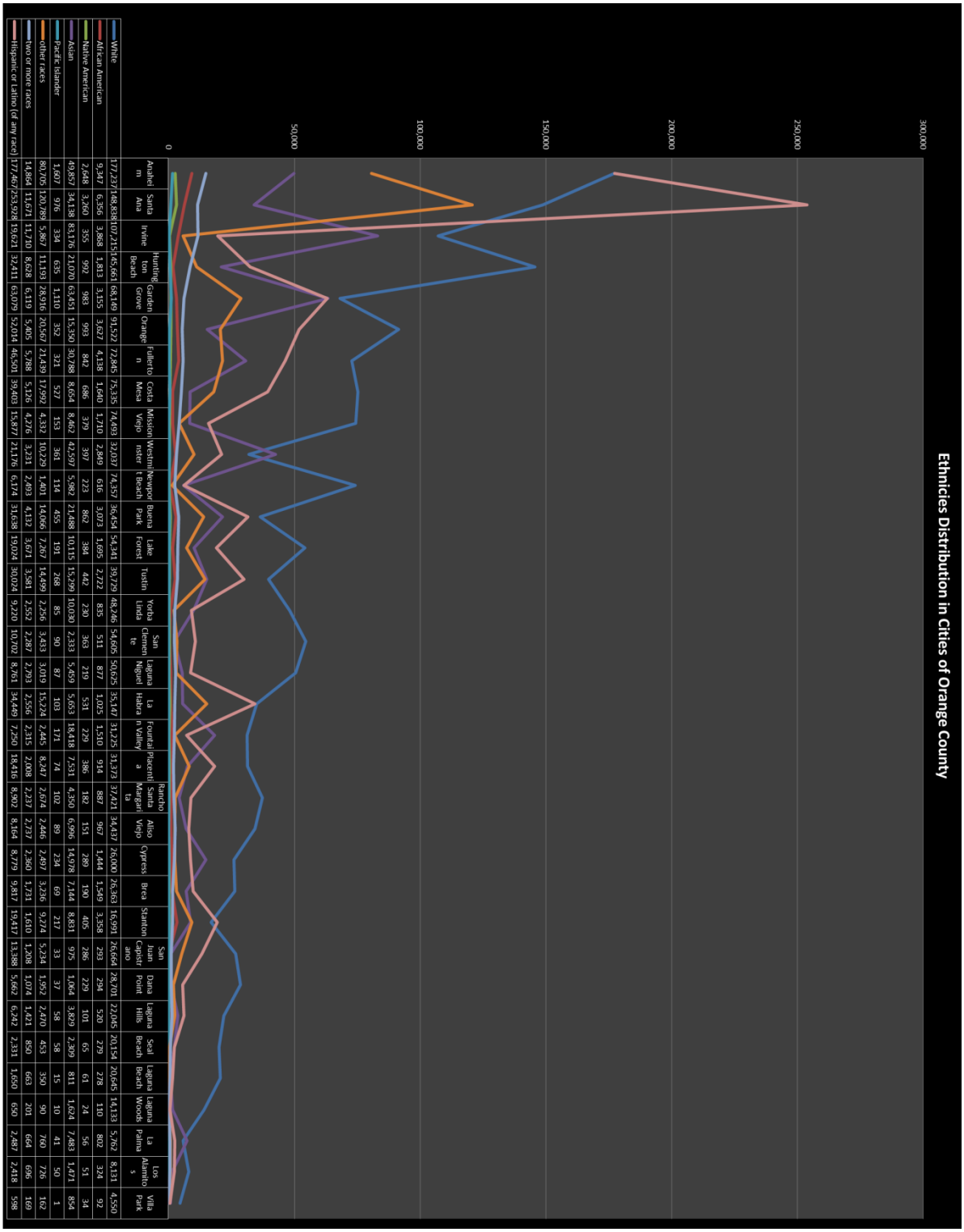

Fig. 9: Main ethnic groups in 34 major cities of Orange County

5.2 Cross Functional Cities: Major Urban Functions Attributed to Different Cities

Tourism industry stands at the third place, after business —tax revenue of the businesses— and shopping, and forms a vital source of income for Orange County's economy. Average annual temperature of 68°F (20°C), beautiful beaches, as well as outstanding and vivid inland sceneries of the County, accompanied by exceptional urban attractions, have provided a vibrant combination of possibilities for almost all tastes and preferences.

Most cities in Orange County are acting as a role-player in the development process of the region:

- The pre-planned and young city of Irvine as the home of Fortune 1000 headquarters for Allergan, Broadcom, Edwards Lifesciences, Epicor, Standard Pacific and Sun Healthcare Group and as the city hosting a number of thriving businesses and start-up companies founded by young entrepreneurs, in Southern California, provide a proper place for business. In addition, the well-known schooling system of the city and hosting the accredited University of California in Irvine (UCI), constantly invite younger generations and their families to relocate to the area. All these are accompanied by other unique facilities of the city like Irvine great park home of sustainability and a number of social and cultural events as well as William Woollett Jr. Aquatics Center (WWJAC), etc.
- Having an old town accommodating a number of historically well-known buildings in the area and the only international Airport of the county —John Wayne Airport—, Santa Ana hosts governmental bodies of the county, and play a key managerial role in the region.
- Anaheim works as a tourist hub for the County and hosts Disneyland Park; the second largest theme park in the world. The city with its theme park and many other historical attractions works at national and international levels and invites people from various background and with different expectations.
- The city of Costa Mesa, hosts a number of major buildings and complexes. South Coast Plaza shopping center —originally designed by Victor Gruen— with an approximate 24-million visitors per year, Orange County Fair with more than 1.3 million visitors per year and Segerstrom Center for the Art as a performing art complex and offering world's leading performances are some those attractions.
- Orange County Museum of Art and upscale-luxury Fashion Island open air mall —main buildings designed by William Pereira and Welton Becket— as a part of Newport Center, Both are located in the city of Newport Beach.
- Numerous art galleries of Laguna Beach, offering the world's leading fine art works have rendered the this city as the art hub of the region. Producing a fascinating atmosphere in the city, those galleries lay over the flattering sceneries of the Pacific coastline (see Fig. 10).

In addition, Cristal Cathedral — designed by Philip Johnson— and International Center for Possibility Thinking —designed by Richard Meier— in Garden Grove, and numerous seasonal events like Dana wharf sport fishing, whales and dolphins cruises, wild river water park, air combat center, and many others have been spread in the entire county, working as interlinking functions. This dispersion of urban functions ranging from those needed for everyday life to those known as a place for entertainments or occasional events keep everyone, both residents to visitors likewise, busy and happy to move from one location (city) to another in almost all four seasons of the year.

Each major city of the region has a number of urban attractions and key function(s) that cannot be agglomerated in a single city. This has resulted in a region composed of built-up areas on a *cross-functional* network of correlated urban nods.

Building a cross-functional region is an objective that is achieved by cultivating the major urban functions, across the region. Not only does this approach facilitate the process of establishing specific characteristics for each city, but also expedites the intercity and intracity mobility of the dwellers and users of the different urban spaces which assists the process of mixing various group of spatial users. This causes the development of the dialog between different types of users—from different races, ages, backgrounds and social classes—with each other and with the urban fabrics of the host cities. To the contrary of an experience of an *all-inclusive* and *all-in-one-place cities*, like what can be gained in Las Vegas, in cross-functional-cities model, the citizens, visitors and tourists require commuting from one city to another within the region to arrive at the places they would like visit. This will initiate them into getting familiar with the culture, and some hidden attractions while bringing about their own culture to the heart of the cities. It will also help them learn more about the region and its social dimensions, which in return, makes the mixing procedure smoother and more enjoyable (see Fig. 11).

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In such an atmosphere, the mixing process flows well beyond enacting mere official policies. It turns into being the social practice innate to the daily life of people. As a result, this also resonates with other aspects of social process of mixing cities; acknowledged formally even the governmental bodies.

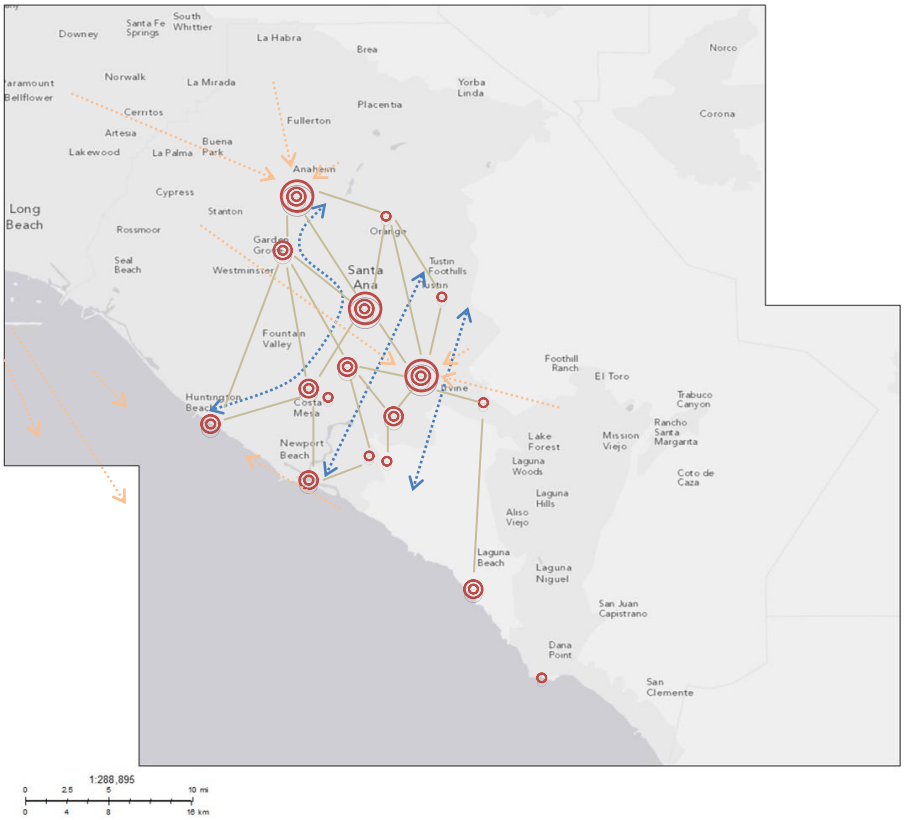

Fig. 10: The spread out urban functions in the cities of Orange County

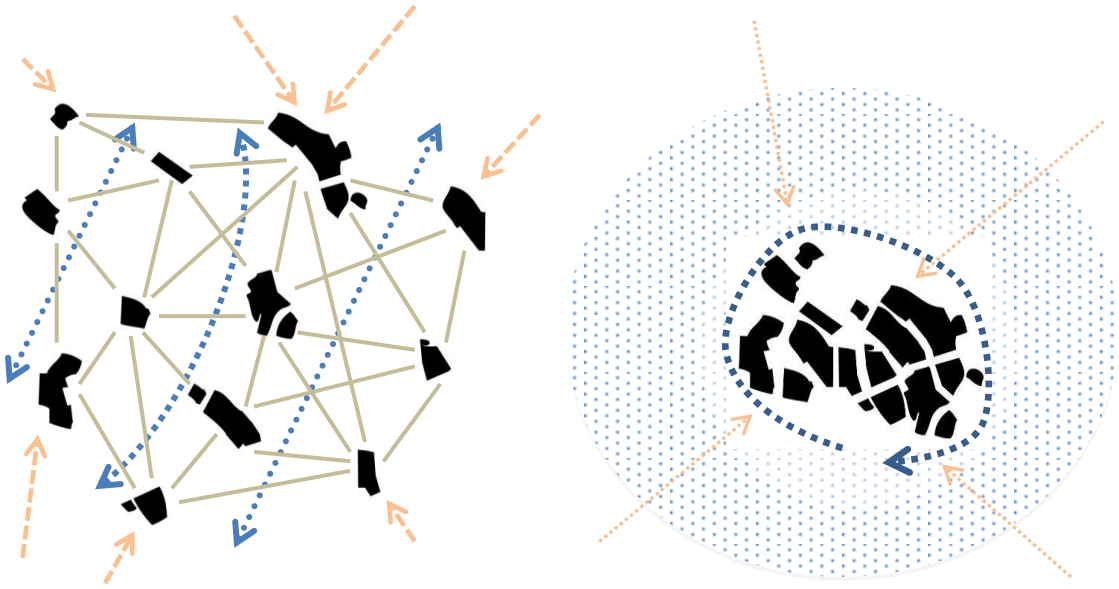

Fig. 11: Reviving urban life in connecting corridors and interfacial urban fabrics in cross-functional region versus all-in-one-place city

The cross-functional region —versus all-inclusive city—, which is heavily based on decentralized governments, holds the *mass-response* characteristic on one hand, and on the other, reinforces the

constructive competition between cities as independent urban entities through which each city attempts to achieve the best position among the others, with regards to its own characteristics and attractions.

6 MODEL OF MIXED-CITIES IN COALITION AND COMPETITION (MCCC)

A cluster of smaller cities, with fully separate authorities, provides decentralized urban management and decision making systems. If, at the same time, the cities are incorporated with their region and are able to work through the regional issues under a regional supervision via the organization whose role is to merely moderate and facilitate the negotiation between cities, they can come into a regional coalition which not only enhances the chance of equal opportunities offered to various cities and the richness of regional diversity, but it also helps the cities work out their chance if they attempt to achieve positions, to propose genuine urban functions or to warrant specific funds at a regional scale. It means, in this coalition system, each city has its own characteristics, yet the entire region, will have the exclusive characteristic that does not exist solely in any of those cities. In this model, the region —according to Gestalt and Systems Theory— is more than arithmetic sum of all participant cities. Fig. 12 indicates how the decision process works in a corss-functional region, using a MCCC model, compared to a traditional model in a large centralized city.

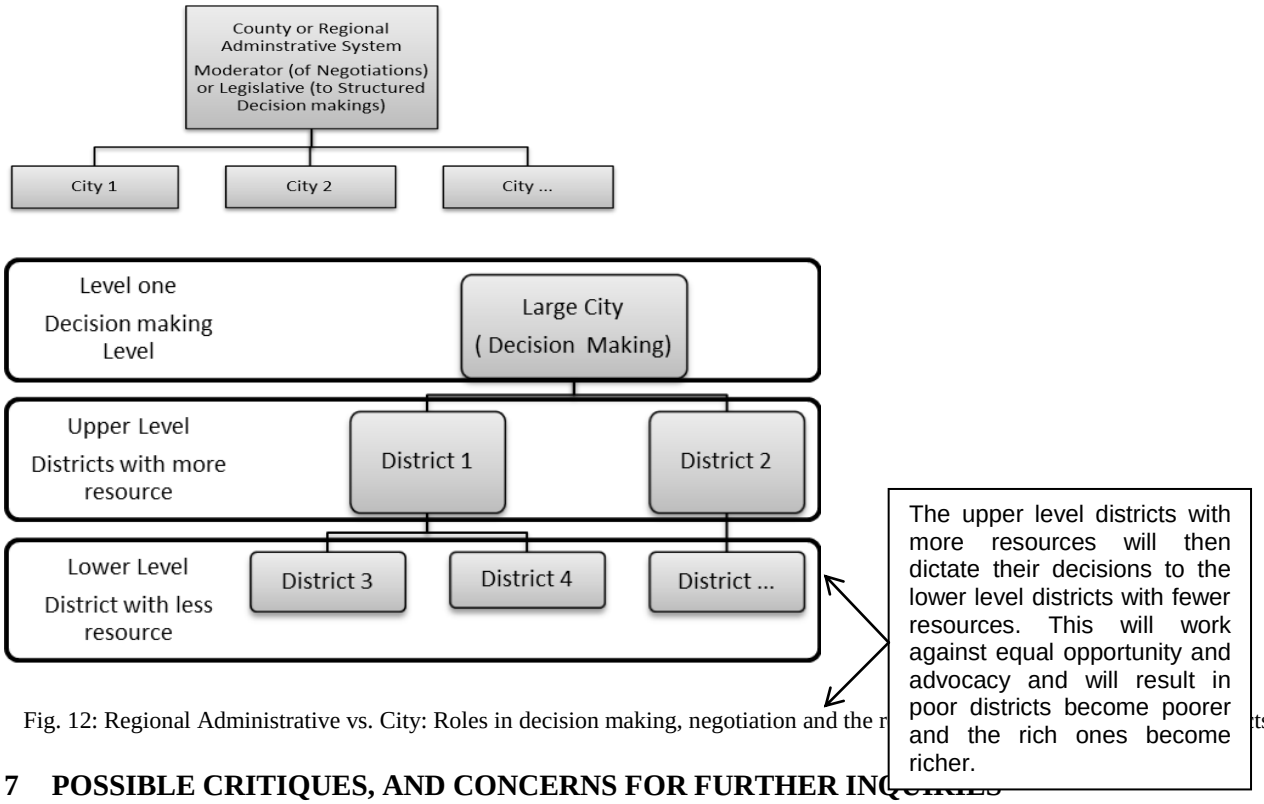

Fig. 12: Regional Administrative vs. City: Roles in decision making, negotiation and the r ts

7 POSSIBLE CRITIQUES, AND CONCERNS FOR FURTHER INQ

This model provides a solution to zoning problems which limit people movements within the city and may act against the notion of mixing city. Allocating similar urban functions in one place, zoning policies in most cities in the United States, encourage people to have linear inner-city trips between some major city hotspots of their owns: home, work and leisure. The question that will remain is: what if the similar zones of different cities are allocated close to each other? This also needs to be considered in the framework of MCCC model.

On the other hand giving a proponent role and characteristic to the smaller cities through applying cross-functional model to low density/low rise cities, the issue of urban sprawl can be addressed and gradually alleviated. Therefore the model itself can provide some proper responses to the issue of urban sprawl. However the further concerns of producing new urban sprawl around the major cities of the region will remain valid. In case of Orange County, the fresher incorporated cities are experiencing the same problem: the cities which have no specific characteristics of their own at the regional scale as yet. To tackle this problem, the process of following the model should be seen far from being an end state; it should reiteratively and reflectively be reviewed, reframed, reconsidered and remodeled.

One of the most important concerns is that at which distance (radius) the expansion and inclusion should happen where the urban functions spread out. If the radius is so large, it may endanger the usage of public

transportations or bikes, as the most sustainable transportation alternative to commuting with cars. This may also compromise overall sustainable life of the region which can face the entire model with serious challenges. Therefore, establishing an assessment method that can help evaluate the factors and deliver the proportionate radii of expansion and inclusion needs to be considered for further research and enquiry.

The last concern is about the managerial aspect of launching, maintaining and enhancing of MCCC, if it is supposed to be pursued through a structured method. First, if a region was not diversified enough from various points of view, is the development of the cross-functional region model prior to other socio-cultural policies? Second, because of some legal issues pertaining to decision-making in the United States, is there any way to legalize this coalition and push it to go beyond the simple negotiations and conventional agreements between cities?

8 CONCLUSION

Orange County as a highly demanded region in Southern California has been inviting diversity in various aspects. Although some cities of the county are not considered as mixed cities, but at a larger scale, the county is a mixed region. The process of mixing the cities by spreading the urban functions in different cities turned out into a cross-functional cities/region model.

Traditionally and logically, larger cities' authorities have learned to deploy —at least, to some degree— 'inclusiveness' so that the development plans can be carried out under a larger yet more unified umbrella of planning and managerial tasks: what shall be called *all-inclusive mixing city*. Quite the contrary, pursuing the same strategy for smaller cities are not financially and rationally justified. The smaller cities naturally cannot exist and develop based on an all-inclusive mixing city scheme. Small city as a parcel of the region undertaking a regional dialog with its context has an alternative way of carrying out coalition with other small cities to achieve mixing the cities.

If the coalition model is applied to the region, the separation of the cities can be used as an advantage compared to large city systems. Not only does this provide the required platform for exercise and flourish decentralization, but it also offers a competitive atmosphere between the cities that adds flexibility and dynamicity to the whole region.

The model, which we have called Model of Mixing-Cities Coalition and Competition (MCCC), proposes all-inclusive regions —attaining cross-functional cities— where independent cities come to a regional coalition while the intracity competitive ambiance can be used as the major source of motivation for further development.

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Remixing Music in the City and Music online: How Listening to Music Changes because of Piracy

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1 ABSTRACT

Music has often changed, from a social point of view, and also the relationship between music and the city. This paper attempts to describe how music changes under the impact of Internet. Are concerned the milieu of musicians and the audiences. The economic model of music has not burst into pieces, but it has deeply changed. There is a trend to pure consumerism thanks to Internet (probably the sales of downloaded music will become more and more important). Also, independent artists can use Internet and have a livelihood (fat tail phenomenon). Therefore the diversity of music can be preserved. Concerts (music in the city) allow escaping from the losses of money because of piracy. There are several experiences for listeners, which are possible, some of them involving going to concerts and festivals.

2 INTRODUCTION

Mutations of music, and also of the relationship between music and the city, have been described by some sociologists. For instance, Adorno, in his famous book on the sociology of music, has shown how the dominance of recorded music occurred. Till the 19th century, music lovers were people performing it. They were aristocrats or people having a job allowing leisure (like doctors). Recorded music allowed anybody listening to the best musical performance. But listeners were no more people performing music. According to Adorno, the companies editing recorded music have a control over the public's taste. Hence a decline of good taste. Music becomes a commercial good. Composers prefer to compose music for movies to have a livelihood. Honegger wrote: "the musician has to be a craftsman". Also, from Stravinsky: "any reaction is good" (meaning that any demand from the public is a good thing). At the opposite, Schoenberg was always an inflexible composer.

The American sociologist Howard Becker tells another story. He describes the ordinary jazzmen (not the "stars" of the milieu) in the USA. The condition and the outcome of their activity is the repertoire. In the first half of the 20th century, it was called the "Great American Songbook". The knowledge of the repertoire allowed jazzmen who were not accustomed to perform music together, succeeding in doing it. The repertoire was a living one (songs becoming out fashioned, other appearing). This music was performed in public places (ballrooms, cafes, restaurants etc.) or in private parties (ceremonies, marriages …). All that changes in the fifties when FM radios appeared (allowing diffusion of precisely defined genres like rock, soul, country music, dance music like sambas, bossa novas etc.), and also TV (changing the way in which people spend their leisure time, they are more and more in their houses and less in public places). Schools for jazzmen appear. Before, they learned pieces of music listening to radios or buying scores (called "lead sheets" or often "fake books" because they were pirated). Now they listen to web radios or streaming sites, can download sores on Internet. It is cheap to record a Compact Disc (used to show the talent of a musician or a band to a possible employer). One can use a home recording studio. Even, some musicians are teleworkers. Also, more and more electrical material is used by instrumentalists. There is a Computer Aided Music. Internet has become a tool for musicians.

In this paper, we shall attempt to describe the current impact of Internet on music. In particular, we examine the consequences of piracy. Bur first, we have to quickly describe what piracy is and what the response of the Majors of music is:

A few words on piracy. There are "amateur pirates" and "professional pirates". The last are an organized community. They have their own definition of performance or feat, their own hierarchy of talents. They meet in some places (they organize congresses). The framing to examine this milieu should comprise the warders. There is the role of social interaction. For instance, the beginners are initiated by those who know the tricks to escape from the warders. Or there is a competition to accomplish the most spectacular feat. The contempt they trigger can influence their behavior (Becker, 1995). This idea on deviance comes from Howard Becker. It is the main idea in the theory called "labeling theory". According to this theory the means used on Internet called "shaming" should not be efficient (note that we speak of the "professional pirates", not of the "amateur pirates"). There are "moral careers": one can stop, go on or … pass to the other side, the warders

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'one, the ability in computing serving the security of firms and administrations. Let us recall that for some, piracy is their livelihood. One can be sure that this kind of piracy will last.

The response of the Majors of music. The economic consequence of piracy is that demand decreases, and also the profits of the Majors (even if other activities than recorded music, like music diffused on radio or TV chains, in nightclubs, or concerts, are not vulnerable to piracy). They have to make economies. They sign fewer contracts with artists. Before, they could sign contracts with beginning artists, being in the role of an insurer. They no more do it, hence some danger for the future of music (Lefebvre, 2008). But now the selection of notorious musicians, among the beginners, occurs on the social networks like Facebook. Once a musician is notorious (thanks to the free diffusion of the music he or she performed on Facebook) he (she) becomes an independent artist or accepts a contract with a Major. The Majors struggle against piracy, using all means they can use (pedagogy, legal punishments …). But if Internet is really a global phenomenon, reflecting the human nature, amateur piracy will be uneasy to eradicate: human nature is made up of Desire (desire of "free lunch") and Reason (acceptance of the economic exchange). Amateur piracy is the consequence of the "appalling popularity of music", to use the words of Constant Lambert.[1] Concerning professional pirates, they will continue. Paradoxically, they do not "steal" the musicians, since they download files illegally only because it is a feat: if they were not pirates, they should not buy the files they download. But they "steal" the telecommunications operators, saturating their networks. Of course, we do not speak of these professional pirates who allow amateur pirates to illegally download pieces of music, thanks to sites they control (they may make money or not). What has been the response of the Majors of music? Their ability to cope with crises is legendary (Lefebvre, 2008). Their response has been to merge and to have branches organizing concerts (since concerts escape from the consequences of piracy).

We shall describe the effects of Internet on the musicians, on the audiences and on the diversity and the evolution of music. Note that the last topic has not only economic and technological aspects, but also social and aesthetic.

3 THE IMPACT OF INTERNET ON THE MILIEU OF MUSICIANS

We can distinguish three categories:

(1) The "stars". Once one of them is notorious thanks to the social networks, he (she) signs a contract with a Major. This company manages his (her) career, including concerts. It is the realm of culture industry. The place is large cities.

(2) Independent artists. They use the social networks and blogs to reach recognition. To have a livelihood, they bank on concerts (and sometimes on teaching). Also, they can use micro labels (to sell Compact Discs) or Net labels (small labels on Internet, allowing downloading music for free or at a very low tariff). They escape from the influence of Majors, which have strong requirements concerning the musicians who have contracted with them. They have a direct control over the link between themselves and the public. Thus Internet allows the "fat tail" phenomenon. Diversity of music is preserved.

(3) Ordinary musicians. They record music rarely, indeed just when they are at the top of their career: at this time they record several Compact Discs and make tours far away from their region. They can sell a few Compact Discs to listeners when they perform music in a concert. In general, they perform music in public places (ballrooms, cafés). They have a livelihood but are not affluent people. They prefer to perform the music they like, but it is not always possible. According to the French sociologist Perrenoud, who has studied this milieu, there are three possible situations. When they give concerts the music they perform is of a good quality. In the case of "entertainment" (balls, feasts …) the audience is a partner and there is an interesting stake for them, since they have to understand the desires of the customers and to satisfy them. In a third situation, it is Eric Satie's "musique d'ameublement" (music like furniture) or background music. For instance the musicians play jingles during a ceremony, or they perform music in a casino. The public is indifferent, or they do not listen to music at all. If it is boring for musicians, it is … lucrative. According to Perrenoud, these musicians participate in "local networks" while the "stars" participate in "cosmopolitan networks". The American sociologist Robert Merton has characterized the "local networks" as relying on personal relations, and the "cosmopolitan networks" as relying on competency. The "cosmopolitan networks" are present in the large cities, where culture industry is located.

[1] Already in the thirties, there were attempts to diffuse music thanks to loudspeakers in the streets of some British cities.

4 THE IMPACT OF INTERNET ON AUDIENCES

There are three categories. They can be described in terms of listener's experience:

(1) Pure consumerism. These listeners follow fashion. They often listen to a small number of "blockbusters", but changing. If they are young, they listen to music freely (often they access social networks, by means of mobile phones). The sales of downloaded music are increasing, as it is shown by the success of I-Tunes. Internet is favorable to this kind of consumption: practical, allowing teasing the desires of listeners, entertaining. Of course, "amateur piracy" is a limit, but let us recall that at the time of discs and CDs, there was some piracy, also. Legal downloaded music is more and more in accordance with the needs of this audience. These listeners can go to concerts given by the stars they like. It is the kind of concert in a large hall or outdoors, gathering thousands of people. It is attractive not only because of music but also because of the spectacle and atmosphere. But even if this case, there is a substitute: the music video. Music videos are a great success. They can be bought on Internet. Also, one can view them on some TV chains (MTV is the most famous).

(2) Tribal listeners. It is another experience of listening to music, that of listeners fond of a particular genre. They use social networks, Internet and go to concerts. They are a tribe, a "group of peers", to use the words of the American sociologist David Riesman. Often, these musical tastes are linked to other tastes, or behaviors (clothes, politics …). This passion can lead to attempt to perform music. Often, a beginning musician passes from a "group of peers" to a professional way of life (Perrenoud, 2010).

(3) "Interested amateurs". These listeners build up their own experience in an autonomous way. They want to understand some aspects of the music they listen to, its evolution etc. They make experiments. They use all the means to listen to music: Internet, independent medias (like France Musique and TSF Jazz, which are radio chains in France) , concerts … From an economic point of view, it is interesting for those whose livelihood is music: these various means of diffusing music can be combined to obtain "synergies", that is to say to boost sales. For instance, a radio chain informs that on Internet one can obtain rebates to go to some concert, make advertising for clubs organizing concerts, broadcast discussions triggering the purchase of CDs by listeners etc. Here, there are two opposite points of view. According to Adorno, these listeners are in "secondary roles". According to the musicians described by Howard Becker all those who are not musicians are "squares" (meaning philistines). But some think that there is room for a middlebrow art. We deal with this topic, now.

5 THE IMPACT OF INTERNET ON DIVERSITY OF MUSIC AND TASTES

According to Constant Lambert, there is a highbrow art, a middlebrow art and a lowbrow art. Lowbrow art is popular art (pop music, songs which are "blockbusters" etc.). Middlebrow art is more sophisticated. One often quotes Offenbach, Cole Porter, Duke Ellington and Kurt Weil. Note that the line between middlebrow and highbrow music is not so clear: Sibelius composed for circus, Schoenberg, Webern, Ravel (and others) composed waltzes à la Johan Strauss … But what is highbrow art?

Let us start from the Impressionist Revolution in painting and music. Around 1900, occurred the "painter's rebellion" according to André Malraux in his book "Le musée imaginaire". The topic disappears. Instead, the way in which the painter looks at the world, is interesting. Perspective and horizon disappear. Color is dominant, not drawing. According to the French sociologist Francastel, Cézanne "paints the color" (not adding color to drawing), creating an impression of depth with color. On the painting, large colored areas suggest mutual links between things or human beings. The end of successive planes removes sacredness (our environment is not always submitted to hierarchies). But emotion does not disappear. There is color and atmosphere. Also, it is a fleeting instant, as when the modern citizen understands what he (she) has around him (her) thanks to his (her) saturated senses (Mac Luhan thought that we understand our environment thanks to synthetic images). The evolution is from the meticulously built up spectacle, to poetic atmosphere. From structured spectacle, with particular areas on the painting, to a single space pervaded by an atmosphere (at this time, the French sociologist Tarde wrote that diffusion is space is a universal notion). In music, traditional form (symphonies of the 18th century, Liztian symphonic poem) is dynamited by Debussy, Stravinsky and Schoenberg, before the First World War (Lambert, 1948). Curiously, the origin is … Oriental music, with Glinka. Form is replaced by frantic rhythm and successive surprises. Through the Russian musicians, Chabrier, this influence reaches the music of Debussy, Stravinsky and Schoenberg. What was

efficient to remove traditional form was not so much nationalistic music but exoticism (Glinka composed music in the Spanish style). Finally a list of innovations was accepted (pentatonic scale, all tone scale, atonal and serial music, rhythmic innovations coming from ethnic sources etc.). After the First World War an era of pastiche begins. The major influence is "barbaric rhythm" suggested by jazz, but no highbrow composer will seize the opportunity. An era of experiments (like concrete music initiated by Georges Antheil or electronic music) begins. Constant Lambert deplores the lack of middlebrow composers.

Let us sum up the characteristics of lowbrow and highbrow art:

Lowbrow art	*Highbrow art*
Specialized (idiomatic)[2]	Universal (cross border)
Unambiguous	Ambiguous
Redundant	Full of surprises
Oriented towards the person's universe	Abstraction, intellectualism[3]
Not technically sophisticated[4]	Technically sophisticated

Now we can describe towards what fate the "interested amateur" is driven by his (her) experience. Either we describe this experience in the words of marketing. Brands allow the customer's experience. They choose a theme, and then freely propose videos on social networks or Internet (on particular regions, on trips, on "stars", on sports …) or give advices, display cooking recipes etc. The idea is to fashion the customer's experience to trigger the purchases of the brand's products. In this case, the "interested amateur" is in a "secondary role". But he (she) can also reflect on music in an autonomous way. There are many questions deserving reflection:

- What is the better music, the exotic or the nationalistic?[5]
- Do we need middlebrow composers and to do what?
- What is the role of technology?[6]
- What is the evolution of music?
- Etc.

The French specialist of Medias (and musician who invented "concrete music") Pierre Schaeffer wrote: "on music anybody tells anything". Therefore there is room for the "interested amateur" reflecting on music in his (her) own way.

Howard Becker has described these groups giving support to an artist (or several artists) attempting to change conventions and aesthetic choices (Becker, 1988). An "interested amateur" should belong to a group of this kind.

6 CONCLUSION

The city is no more the place where notorious musicians are selected (it is done on the social networks[7]), or where the tastes are fashioned, but it remains a place where music is diffused, listened to. After all, the city and music have something in common. For instance, the both allow "time travelling" (to use the Constant Lambert's words). The atmosphere of ancient quarters in cities gives the impression to make a trip in time. It is the same when one listens to ancient music, perhaps played with ancient instruments. It is emotion thanks

[2] Idiomatic is the word used by Perrenoud to characterize the genre that tribal listeners listen to.
[3] According to Mac Luhan, modern art wants to understand the aesthetic effects. It is more difficult to understand the effects (backward, from the effect to the cause) than to observe the effect (forward, from the cause to the effect).
[4] Some innovations coming from highbrow music can pervade lowbrow music after some time: thus the pentatonic scale is used by the rock music. But even the rhythms of lowbrow music are less complex than those of highbrow music (as the rhythms coming from the Hindu tradition used by Olivier Messiaen).
[5] Nationalistic music sticks to folklore melodies and rhythms, and even can be played with authentic, traditional instruments. Representatives are Albeniz and Bartok. Now it is called "world music".
[6] In the case of "electronic music" there are no more instruments. Music is diffused through loudspeakers. However, it is played. Tunings are made by the composer, who is also the Disc Jockey. Software is used.
[7] It is different for classical music. The career involves studying in a conservatory, participation in international competitions, then recordings and concerts.

to a travel in time. One can taste the both: visiting the French Quarter in New Orleans and listening to jazz dating from 1900. Cities propose many ancient places where one can listen to music: churches, cloisters, palaces, old plazas etc. There are also industrial buildings which have been revamped, opera houses, classical concert halls, modern auditoriums … Only the modern auditoriums are really adapted to the sound engineers 'tricks to obtain a sound of good quality, and modern orchestras. In other places there is a dilemma: one can use the sound engineers 'tricks to obtain a sound of good quality, but the original atmosphere is lost, or one keeps the ancient atmosphere but the sound is not perfect. In any case, recorded music is of good quality, no matter the place where it is recorded.

The presence of music in cities is often subsidized: it is the case for opera houses, conservatories, sometimes some bands. The ordinary musicians are paid indemnities if they do not earn enough fees in one year (in France and other European countries). In large cities, the stake is the image of a city. In small cities, support is given to festivals. Essential are events (like the presence of famous artists) and the peculiar atmosphere which is liked by those going to festivals. Settings have to be pleasant thanks to historical, architectural or natural features. The success of festivals depends on their reputation.

There is not a revival of concerts, but the dominance of recorded music is not absolute. One of the reasons is that concerts escape from the consequences of piracy. It is better from the point of view of the musicians 'livelihood.

There are several experiences of listening to music, some of them involving going to concerts.

Ten or fifteen years ago, Internet appeared as very much adequate to distribution of music. It was flexible enough to distribute music in these two situations: either the public is large and unknown, either it is small and known (Becker, 1988). But one can apply this idea from the French social thinker Proudhon to Internet: any important social progress has its other side, is also a cause of problems. Internet generated piracy. The economic model of music has not exploded. But musicians are more interested in concerts, since their revenues from recorded music are often threatened by piracy.

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Remixing the (Suburban) City – Institutional Frame, Strategies, Projects in the Vienna Region

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To understand regional development /spatial planning in the Vienna Region …

Metropolitan Area Management Vienna - Lower Austria

To understand regional development /spatial planning in the Vienna Region …

- The legal frame and the laws of regional/spatial planning are regulated by the "lands" in Austria. In the case of Vienna and Lower Austria, they are partly completely different which complicates co-operations.

Spatial planning of the local level

- The spatial planning on the local level is part of the autonomous competence of the municipality. Provincial government supervises the spatial planning activities of the municipalities. (local development scheme (örtliches Raumordnungsprogramm),land use plan (Flächenwidmungsplan),building regulation plan(s) (Bebauungsplan)

Vienna:

- Because of the status as a municipality and a land, Vienna has to fulfil the spatial planning on the local and the supra-local level in its autonomous competence.

Metropolitan Area Management Vienna - Lower Austria

To understand regional development /spatial planning in the Vienna Region …

- Due to the Austrian tax system municipalities try to improve their financial situation by creating new business and housing areas (financial compensation law, payroll (communal) tax: revenue depends on population size and number of working places)
- Favourite housing areas for Austrians are (still?) small villages near the cities, with „green" intact environment, good traffic connections – to use the economic, cultural infrastructure of the agglomeration area.

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To understand regional development /spatial planning in the Vienna Region …

- Because of the fact that Vienna is a municipality and at the same time a provincial state the co-operation on the same level (Vienna with Lower Austria or Vienna with the surrounding communes) especially with the surrounding communes is difficult.
- Vienna and the communes of Lower Austria do not have a common inter-communal planning body because of political reasons, economic prosperity and rivalry between the city and the suburban area. Regional planning and planning between the city of Vienna and the municipalities of Lower Austria were mainly based on singular projects

Metropolitan Area Management Vienna - Lower Austria

Vienna region – structures for Cooperation

- The „Planungsgemeinschaft Ost (PGO)" is plattform of the federal states Vienna, Lower Austria and Burgenland to initiate and co-ordinate spatial-related activities. It was founded in 1978. It elaborates basic information, reports and concepts, mostly concerning the development of settlements, traffic and the preservation of green spaces.
- The association „Verein Niederösterreich – Wien, gemeinsame Erholungsräume" was founded in 1974, it aims at securing leisure related areas and at creating and financially subsidising leisure areas with supra-local importance.
- The Verkehrsverbund Ost-Region Ges.m.b.H. (VOR) co-ordinates tariffs, time-tables and information of public transport (train, bus, tramway, underground) of the Eastern Region of Austria and the Viennese metropolitan area (1984).Share holders: Vienna, Lower Austria , Burgenland
- A political upgrading of the intermunicipal co-operation has been realised by the institutionalisation of a common financed metropolitan area management / Stadt Umland Management (2006).

Metropolitan Area Management Vienna - Lower Austria

Stadt-Umland-Management Wien / NÖ

- Joint initiative of the provincial governments Vienna, Lower Austria
- „Political heads" are the members of the provincial governments in charge of spatial planning, regional development
- Steering comitee with administrative and political representatives
- Budget: approx. 200.000 € (for continuos activities)

Metropolitan Area Management Vienna - Lower Austria

SUM Region

„SUM region“ is not defined exactly (due to different functional linkages) …

but focused on this region.

Metropolitan Area Management Vienna - Lower Austria

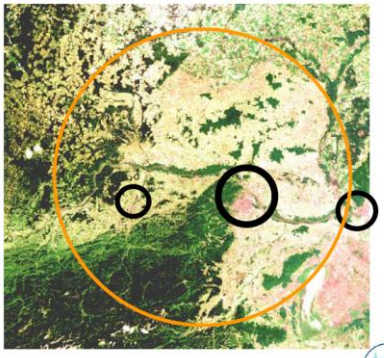
SUM - Activities

- Cooperation and Intermediation
  - → activating the cooperation and harmonization of the involved Lower Austrian communities and Viennese districts and the two „Länder“ concerning regional planning matters as well as specific projects
  - → mediating controversial cross-border issues
- Plattform of Information
  - → serving as a plattform for information about topics of regional relevance
  - → organising exchange of ideas among the stakeholders with a focus on establishing an all-inclusive vision of the agglomeration
- Incentives and Management
  - → designing solutions for cross-border challenges together with the stakeholders to create added regional value

Metropolitan Area Management Vienna - Lower Austria

Regional Development - Lower Austria

- **„Rural country“**
- **With different problems due to the history after the 2nd world war.**
- **Iron Courtain (1945 – 1989)**
- **New challenges - EU enlargement**
- **Development in the „Bratislava Region**
- **Population increase vs. decrease**



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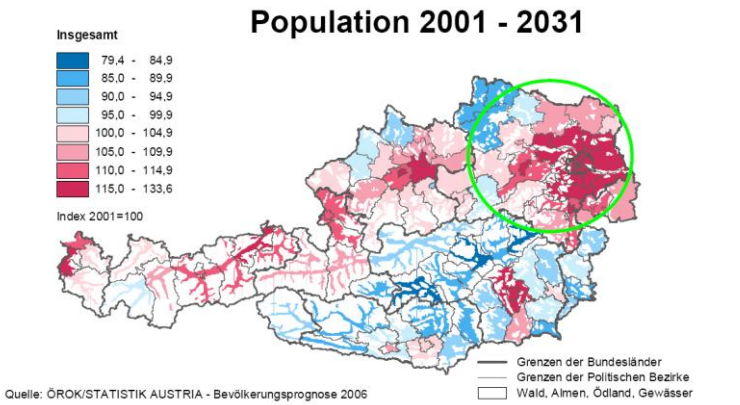
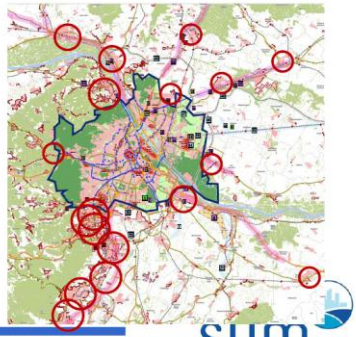


Metropolitan Area Management Vienna - Lower Austria

The agglomeration area Vienna – Lower austria

- metropolitan area with 2,6 mio inhabitants
- separated by the Danube River into „North" and „South"
- Vienna (1,7 Mio), surrounded by 13 small towns (10.000 – 25.000), many small municipalities (> 100) and large areas of precious nature and farmland
- radial structure, continuous settlement area along some axes (esp. to the south)



Metropolitan Area Management V ... Austria

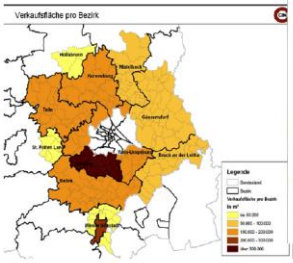
The agglomeration area in Lower Austria

- Concentration in the south of Vienna
- Biggest settlement area in Lower Austria
- Highest regional tax revenue
- Decrease industrial/producing sector
- Retail, logistics most important branches
- Problems concerning environment, traffic system, „life quality"
- New challenges for politician (new initiative groups versus traditional politician system, cooperation vienna – Lower Austria)

Metropolitan Area Management Vienna - Lower Austria

The agglomeration area in Lower Austria

Competition city versus periphery – for example: retail



Metropolitan Area Management Vienna - Lower Austria

Centre Areas in Lower Austria

www.raumordnung-noe.at

- Since December 2004 (14th amendment to the Lower Austrian Spatial Planning Act) municipalities have the possibility to zone "centre areas" in the land use plan. Zoning town centre areas is an important step towards an integrative strategy for the development of the town centre and retail structures.
- Inside centre areas – no limitation of sales area
- Inside housing area – max. 1000 m² floor space
- Periphery – max. 80 m² (except goods not relevant for centre areals like cars, furniture..)

Metropolitan Area Management Vienna - Lower Austria

Urban renewal in Lower Austria

www.dorf-stadterneuerung.at

As a result of the successful programme "Village Renewal", the programme „Urban Renewal" was started in 1992.

- people in the towns can take part actively in the life of the town and get involved in the discussion, decision and design process.
- Main goals:
  - more life quality in the towns
  - better communication of the citizens among each other
  - Rising its attractiveness and the economic potential
  - Co-operation of town and economic acteurs
- Always 18 towns can be active in the programme Urban Renewal at the same time
- financed by the government of Lower Austria and the municipalities

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Further initiatives (Lower Austria)

- **Lower Austrian cooperation platform for promoting shopping in town centres - www.nafes.at**
  - Cooperation government of Lower Austria – chamber of commerce
  - Focussed on projects with „commercial background“
  - Financial support for projects financed by the government and chamber of commerce
- **Housing subsidy in centre areas**: housing projects in defined centre areas can gain higher housing subsidies – main goal: revitalisation of town / village centres
- **Integration:** Social segregation is an urgent challenge especially in old, historical centre areas in former industrialized regions. There are now a lot of Integration activities organized by NGO`s, municipalities, regions and the government of Lower Austria.

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Projects (Lower Austria)

New Design public space (Guntramsdorf)

Guidance systems (Bad Vöslau)

New town hall (Ebreichsdorf)

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Projects (Lower Austria)

Renewable energy (Perchtoldsdorf)

Cultural events (Haag)

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Projects (Lower Austria)

Multimedia library
(Eggenburg)

New Design City Center
(Hauptstrasse Mödling)

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Projects (Lower Austria)

New design city center with
underground parking lot
(Tulln)

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Projects (Lower Austria)

New event location
(Burg Perchtoldsdorf)

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Projects (Lower Austria)

New event location
(Multiversum Schwechat)

Metropolitan Area Management Vienna - Lower Austria

Further informations….

www.stadt-umland.at
www.pgo.wien.at
www.raumordnung-noe.at
www.dorf-stadterneuerung.at
www.nafes.at
www.burg-perchtoldsdorf.at
www.multiversum-schwechat.at
…..

Thank you for your attention

Metropolitan Area Management Vienna - Lower Austria

Revitalizing Urban Neighborhoods with a Community Approach to Sustainable Development

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1 ABSTRACT

City neighborhoods, despite its historical importance, today forming the pattern of urban living have little significance. However, in recent decades in the context of sustainable development, they have been re-emphasis on reducing. A vision of sustainable community development, the new approach will strengthen the city in which problems in returning to the neighborhood as the cells are thought to urban life. In the present study the recovery of new urban areas in terms of social patterns, has been

Elected in a district of Tehran) in a neighborhood of Tehran's Evin (the process of restoration and sustainable community development approach in the context of neighborhood functions and were analyzed Using the principles and indicators of sustainable community development and application perspective The depth interviews and focal groups were used to examine the mental impressions and opinions of residents In improving the spatial structure and the promotion of social capital by The results show Discontinuity in the spatial structure of communities and loss of physical identity Area residents and reduce the loss of social structure through continuous communication and interaction between people is The results showed that a strong social networks and groups in local communities And create the necessary background and contexts of communication between residents of Effective feedback can lead to problems of urban residents and improve the biological With emphasis on the spatial structure of the proposed sustainability indicators that are observed in the , Can be useful in improving social interactions and relationships between residents within the local communities approach the expected This indicates that the assessments These interactions in a reversible process leading to the improvement of the spatial structure of neighborhoods and strengthen the local identity.

2 INTRODUCTION

Residential neighborhoods in the cities of the distant past, as the cells have an essential role in the lives of residents of urban life they have.

Since, in urban neighborhoods, gathering place for people with specific ethnic, racial, religious, social and economic has been common, followed by accumulation in a range of individuals with common characteristics, the specific identity of parts of the city known it was for a cause other surrounding tissues were differentiated.

The operating range of identity in the cause and function spaces with specific functions that distinguish the tissue surrounding it returns the range. A certain lifestyle among residents in a neighborhood usually lead to common goals and interests among the residents of a neighborhood.

In recent decades, with dramatic changes in lifestyle and changes in community structure is established.

Meanwhile, with the vision of sustainable community development as the view that the current problems of cities and urban life in the group returned to the neighborhood knows, you can use the powerful forces of endogenous and social capital in its existing problems.

Accomplishing this is a neighborhood structure that distinguishes it from the adjacent neighborhood. These characteristics reflect the cultural, historical, social and neighborhood residents and neighborhood-level social network in which communication occurs in different forms.

In other words, a range in which the civic life and urban life in a neighborhood scale is now. And indicators of cultural, social, historic in scale, it may be possible.

Lack of local connections can cause rupture of the spatial structure of the residential neighborhoods that only the shadow of popular participation and improved results.

some people knows that, solutions of urban problems in return to the villages and rural life. And others unhappy with the phenomena of urban life, it also points out the pros and seek appropriate solutions to overcome these problems are.

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Using the perspective of sustainable development can make sense for neighborhood residents and neighborhood culture and common sense in place of biological problems to achieve success.

This study has the potential within the urban areas, through building a powerful local groups and be active participants as social capital, deep and effective to use. So in addition to creating a better environment to live, work and play with the improvement of the spatial organization of urban neighborhoods where they play a fundamental role in establishing the identity.

The main questions this research include:

1. You can view the related theoretical concepts for sustainable neighborhood development, improve the spatial structure of urban neighborhoods of Tehran be used?

2. How can the social capital of local communities to improve the spatial structure be used?

In this study, the studied area is, Evin neighborhood,in Tehran. This area has a strong historical background, and has undergone new development, a municipality located in the region.

3 THEORETICAL FRAMEWORK

Neighborhoods and local communities:

Another element that must be evaluated in view of sustainable community development, neighborhood, urban life is a living cell. Generally, the neighborhood is part of the city in which spatial relations are facing as individuals. With respect to each aspect of the neighborhood may be defined:

1) The administrative relations: by borders and boundaries

2) aesthetics, features and history developed by

3) Social and saw the look of the area residents

4) Performance of services by

5) Environmental: by spaces with high quality traffic flowing smoothly and the environment.

((Neighborhood is an important part of the activities and work space in which citizens use it occur. Neighborhood is an important foundation for understanding the broad social mobilization of people and the people To enable, develop and defend those rights is that Not in the political sphere but also in the field of energy and material culture, economy and social life are.))

It is a neighborhood institution through which individuals and by the ability for early action by an effective interaction in individual and collective within or beyond it, to implement.

Generally, the neighborhood can be a predominantly residential area With specific and distinct identities and characteristics of the surrounding tissue as , Which usually includes the local service area for pedestrian and bicycle access and priority is.

Development of a sustainable community:

The cell with the neighborhood as "urban life" only to realize sustainable development in local development and local scale, and the idea of "think global, act local" was followed.

Because now more than 50% people live in cities, How can the macro-scale neighborhood development and success or failure of society to the problems of environmental, social, physical and ... To determine.

"A sustainable community development" is only a single type of neighborhood, neighborhood, town or region does not describe. Enables traders to activities of the citizens want and can give them stability, which may vary from one community to another community. Generally, a stable neighborhood, with consideration of potential environmental, social and economic needs of inhabitants, says the response. Development of a sustainable community can be as changes in local management practices to global environmental sustainability and at the same time also helps the local environment, natural and artificial, Be explained. Sustainable development by increasing local control over decisions and encourages consideration. Such a strategy requires the development of empowerment in decision making to the local level.

Aims to create sustainable neighborhoods:

The vision of a sustainable neighborhood development, the two main areas in the urban neighborhoods targeted for sustainable neighborhood development as:

1) The spatial structure and spatial identity

2) social capital

Generally, the main goal of a sustainable neighborhood development, Improve spatial structure and spatial identity through strengthening social institutions and social capital is in line to use. Location identification of biological To facilitate understanding of the meaning is one of the most important aspect of quality is a place. Spatial identification process and the environment and human interaction And human activities within this environment are considered.

For a range of residents, And length of stay or activity due to internal experiences, Observations or different memories, Sense of integrity and dedication to me as part of its social identity develop and strengthen the development of space systems alone can not be responsible for neighborhood development goals. Thus the space requirements needed to rebuild and revitalize and strengthen social networks, social interactions. Social interactions and social networks in urban neighborhoods with sustainable and their sense of belonging and responsibility among residents of a neighborhood were considered.

As was mentioned,the ultimate goal of a sustainable neighborhood development is the relationship between social capital and physical.

The concept of social processes, to improve the physical structure and the identity and capacity for future development are used.

Subjective impression of the neighborhood residents Evin:

Neighborhoods within its historical core of the relatively old Evin in Tehran is a city in central region that regular and irregular texture of chess in which the tissue is relatively modern.

Original inhabitants of this area of the Armenians have the use over time, the other residents who also compiled and mixed tissue formed.

The Community believes that strong social relationships is in the range has a spatial structure which integrated.

The range of elements that are symbolic and environmental perspectives in mind, people remain.

Opinions of residents in two areas of social and physical, is obtained through two techniques :

A) depth interview

B) discussions with focus groups

In the present study to collect data, Method and direct face to face interviews with neighborhood residents, Evin has been used. Chosen because this method and multi-dimensional extension of this research And the lack of practical and applied research in this field .

In this type of interview is a qualitative, response of the different spectra are chosen . Some officials in the municipal affairs of the municipal authorities, the Arts and Cultural Center ... , Local dignitaries and residents with the most basic form of the interviewee.

Factors such as intimate partner sexual diversity, age, duration of residence and has been involved in the selection of individuals interviewed.

Information and personal characteristics of interviewees:

Possible location of the interview with the relative dispersion in the study area has been. These variations cause variations in the results of the questionnaire has been.

As was predicted the willingness to participate, His sense of responsibility and sense of belonging among residents with higher residential And those who owned their own property More than all tenants and residents with residence history is less than 5 years.

Considering the physical and social issue in two main areas to be, Results obtained in these two areas mainly covers ,mental problems that you think people in their lives can be seen from the range include:

* Background Physical

* Traffic and access problems

* Local service problems

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* The break in the spatial structure
* There are different types of pollution in the area
  * Social background
  * Lack of participation
* Lack of information about local groups
* Lack of adequate understanding of each other residents

4 CONCLUSION

Specific location and placement of these elements, and a member in its range, It caused a major role in the region in terms of availability and performance has been. The historical record shows four stages of change that caused a major change in the relationship between mass and space and the space and its users are.

Evin local axis passing through the one hand and increasing human population density and spatial structure and its social construction in this area led to the rupture. While the placement of the cross member of a neighborhood like Beheshti University, commercial office elements and ... Addition, all were due.

Characteristics and problems of study area,The two techniques of field and depth interviews conducted with residents. The results confirm the difficulties in their social context and the spatial structure. Discontinuity in the spatial structure and so weakened by the loss of physical identity and ultimately rupture in the social structure is. This break led to a decrease in social interactions among residents have been limited. The main results of the use of social capital in the potential range.

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Sharing the Land Knowledge: The HLANDATA Way to Harmonized Information on Land Cover/Land Use

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1 ABSTRACT

An understanding of the causes and the implications of land use and land cover changes and trends is a fundamental part of planning for sustainable development. As consequence, spatial information on land use and land cover become nowadays more and more available, sourced by regional, national as well as European iniciatives or programmes. Though, like in case of so much data in Europe, all these investments can run in the risk of losing the real impact due to incompatible data standards, decentralised data storage and high data complexity for operational assessments. The HLANDATA project aims to demonstrate the feasible European level harmonization of the land use and land cover datasets taking into account both the data categorization and the data models through the development of user oriented value-added services to streamline harmonized data exploration and analysis.

2 CONTEXT

2.1 Land cover or land use?

Land cover and land use and are amongst the most important geographic information themes today and an understanding of the causes and the implications of their changes and their trends is a fundamental part of planning for sustainable development. Land cover represents the biophysical state of the real landscape which means that it consists of natural, but also modified (cultivated) and artificial objects, as referred by the categorization such as artificial surfaces, agricultural areas, forests, natural areas, wetlands, etc.. Land use reflects the socio-economic purpose for which land is used (land function), either current or planned in future, as referred by the categorization such as residential, industrial, commercial, agricultural, recreational, etc. Together thus land cover and land use provide for the particular territory complementary information both on landscape potential and on realizing this potential - the characterization, which essential for many applications areas.

2.2 Need for harmonisation

Historically, land cover and land use information has been managed at various levels - from European to national, regional or even local one. The many activities producing information from European to local scale have been mostly developed independently, addressing specific requirements (i.e. information to be acquired, level of detail both geometric and semantic, updating periods, timelines, precision) of specific users. This has resulted in a suite of datasets, mainly not compatible with each other, not taking into account the interoperability of the information. However, in a context where related environmental threats (for example; climate change, biodiversity loss, and food security) become more and more global issue, there is a need to better integrate various sources of information at various scales. One of the succesfull long-term programme providing harmonized land cover and land use at a pan-European level is the European CORINE Land Cover iniciative [1], nowadays integrated (together with High Resolution Layers (HRL) and Urban Atlas components) in the initial operational phase of GMES programme framework [4]. Nevertheless, many parallel national, regional and local land monitoring activities still exist and need to be linked or integrated in order to achieve efficient land monitoring set up in Europe. Therefore, at present there is an urgent need for harmonization and standardization of land cover and land use information at various levels.

2.3 INSPIREd effort

The main European geographic information harmonization initiative, INSPIRE Directive, set up the rules for the implementation of the datasets included in INSPIRE's Annexes II and III which must be approved by the Member States, and to asure that the datasets owned by the different Member States will be implemented in order to allow their interoperability. All European Member States will have to make available their geographic information as established in INSPIRE, being land cover one of the themes included in the

Annex II of the Directive, and land use one of the themes included in the Annex III of the Directive. The INSPIRE Directive [3] is truly a key driver for the standardization and harmonization of land cover and land use information in the EU, but there is still a long process to reach this situation. Development of the respective INSPIRE Technical Working Groups (TWGs) has to be also regularly tested to assure the best use of the existing experiences in the land cover / land use mapping community. This is why, some initiatives have been / are being carried out which support INSPIRE in achieving its objectives. In prominent position, the HLANDATA project builts on experiences from various previous harmonisation activities and, in close cooperation with respective the INSPIRE TWGs, aims to demonstrate the feasible European level harmonization of the land use and land cover datasets taking into account both the data categorization and the data models through the development of user oriented value-added services to streamline harmonized data exploration and analysis.

3 HLANDATA APPROACH

3.1 Project background and objectives

HLANDATA,[1] lead by the Government of Navarre and TRACASA - Spain, is a European project supported by the ICT Policy Support Programme (ICT PSP) between March 2010 and February 2013. ICT PSP aims at stimulating innovation and competitiveness through the wider uptake and best use of information and communication technologies by citizens, governments and businesses. HLANDATA consists of 9 partners, i.e. public authorities, private companies and research institutes from 6 different European Union countries as well as one international planning organization. Primary goal of the HLANDATA project aim is to contribute to a common data sharing infrastructure, contribute and test TWG data specification to assure sharing land cover and land use data between different public administrations and other stakeholders on European, national, regional and local level. More, HLANDATA aims at fostering the use of land use and land cover data at a European level through the creation of value-added services beyond the traditional concept of land cover and land use data provision. The results are web services in different Pilots - different application areas and the support of awareness rising for data harmonization, data sharing, data exploration and analysis guiding holistic planning. The services are based on the development of one land cover and land use harmonization proposals (coordinated with INSPIRE TWGs) which takes into account already existing data models and categorizations as well as the specific requirements of the users.

3.2 Project phases

From technical point of view, the HLANDATA project is phased into following subsequent logical chain of activities (reflected also on organization level by Work Packages (Figure 1).

Diagnostic phase

The first phase - 'Diagnostic' consisted of assessment of the current European situation regarding the harmonization of the Land Cover and Land Use geographic information, taking into account the categorization and data model initiatives already ongoing in that field (i.e. SIOSE, LISA). Also, being HLANDATA focused on relevant value-added services, thorough assessment of the end users and their needs from the point of view of data harmonization i.e. kinds of users, user purposes and required functionalities for the high-level services was developed in the project.

Harmonization and development of common data infrastructure phase

In the second phase – 'Harmonization and development of common data infrastructure', based on the diagnostic results, a harmonization proposal for the land cover / land use geographic information was developed and provided to respective TWGs, both from the perspective of the data categorization and the data model (i.e. HILUCS for TWG LU). Fruitfull cooperation with INSPIRE TWGs is clearly one one of the achievements of the HLANDATA project.

[1] HLANDATA website http://www.hlandata.eu

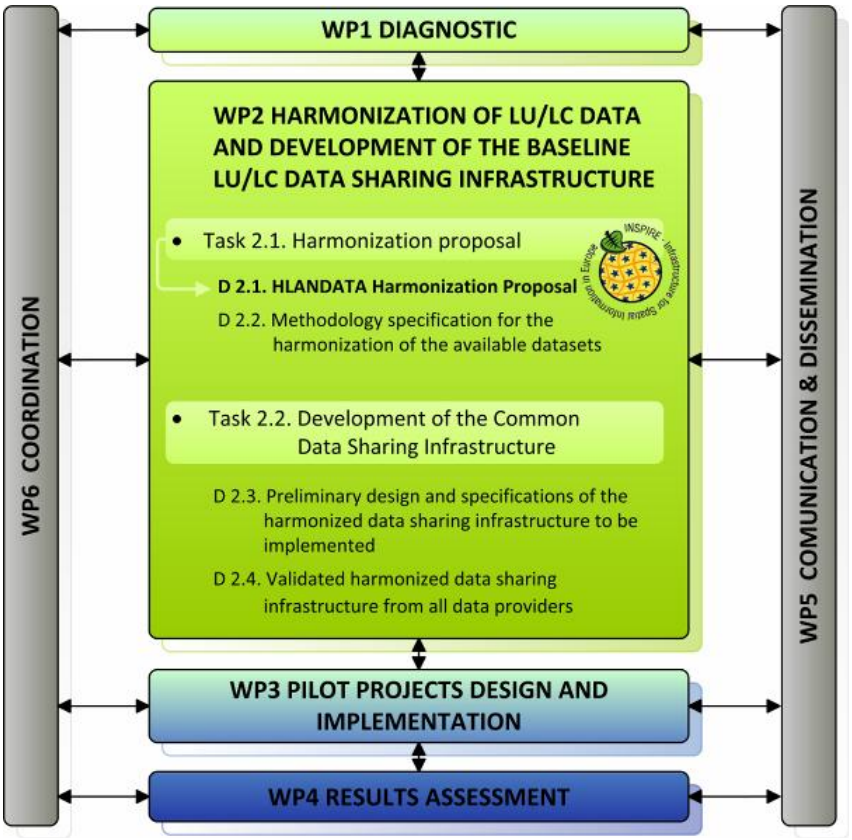

Fig 1: Phases / Workpackage structure of HLANDATA project

More, common data sharing infrastructure (CDSI) has been developed to support harmonised land cover and land use data stored and maintained in different sources across Europe. The HLANDATA geoportal provides a map viewer to overlay and compare spatial data, and a metadata catalogue that allows to search and to find available data. The HLANDATA geoportal follows the principle: one centralised access to decentralised data! The CDSI enables access to the harmonized data via WMS. A common functionality and requirements on WMS are defined, so that interoperability of WMS is given. The HLANDATA geoportal is the access portal to the CDSI and the harmonized WMS, and provides a viewer for mapping and overlaying data.

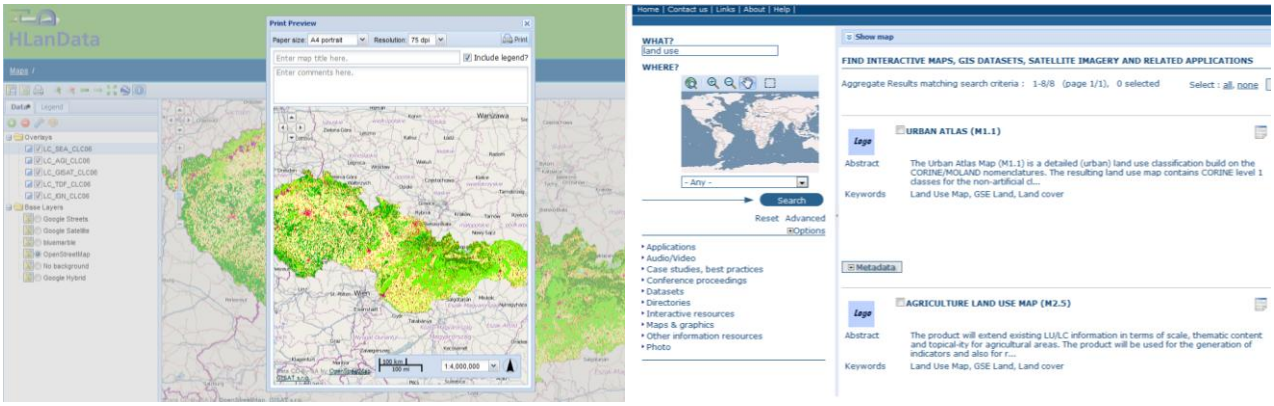

Fig 2: The HLANDATA Geoportal

Additionally a metadata search allows to access relevant information on the datasets according to one common metadata profile. The architectural design consists of a three tier architecture, which has the advantages of flexibility, good scalability and thin clients. The HLANDATA Geoportal is accessible on http://portal.HLANDATA.eu (see on Figure 2.)

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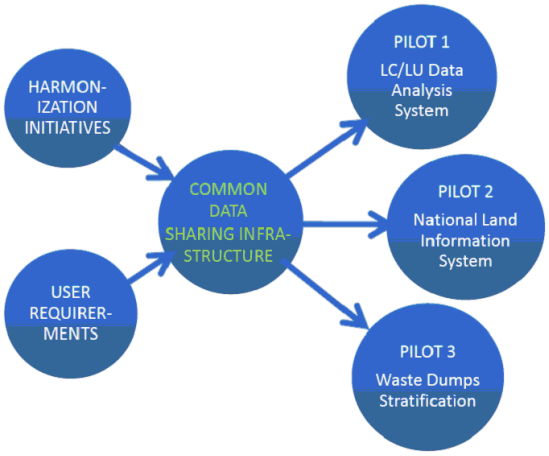

Fig 3: The HLANDATA Pilots and the previous project phases

Value-added web services implementation and validation

Finally in the third phase - 'Value-added web services implementation and validation', the HLANDATA common data sharing infrastructure (CDSI) is used and data harmonization potential is demonstrated using three specific value-adding thematic web based services (Pilots) developed for the selected users: LC/LU Data Analysis System (Spain), National Land Information System (Czech Republic, Lithuania) and Waste Dumps stratification (Slovakia) as seen on Figure 3. The value-added service within each of the pilot project is a specialized web-based map application that allows users to freely access it and to perform selected operations to obtain desired new information using harmonized land cover / land use data. These functionality is in most cases provided by using standardized web services (e.g. OGC – WMS, WFS, WPS) and standardized IT protocols and formats (REST, JSON, …). Contained map layers of each Pilot include harmonized WMS that were prepared at previous stages. Some of Pilots offers also additional value-added services based on functionality that needs availability of source data and/or some additional data – through a (geo)database. Both Open Source and commercial development frameworks have been tested in Pilot implementation. User utility assessment is also carried out within this phase to validate pilots design. Following chapter is focused on Pilot 2 - National Land Information System overview provided by GISAT.

4 PILOT 2 – LAND COVER / LAND USE DATA EXPLORATION WEBTOOL

In the frame of the HLANDATA project Pilot 2, GISAT and CENIA, which jointly serve as the National Reference Center (EIONET NRC) for Spatial Analysis and Land Cover in the Czech Republic work on exploring the potential of the setup of a national land information system and on the development of its trial which shall be demonstrated as the Czech pilot within the HLANDATA project. The project focuses mainly on technical, but reflects also organizational support required to set up data sharing cycle of the national mandated actors and data providers of partial land cover and land use data in a harmonized way.

Public administrations, decision makers, private companies, NGOs, researchers, planners, GIS analysts, the public, all these stakeholders and more require access to adequate and comprehensive data to achieve interdisciplinary and holistic analysis and planning activities, transparency and participation in decision-making, efficient integrated data management, and monitoring of changes for a sustainable development. Due to the harmonisation according to common standards, land use and land cover data across Europe can be shown on the HLANDATA geoportal together in one map, with one common legend, and therefore become comparable as a key input for cross-border analysis and integrated planning activities, e.g. in regard to environmental, mobility, economic, and social issues.

Nevertheless, The HLANDATA project aims even more by exploring potential how to turn data into standard information and provide user-friendly tools to explore, describe, compare and explain land cover and land use changes in socio-economic context. In order to achieve this level of flexibility and usefulness required by users, the service specification for the Pilot 2 goes far beyond the traditional concept of data provision. Inspired by the European Environmental Agency (EEA)'s the Land and Ecosystem Accounting framework [2], the Pilot 2 is based on an interactive web-based approach, where both spatial and socio-economical statistical data are delivered in an organized way, together with tools, in a fast and flexible

environment. This allows data to be easily viewed and analyzed in user-predefined themes (indicator views), as well as being further explored interactively. The webtool, based strictly on Open Source frameworks, integrates main standard presentation modes - maps, tables and graphs in an interlinked manner i.e. user-defined changes in/via one presentation mode are instantly reflected in all the others. User is also free to choose the most appropriate level of granularity for his analysis or define his own analytical units. Analytical views on data can be stored (using OpenID authentification) and/or shared with other users using URL link. Finaly, users can export of each webtool component (into PDF or images) to be used in user reports or assessments.

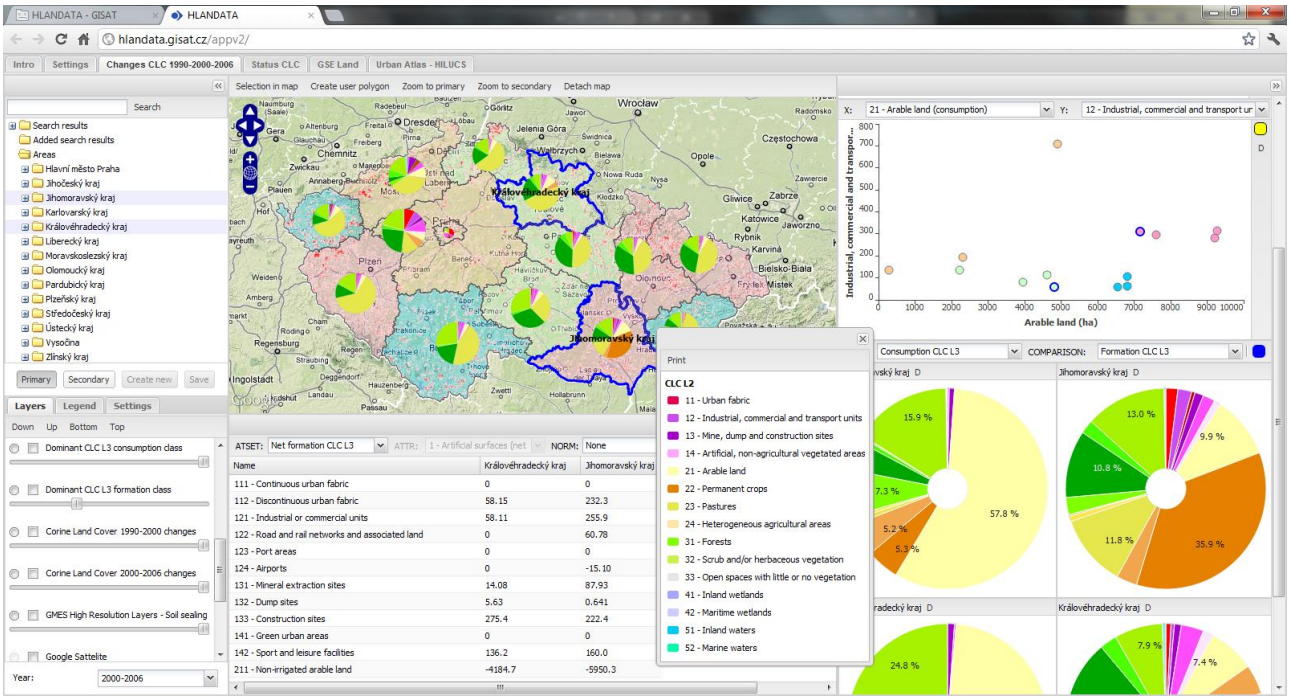

Fig 4: Example of the HLANDATA Pilots 3 – webtool interface

5 CONCLUSION

The HLANDATA project demonstrates advantages of current European effort for data harmonization of land use and land cover datasets within the INSPIRE context on example of user oriented value-added services streamlining harmonized data search, exploration and analysis. The web-based approach to the Pilot demonstrators developed within the HLANDATA project then shows not only potential of harmonised land cover / land use data, but also the power of new technological solutions to support the complex spatial information provision to the end-user. Intuitive, fast and user-friendly exploration and analysis webtool handling large spatial datasets integrated with traditional socio-economic statistical data can provide effective support to spatial planning on various administration levels and assure sharing the land knowledge on decision making level.

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Smart Cities – wie Systeme intelligent werden

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1 ABSTRACT

Vor dem Hintergrund der Notwendigkeit, den weltweiten CO_2-Ausstoß in den kommenden Jahren drastisch zu reduzieren, nehmen Städte eine wesentliche Rolle ein. Dies trifft im Besonderen auch auf Österreich zu, wo der Urbanisierungsgrad inzwischen 50 % beträgt und laufend weiter zunimmt. Nachhaltigkeit und Energieeffizienz sind die Werte, an denen sich heute die Zukunftsfähigkeit einer Stadt misst. Die Reduktion der Treibhausgasemissionen komplementiert Vorgaben wie Verkehrsdurchlässigkeit und Habitatsdichte als Ziel der Städteplanung. Es gibt keine lebenswerte Zukunft ohne Klimaschutz. Städteplanung und -entwicklung befinden sich weltweit in einem Wandlungsprozess, und eine neue „Gründerzeit" zeichnet sich auch in Österreich ab. Die Zukunft gehört ökologisch ausgerichteten Metropolen, die zwar dicht bebaut sind, aber dennoch sparsam mit Ressourcen umgehen, ihre Energieversorgung organisieren, Verkehrsströme begrenzen und die Landschaft und Arbeit zurück in ihre Mitte holen.

Genau hier setzt der Klima- und Energiefonds mit seinem Förderprogramm „Smart Energy Demo – FIT for SET" an. Mit diesem und weiteren Programmen in der Energieforschung und im Verkehr werden Fördermittel für die smarte Stadtentwicklung bereit gestellt, um österreichische Industrieunternehmen, Energieversorger und große urbane Zentren im internationalen Wettbewerb zu unterstützen. Gleichzeitig erhalten aber auch kleine und mittelgroße Städte Zugang zu intelligenten Technologien auf nationaler Ebene. Insbesondere bei der „Stadt als Testbed" sieht der Klima- und Energiefonds ein großes Potenzial: Österreichische Unternehmen sind in vielen Bereichen, von der Energietechnologie über Gebäudetechnologien bis hin zur Elektromobilität, internationale Spitzenreiter. Mit Unterstützung des Klima- und Energiefonds planen und realisieren diese Unternehmen wegweisende Demo-Projekte für eine weiterhin hohe Lebensqualität in Österreichs Städten.

2 SMART CITIES ALS BAUSTEIN FÜR ZUKUNFTSFÄHIGE WIRTSCHAFTSSTRUKTUREN

2.1 Nachhaltige Stadtentwicklung – Systemintegration und Systemoptimierung

Viele (Einzel-)Ergebnisse als technologische Basis für eine klimaneutrale Stadt sind vorhanden: Über das breite Portfolio des Klima- und Energiefonds mit den Schwerpunkten der vergangenen Jahren wurden bereits zahlreiche Ergebnisse initiiert. Eine der Hauptaufgaben der Planung neuer Siedlungsformen liegt nun in der Integration der Vielzahl innovativer, urbaner Einzellösungen – es stehen also Systemintegration und Systemoptimierung im Zentrum. Gebäudesanierung und effizienter Neubau, solare Technologien, Mobilitätskonzepte, Intelligente Verkehrssysteme, erneuerbare Energieaufbringung oder „Smart Grids" sind Bereiche, die vor allem im optimalen Zusammenspiel eine nachhaltige und klimaschonende Stadtentwicklung erlauben.

Das Förderprogramm „Smart Energy Demo – FIT for SET" zielt daher auf die Integration von mittlerweile meist sehr ausgereiften Einzellösungen ab. Die Verflechtungen der technologischen und sozialen Notwendigkeiten einer emissionsfreien Stadt sind Hauptzielrichtungen der Demonstrationsprojekte, die im Zuge von „Smart Energy Demo" geschaffen werden sollen. Der Anspruch der klimaneutralen und nachhaltigen „Smart Cities" soll insbesondere auch in Österreichs historischen Städten umgesetzt werden.

Die erste Ausschreibung hatte die Konsortienbildung und eine gemeinsame Visions- und Konzeptentwicklung (Roadmap, Actionplan) sowie die Vorbereitung der Antragstellung für die zweite Ausschreibung im Fokus, der zweite Call zielt auf großvolumige Pilot- und Demonstrationsprojekte im urbanen Kontext ab.

2.2 Smart Energy Demo – FIT for SET: Programmvision und -strategie

Die Vision des Klima- und Energiefonds für das Programm „Smart Energy Demo – FIT for SET" ist die erstmalige Umsetzung einer „Smart City" oder einer „Smart Urban Region", also eines Stadtteils, einer Siedlung oder einer urbanen Region in Österreich, die durch den Einsatz intelligenter grüner Technologien

zu einer „Zero Emission City" oder „Urban Region" mit hoher Lebens- und Wohnraumqualität wird. Bei der Betrachtung einer Stadt als (Gesamt-)System werden jene Themen in den Mittelpunkt gestellt, die dazu beitragen, die Rohstoff- und Energieversorgung, die Verarbeitung, Entsorgung und Wiederaufbereitung

von Ressourcen für „Städte der Zukunft" effizient zu gestalten. Demovorhaben, die durch den Klima- und Energiefonds gefördert werden, beinhalten daher insbesondere Technologieentwicklungen, die eine Interaktion und Vernetzung von einzelnen technischen Systemen ermöglichen, zwischen Systemen eine Schnittstelle bilden und damit die Einzelsysteme bzw. Einzellösungen optimieren;

„Smart Energy Demo – FIT for SET" ist darüber hinaus jenes Förderprogramm der Bundesregierung, das österreichische Unternehmen für die Beteiligung an „European Industrial Initiatives" im Rahmen des „SET-Plans" bereit macht. Die Programmstrategie orientiert sich daher auch an der Europäischen Forschungs-Strategie für „Smart Cities" („European Research Strategy") und deren strategischen Eckpfeilern.

3 TECHNOLOGISCHE BAUSTEINE EINER SMART CITY

Die richtigen Technologien sind von zentraler Bedeutung für die Lösung der Herausforderung, Städte fit für die Zukunft zu machen. Beispiele hierfür sind Gebäude als Kraftwerke, intelligente Energienetze (sogenannte Smart Grids), neue Speicherlösungen, multimodale Mobilitätslösungen sowie intelligente Informations- und Kommunikationstechnologien – all dies sind Bausteine einer „Smart City" mit hoher Lebens- und Wohnraumqualität.

Seit 2007 unterstützt der Klima- und Energiefonds mit seinen Programmen die Entwicklung dieser Bausteine in Theorie und Praxis mit mehr als € 600 Millionen. Mehrere Beispiele aus fünf Jahren Forschung zeigen einen kleinen Ausschnitt aus dem breiten Spektrum an technologischen Möglichkeiten.

3.1 Gebäude als Kraftwerke

In Österreich werden knapp 40 % der Endenergie in Gebäuden eingesetzt. Sie bergen das größte Verbesserungspotenzial im Bereich der Energieeffizienz, um die Belastung steigender Energiekosten ausgleichen und Treibhausgasemissionen reduzieren zu können. Gleichzeitig zeigen Untersuchungen, dass in einem urbanen Stadtteil eine 100 % Gesamtdeckung des elektrischen Energiebedarfs und sogar Überschussproduktion durch den Einsatz erneuerbarer Energie prinzipiell möglich.

Mit SmartCityGrid: CoOpt testet ein Konsortium unter Federführung vom Austrian Institute of Technology (AIT) die koordinierte Optimierung von erneuerbarer Energie in Netzen und Gebäuden anhand der ENERGYBase, SOL4. Es werden optimierte Regelstrategien entwickelt, welche vorausschauendes Reagieren erlauben. Dafür haben sich modelbasierte prädiktive Regelungen (MPC) bereits in industriellen Anwendungen bewährt (z.B. Kraftwerkstechnik). Durch die prädiktive Eigenschaft des Reglers kann auf zukünftige Veränderungen optimal reagiert werden. Dazu sind genaue Modelle und Vorhersagen, etwa von Energiebedarf und -erzeugung, Wetterentwicklung oder Benutzerverhalten essentiell.

Die Sanierung denkmalgeschützter Gebäude auf Aktivhaus-Standard untersucht die Stadt Graz im Rahmen des Forschungsprojekts denkMalaktiv. Die neuesten Technologien werden sondiert, teilweise weiterentwickelt und zu Sanierungskonzepten verknüpft. Die Umsetzung als konkretes Pilotprojekt für ein „Netto-Null-Emissions-Haus" erfolgt am Beispiel des Jugendstilgebäudes Sanatorium in der Schönbrunngasse in Graz. Der älteste Teil des Hauses stammt aus dem Jahre 1885. Das Gebäude vereint Historismus und Neorenaissance sowie einen Bauteil aus 1902-1903 mit ersten Jugendstilelementen.

Beide Projekte wurden im Rahmen des Forschungs- und Technologieprogramms „Neue Energien 2020" gefördert.

3.2 Smart Grids für smarte Märkte

Die Einführung von Smart Grids bietet Zugang zu einer sicheren, kosteneffizienten und nachhaltigen Energieversorgung. Österreich verfügt bereits über großes Know-how sowie Innovationen im Bereich der Smart Grids. Dank mehr als 18 Millionen Euro Forschungsförderung für Smart Grids im Rahmen von „Neue Energien 2020" liegt Österreich EU-weit im Spitzenfeld.

Im Forschungsprojekt ADRES wurde ein Autonomes Dezentrales Regeneratives Energie-System in einem ganzheitlichen Konzept entwickelt und erprobt. Ziel ist das Erreichen von Leistungsautonomie, also jenes Zustands, in dem ein Siedlungskollektiv nicht nur in der Jahressumme, sondern auch in Echtzeit

ausbilanziert ist. Das Projekt wurde interdisziplinär geführt mit dem Institut für Energiesysteme und Elektrische Antriebe der TU Wien als Projektleiter, dem Institut für Energietechnik und Thermodynamik der TU Wien, AIT, Austrian Power Grid (APG), Burgenländische Elektrizitätswirtschafts AG (BEWAG), Energie AG Oberösterreich, Energieversorgung Niederösterreich (EVN) und Wienenergie Stromnetz.

Die Ergebnisse des Projektes in Kurzform sind:

- Dezentrale autonome Energiesysteme sind möglich, aber die Kosten ohne Netzanbindung sind hoch, insbesondere da dann die Speicherung und Backup-Versorgung dezentral in der Siedlung erfolgen müssen.
- Voraussetzung für nachhaltig versorgte Siedlungen ist eine Effizienzsteigerung in der Endanwendung
- Minimale Speicherkosten entstehen bei Erzeugungsmix aus etwa 70 % Windenergie und 30 % PV.
- Tagesspeicher sind kostengünstig, Wochenspeicher und Speicher für längere Zeiträume sind unwirtschaftlich gegenüber einer Netzanbindung der Siedlungen.
- Biomasse eignet sich als Backupversorgung mit der Möglichkeit, Elektrizität und Wärme zu erzeugen.
- Photovoltaik ist zukünftig wirtschaftlich und „lastfreundlich" durch die Tageserzeugung.
- Windenergie ist nur in Großwindanlagen, nicht aber in siedlungsnahen Kleinwindanlagen wirtschaftlich.
- Neben Suffizienz und Energie-Effizienz ist auch Leistungseffizienz zweckmäßig, d.h. die Verbrauchsgeräte sollten in ihrer Spitzenlast möglichst begrenzt sein.

Die Salzburg AG nimmt die Herausforderungen einer integrierten Beatrachtung des Energiesystems an. Alle Projekte, welche die zukünftigen Anforderungen der Energiewirtschaft wie intelligente Netze und Zähler zum Thema haben, werden in der Initiative „Smart Grids Modellregion Salzburg" gebündelt. Für den gesamten strategischen Ansatz wurde Salzburg vom Klima- und Energiefonds als „1. Smart Grids Modellregion" ausgezeichnet. Alle Energieträger und Komponenten von Strom und Fernwärme über Mobilität und Gebäude werden zu einem horizontal und vertikal integriertem Gesamtsystem zusammengefügt. Energiewirtschaft, Wissenschaft, Industrie und Wohnbau ziehen an einem Strang. Dadurch entsteht ein breites Knowhow-Portfolio von technischer und wirtschaftlicher Expertise über Erfahrung bezüglich Nutzerverhalten bis zur Analyse sozio-ökonomischer Aspekte.

3.3 Multimodal ins 21. Jahrhundert

Einer der Kernbereiche einer „Smart City" ist ihr Umgang mit Mobilität und Verkehr: Hier sind neue, intelligente Strukturen notwendig, um die Lebensqualität der Menschen zu verbessern und dabei als Stadt Wirtschaftlichkeit zu garantieren. Die verkehrsbedingten Emissionen sollen laut „Weißbuch Verkehr" bis 2050 um 60 Prozent reduziert werden, konventionelle Autos zur Gänze aus dem Stadtbild verschwinden. Die Verlagerung des Verkehrs von der Straße auf die Schiene und die Integration intelligenter Verkehrskonzepte und -Leitsysteme in Städte und urbane Regionen werden vom Klima- und Energiefonds als Querschnittsthema durch mehrere Förderprogramme getragen.

Mit Projekten wie GIP (Graphenintegrationsplattform), GIP.GV (e-government Lösungen zur Wartung der GIP), VAO (Verkehrsauskunft Österreich) und den laufenden Demonstrationsprojekten wie EFM Modellregion Bregenzerwald, FCD Modellregion Salzburg und Testfeld Telematik wurden vom Klima- und Energiefonds bereits wesentliche Schritte in diese Richtung gesetzt. Das vom Klima- und Energiefonds 2011 gestartete Programm „Innovationen für grüne und effiziente Mobilität" setzt auf diese Vorarbeiten auf und unterstützt Intelligente Verkehrssysteme, die dazu beitragen, die Effizienz und Sicherheit des bestehenden Verkehrssystems zu erhöhen, die Verkehrsnachfrage in Richtung der stärkeren Nutzung umweltverträglicher Verkehrsträger zu beeinflussen und „grüne Güterverkehrskorridore" zu schaffen. Es leistet damit einen essentiellen Beitrag zur Gesamtstrategie für ein Intelligentes Verkehrssystem, das den europäischen Rahmenbedingungen und nationalen Vorgaben entspricht.

Die Einbettung von E-Mobilität in ein Gesamtverkehrskonzept wird im „Leuchtturm der E-Mobilität" eMORAIL aufgezeigt. An zwei Pilotstandorten in Österreich – in der Steiermark und in Niederösterreich –

wird ein integrierter Ansatz zur Verknüpfung des öffentlichen Verkehrs mit E-Mobilität- Services entwickelt, die Grundlagen für einen flächendeckenden Rollout werden geschaffen. Im Rahmen des Internationalen Eisenbahnenverbands in Europa nehmen die ÖBB damit eine Vorreiterrolle ein. Die Entwicklungsschwerpunkte im Projekt beschäftigen sich mit den Dispositions- und Abrechnungssystemen, den Kundinnen- und Kundeninformationssystemen und dem einfachen Zugang zu E-Mobilität für Nutzerinnen und Nutzer öffentlicher Verkehrsmittel sowie der Integration beider Verkehrsleistungen zu einem neuen integrierten Verkehrsangebot. Die entwickelten Lösungen sollen den Kundenansprüchen im hohen Maße entsprechen und den „Open Source"- nspruch erfüllen.

Mit dem Ziel, dass der öffentliche Verkehr noch umweltfreundlicher wird, haben sich die Wiener Linien, Siemens, Vossloh Kiepe, Rail Tec Arsenal und die SCHIG zu einem Konsortium unter Führung von der Technischen Universität Wien zusammengeschlossen. Bis November 2013 laufen Tests im Klima-Wind-Kanal sowie im regulären Passagierbetrieb. In der ersten Phase von EcoTram wurde ein Schienenfahrzeug in Hinblick auf dessen Energieeffizienz der Heizungs-, Klima- und Lüfungstechnik-Geräte durchleuchtet. Aktuell kamen bei einer Straßenbahn energieeffiziente Komponenten zum Einsatz. Sie verfügt über zahlreiche technologische Innovationen, wie eine Wärmepumpe oder eine frequenzvariable Ansteuerung. Die TU Wien entwickelte dafür ein Simulationsmodell für einen Regler, der selbständig den Heiz- oder

Kühlbedarf ermittelt. Bei einfachen Umrüstungen von den etwa 300 „Ultra Low Floor" Straßenbahnen in Wien wären Einsparungen von rund 30.000 t CO_2 pro Jahr möglich.

4 STÄDTE ALS TESTBEDS

Der Schwerpunkt des Förderprogramms „Smart Energy Demo – FIT for SET" liegt auf der Umsetzung im städtischen Kontext – sowohl seitens der Umsetzungsplanung als auch im tatsächlichen Umsetzen integrativer „Smart City"-Lösungen („Städte als Testbed"). Viele Städte Österreichs können hier bereits erste Ergebnisse vorweisen.

4.1 Linz setzt auf Energienetze

Linz ist mit 190.000 Einwohnerinnen und Einwohnern wirtschaftliches und politisches Zentrum von Oberösterreich. Die Industriestadt setzt seit Beginn der 1980er-Jahre energische Schritte zur Verbesserung des ökologischen Umfeldes. Ziel der Smart City Linz " High Level pproach Towards n Integrated Energy Vision 2050, Roadmap 2020 and Action Plan 2015" ist nun eine Bündelung der zahlreichen aktuellen und abgeschlossenen Klimaschutz-Projekte. Bestehende Initiativen zu Smart Metering, E-Mobilität, Energieeffizienz in Gebäuden oder Informations- und Kommunikationstechnologien werden vernetzt und zur Vision einer „Smart City Linz 2050" zusammengeführt. Roadmap und Aktionsplan beschreiben die Zwischenstationen auf dem Weg zur Verwirklichung der Leitziele.

Linz setzt klar auf intelligente Netze (Smart Grids), die auch die Einspeisung von Energie aus kleinen, dezentralisierten Produktionseinheiten (Solar, Wind, Geothermie, Biomasse) bewältigen. Dabei soll die Produktion durch Nachfragesteuerung, über verringerte Verteilungsverluste und verbesserte Koordination der Energieproduktion aus erneuerbarer und fossilen Ressourcen optimiert werden. Der Einbau moderner Informations- und Kommunikationstechnologie in die „intelligenten Netze" erlaubt dabei neue Lenkungs-möglichkeiten auf Nachfrageseite und hat mit dem größten österreichischen Roll-Out – rund 20.000 Smart Meter sind in Linz bereits installiert – vorangehend begonnen.

4.2 Smart Satellite City Deutschlandsberg

Nach der Fertigstellung der Koralmbahn 2020 verbindet der künftige IC-Bahnhof Weststeiermark den Bezirk Deutschlandsberg mit den Zentralräumen Graz, Wien und Klagenfurt. Bei täglich rund 3.000 Passagieren wird dieser Verkehrsknotenpunkt Brennpunkt eines künftigen Stadtteils, der zwischen dem neuen Bahnhof und der 6 km entfernten Bezirkshauptstadt Deutschlandsberg neuen Wohnraum für rund 10.000 Einwohnerinnen und Einwohner liefert. Im Zuge des „Smart Energy Demo – FIT for SET"-Programms wurde eine gemeinsame Vision und Roadmap für das Jahr 2020 und 2050 für Deutschlandsberg und den neuen Stadtteil rund um den neuen IC-Bahnhof entwickelt.

Das übergeordnete Ziel für die ganze Region ist es, zu einem „Greenfield for green jobs and green investments in a green valley" zu werden. So sollten bis 2050 80 % der CO_2-Emissionen von

Deutschlandsberg und der betroffenen Gemeinden reduziert werden. Das neue Siedlungsgebiet rund um den Bahnhof Weststeiermark ist als Null-Emissions-Best-Practice-Beispiel geplant.

Hauptpunkte sind Informations- und Kommunikationstechnologien (IKT) und intelligente Netze, in denen erneuerbare Energien und Speicher integriert werden. Bessere Wärmedämmung bestehender Gebäude und die Einführung von energiesparenden Baustandards soll den Wärmebedarf von Deutschlandsberg und der angrenzenden Energie-Region Schilcherland um 60 % bis zum Jahr 2050 verringern. Zudem soll solarthermische Energieerzeugung bis 2050 auf mindestens 80 % ihres Potenzials ausgebaut sein.

5 CONCLUSION

Seit mehr als vier Jahren arbeitet der Klima- und Energiefonds als zentrales Instrument der österreichischen Bundesregierung für Klimaschutz, höhere Energieeffizienz und den Ausbau von innovativer erneuerbarer Energie. Er hat sich in dieser Zeit als Impulsgeber und verlässlicher Partner für heimische Unternehmen und Institutionen etabliert, die durch gezielte Förderungen ihre starke Position im internationalen Wettbewerb ausbauen und nachhaltige Arbeitsplätze schaffen.

Der Klima- und Energiefonds wirkt mit seinen Förderprogrammen, weil in den Smart Cities mehr als 4,8 Millionen Menschen in Österreich täglich dabei unterstützt werden, eine nachhaltige Energieversorgung für ihre Region aufzubauen und klimaneutral zu leben. Mit diesen Fördermitteln werden heute intelligente Lebensräume skizziert und heimische Forschung und Entwicklung unterstützt, die die Erreichung der Klimaziele erst möglich machen und gleichzeitig die Innovationskompetenz am Wirtschaftsstandort Österreich stärken.

Spatial Planning and Open Space Integration in Urban Ethiopia: a Sustainable Accessibility Exegesis

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1 ABSTRACT

Urban planning practices of many cities are in constant mutation throughout the world. With sustainability as a goal, land use monitoring and regulation is becoming more in demand. This analysis seeks to assess the accessibility and attractiveness of public open spaces in a sample of cities and/or towns in Ethiopia. Specifically, it questions the extent to which Ethiopian cities are designed to human scale. The analysis utilizes data from a series of surveys conducted in four major cities and/towns. A econometric analysis was employed to pool the findings together. Results reveal that most public open spaces are less attractive and difficult to access. Absence of such recreational facilities in many neighbourhoods has seen some households travelling greater distances to access such facilities in other (often distant) neighbourhoods. Three major factors are to blame. These include absence of a land use (re)mixing strategy, weak development controls that have seen some open spaces giving way to illegal land uses and the general absence of quality infrastructure in existing open spaces. The most affected households reside in poor neighbourhoods. The scale of the challenges was also found to be much higher as one moved from smaller cities to much bigger cities. Only a spatial planning strategy that is guided by a known land use (re)mixing strategy would ensure improved accessibility to open spaces. Such an effort however needs to be complemented by strategies that strive to strengthen the current development control mechanisms and the fortressing of open spaces that are under immense pressure from other competing uses. A major facelift on the attractiveness of existing open spaces through the provision of quality infrastructure is also required.

2 INTRODUCTION

Urban planning practices of many cities are in constant mutation owing to a myriad of driving forces. Lifestyle patterns of many cities are shifting to those of a sustainable society (Chiesura, 2004; Burnett, 2007; Ioj˘a, 2011). One notable force is urbanization that has seen the distance between people and the natural space expand (Li et al, 2005). Increasing urbanization trends, have seen nartural ecosystems increasingly being replaced by urban development. One of the most affected component of urban landscapes is open space. Open spaces are part of the urban greenspace that form an important component of the complex urban system. Urban greenspace plays a crucial role through direct and/or indirect provision of essential ecosystem services (Costanza et al., 1997). Benefits that accrue to urban communities are many. Such benefits are often environmental, aesthetic, recreational and economical in nature (Bradley, 1995; Tyrv¨ainen, 2001; L¨utz and Bastian, 2002). Mahdavinejad and Abedi (2011) contend that urban openspaces have an exceptional environmental importance with regard to their contribution to the reduction of various types of pollution and to the improvement of microclimatic conditions. In addition to this role, they also make positive contributions to human health and well being. They also lead to an important contribution to human thermal comfort in exterior spaces (Aravadinos, 1999). Aspects such as “amount of public green spaces per inhabitant”, “public parks” and “recreation areas” are often cited in literature as important factors that make the city liveable, pleasant and attractive for its citizens (Mahdavinejad and Abedi, 2011).

With sustainability as a goal, land use monitoring and regulation of open spaces is becoming more in demand. This is because planning and management of urban greening is of utmost significance to urban sustainable development (Miller, 1988; Grey, 1996; Teal et al., 1998). With this new thinking, it is also strongly beleived that developing more sustainable cities is not just about improving the abiotic and biotic aspects of urban life, it is also about the social aspects of city life (Mahdavinejad and Abedi, 2011). Such a social focus encompasses among other aspects people’s satisfaction, experiences and perceptions of the quality of their everyday environments (Chiesura, 2004). This analysis takes this social inclination by assessing the accessibility and attractiveness of public open spaces in a sample of cities and/or towns in Ethiopia. Specifically, it questions the extent to which Ethiopian cities and/or towns are designed to human scale and/or aspirations. Public open spaces are in this analysis refer to recreational facilities such as public parks, playgrounds and amusement centers and residential gree space.

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2.1 Open space management and accessibility issues

The design of public and green spaces has emmetrged and one importatnt area of particular interest for landscape architects and planners in recent years (Oguz, 2000; Chiesura, 2004). It is now beleived that sustainability indicators for urban development should include more parameters about public spaces and green open areas, as well as indexes reflecting citizens' satisfaction and perception of their living environments (Chiesura, 2004). Herzele and Wiedemann (2003) for instance developed an integrated indicator to assess the accessibility and attractiveness of urban greenspace in four Flemish cities. Pauleit et al. (2003) proposed a more flexible approach named Accessible Natural Greenspace Standards Model to promote the natural greenstructure of towns and cities and devised a decision-support framework for its implementation.

Cooper Marcus and Francis (1998) argue that aesthetics are a factor that affects use and enjoyment. Some critiques have argued that the aesthethic/design approach should also be based on function rather than aesthetics alone (Goliˇcnik, 2010). The the utility derived from the open space depends on the distance to and the size of the parcel (Anas, 1978; Wu and Platinga, 2003).

2.2 Spatial planning and open space management

A number of challenges that spatial planners and/or urban designers face in creating inclusive urban spaces for contemporary and future use have been noted by many research scholars (Ward Thompson, 2002; van Kamp et al., 2003; Maruani and Amit-Cohen, 2007; Matsouka and Kaplan, 2008). With regard to the planning and management of public open spaces Goliˇcnik and Thompson, (2010:38) beleive that urban designers are still far from finding answers to the following daunting questions;

- How well to predict the use of spaces they have created?
- How certain they can be that a place designed for certain types of activity and occupation will serve its users' needs well?

It is generally argued that the empirical basis for much of the decision making as it regards the creation of people friendly urban space is often lacking (Forsyth, 2007; Frick, 2007).

The notion that landuse planning could be used to determine appropriate levels of accessibility to different landuse functions is not new (Curtis, 2008). The bulk of such efforts have been encuspulated in discussions revolving around the area of land use transportation integration (Freilich and White, 1994; Kelly, 1994). While there is no concensus as to the ideal urban form – an urban morphology that would achieve sustainable accessibility, there is a general agreement among urban planners and designers that some urban forms are more sustainable that others (Williams et al., 2000; Sorenson, 2001; Hickman and Banister, 2002). It is believed that urban forms that are guided by a sound land use (re) mixing strategy promotes the achievement of sustainable accessibility to public open space.

3 MATERIALS AND METHODS

Since the study is largely an environment – behaviour research, the major research instrument employed in this study was observation. Such kind of studies have long history. Typical studies in the past have always used behavior mapping as a way of understanding the interaction between people and space (SeeIttelson et al. 1970; Bechtel et al. 1987). Such an approach is premised on the fact that there is less recorded on how people use green space and the kinds of dimensions and details that support different uses within such settings. (Lawson, 2001; PPS - Project for Public Spaces, 2005; Goliˇcnik and Thompson, 2010). In addition to observed behavior of space users as well as the recording of size and typology of public open space facilities, a questionnaire was administers to a smaple of random observed space users. This was done to comprehensively capture both that passive and active interaction between people and space. A total of 451 questionnaires were administered with the help of Urban Management Masters (UMM) students at the Ethiopian Civil Service University (ECSU) in 2009. Such a survey was conducted in four selected cities and/or towns – including the capital city of Addis Ababa, the city of Dire Dawa, and the two towns of Nekemte and Chancho. Sample charcteristics and a description of each study area chacteristics is summarized in table 1.

Name of City/town	Number of surveyed open space users	General characteristics of city/town	Urban landscape characteristics charcteristics
Dire Dawa	112 observed space users surveyed in the city's 5 out of 9 kebeles	It is the second bisggest city (after Addis Ababa – the capital). The total urban population is 232 854 inhabitants.	Dire Dawa covers a total area of 128 802 hactares of which 2 684 hactares is urban.
Nekemte town	100 observed space users surveyed in the twon's 7 out of a total of 12 Kebeles	It is the administrative capital of Wellega zone in Oromia Regional State. The town is 331km away from the country's capital Addis Ababa. Its population stood at approximately 76 817 in 2009.	According to the current urban master plan, the town occupies 3 192 hactares of land of whicxh 627 hactares is urban land. Urban agricutures constitute 1.24% of urban land; Urban forest 32.5 percent; Open space 5.6%, Sportfields 0.5%; the built environment 60.1%.
Chancho town	67 observed space users surveyed in the twons 3 out of a total of 5 kebeles.	It is the administrative capital of Gololcha Woreda in Oromia Reginal State. The town is located 307 km to the South-East capital city of Addis Ababa According to the CSA report of 2007, the towns gross population density stood at 1641.1 people per km^2.	The covers apprimately 493 hactares of land.
Addis Ababa	172 observed space users surveyed in a sample of kebeles of the city's 3 out of 10 subcities of Yeka, Lideta and Bole	It is the capital city of Ethiopia. The estimated total population of the city in 2008 was 2 738 248 (FDREPC, 2008).	?

Table 1. Sample characteristics and discription of study area

3.1 Model specifications

The logistic regression model was applied to determine factors that explained why some urban urban citizens define their surrounding public open spaces as accessible. When dealing with a dichotomous dependent variable - the main interest is to assess the probability that one or the other characteristic is present (Peng and So, 2002; Peng et al, 2002). The logistic regression model answers the question what determines the probability that the answer is yes, or no. The special features of the model guarantees that probabilities estimated from the logistic model will always lie within the logical bounds of 0 and 1. In other words the probability that an urban citizen picked at random is defines public open space as accessible is not a continuous variable but a discrete one. The logistic regression model can be expressed mathematically as follows;

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_n x_n + ui$$

Where

Y = is the dependent variable (i. e. probability that an urban citizen chosen at random is agrees that the surrounding public open spaces are accessible.

B_0 = is the intercept (constant) term

B_k = coefficients of explanatory variables

X_i = explanatory variables

The aggregate expression of the model can be summarized as follows:

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$$Y = \beta_0 + \sum_{k=1}^{k} \beta_i x_i + ui$$

The selection of predictor variables was based on the review literature review on accessibility, spatial planning and green space management issues as detailed in the next section. Model variables were therefore defined as follows;

Y = Probability of an urban citizen agrees that the surrounding public spaces are accessible (i.e. probability/Agree = 1)

X_1 = Type of user (1 = occassional user; 10 = frequent user)

X_2 = Typology of public space (3 = public parks; 2 = playgrounds; 3 = residential green spaces)

X_3 = Size of parcel (1 = small; 10 = large)

X_4 = Observed open-space function (0 = serving its purpose; 1 = not serving its purpose)

X_5 = Income status (0 = low; 1 = high)

X_6 = Distance to open space facility (0 = next to neighbourhood; 10 = far away from neighbourhood)

X_7 = Size of urban area (population equivalent on a 5 point likert scale; 1 = small/Chancho town; 5 = large/Addis ababa)

X_8 = Aesthetic appeal/attractiveness of open space (0 = less appealing/attractive; 10 more appealing/attractive)

3.2 Selection of model variables

The choice of explanatory variables was made on the basis of a review of literature on accessibility, spatial planning and green space management. Many scholars beleive that accessibility to public open spaces is a function quality of spatial or land use planning (Hickman and Banister, 2002; Curtis, 2008). There is general consesus that spatial planning approaches breed different urban forms that ultimately govern the resultant level of sustainable accessibility (Williams et al., 2000; Sorenson, 2001). Delshammar (2005) maintains that spatial planning agencies may comprise a wide range of activities directed at open spaces and at users, both indirectly through work performed in public open spaces that users relate to and use and, more directly,through dialog and participation. To this end, increasing user information and participation is seen as central to making it easier for people to relate to and use public open spaces (Randrup and Persson, 2009). Although others beleive that user participation in open space management may be time consuming and expensive (Buchecker et al. 2002; Mabelis and Maksymiuk, 2009), reseaerch scholars such as Jansson and lindgren (2012) maintain that it can assist spatial planning agencies in fostering socially sustainable open space landscapes and processes.

Other research scholars beleve that it is the quality of created open spaces that determine their level of accessibility. Such open space quality attributes are quantifiable, through an assessment of citizen's satisfaction and the general perception of their living environments (Herzele and Wiedemann, 2003; Pauleit et al. 2003; Chiesura, 2004). Such a more aesthetically inclined approach is beleived to be a major factor that affects use and enjoyment of public spaces (Cooper Marcus and Francis, 1998)

Some critiques have however argued that a complete understanding of determinants of public open spaces accessibility should also be based on function rather than aesthetics alone (Forsyth, 2007; Frick, 2007; Goliˇcnik, 2010). The ultimate utility derived from the open space depends on the distance to and the size of the parcel (Anas, 1978; Wu and Platinga, 2003). Level of accessibility to open spaces is also believed to vary according to type of users. Such different user groups can be characterised by socidemographic variables such as gae and income, or whether they are actively or passively using spaces (Jansson and lindgren, 2012). Kaplain, (2001) defined passive users as urban citizens who experience the spaces mentally or visiually.

3.3 Model evaluation

Parameters in logistic regression model were estimated using the maximum likelihood method. The statistical significance of each coefficient was evaluated using the Wald test. In this analysis, the enumerated regression coeficients represent the change in the logit of the probability from a unit change in the associated

predictor, assuming other factors are constant (Gujrati, 2003). The goodness-of-fit test of the regression model in this study was analyzed using;

- The Omnibus test, which is a likelihood ratio chi-square test that test whether the coefficients of the variables in the model are all jointly equal to zero.
- The Hosmer & Lemeshaw (H-L) goodness-of-fit test, which examines the null hypothesis that the model adjust well to the data and
- The Cox and Snell (1989) and Nagelkerke (1991) – two descriptor measures that reveal the amount of variation in the outcome variable that is explained by the models (Long, 1997; Hosmer and Lameshaw, 2000).

The Hosmer & Lemeshow (H-L) inferential goodness-of-fit test yielded a Chi-square (7 degrees of freedom) of 9.296 and was insignificant ($p > 0.05$) suggesting that the model fitted to the data well. Two other descriptive measures of goodness of fit are R2 indices defined by Cox and Snell (1989) and Nagelkerke (1991). Results suggest 35.4% to 56.2% of variations in the outcome (i.e. the probability of a randomly chosen urban citizen agreeing that own public open space is accessible.

4 RESULTS

Results reveal that out of the 451 surveyed urban inhabitants in four smpled cities and/or towns of Ethiopia, a total of 80.3 % beleived that public open spaces were not easily accesssible. A number of constraining factors were discerned. Such constraints were analysed using the binary logistic model. Results are summarized in table 2. The positive beta estimate on type of user implies that people who regularly use observed public open spaces were 1.027 times (ie. Exp B = 1.027) more likely to agree that such facilities were easily accessible that those seldom use them. Such variation in access between active and passive public open space users were however not significant ($p > 0.5$). Accessibility to public open spaces was also found to vary significantly with the typology of public space ($p < 0.05$). The negative beta estimate reveals that public parks were dismissed as highly inaccessible (in relative terms) as compared to play grounds and residential green open spaces.

Another significant factor ($p < 0.01$) was the size of the observed size of the land land parcel. Large public open space facilities were largely dismissed as inaccessible when compared with small ones ($\beta = - 0.655$). Th major agument was that small public open spaces were in relative terms many than the larger ones which were mostly located in few far distant neighbourhoods. From the face value, this might be a reflection of hierarchical distribution of different sizes of open space facility. Further probing however revealed that this was largely a reflection of lack of capacity by planning agencies to provide an adequate supply of such open space facilities.

Study results also revealed that about 31, 9% of the total sample respondennts were using public open spaces where elements of serviing an unintended function were observed and recorded. Such unintended functions included illegal disposal of solid waste, unauthorized urban farming activities, illegal structures (housing and informal business) and livestock grazing. The binary logistic results revealed that respondents who were observed using public open spaces which had an element of not serving the intended purpose were 0.007 times more likly to dismiss the concerned parcel as inaccessible (refer to table 2). Such a finding was very significant ($p < 001$).

Access to public open space was also found to vary significantly with the income status of the user ($\beta = 2.837$; $p < 0.001$). Open space users who belonged to a low income bracket were 17.068 times more likely to dismiss the public open space more inaccessible than those who occupied the high income bracket. This is because the supply of such facilities was very limited in low income residential areas as compared to high income residential neighbouhoods. As expected, open space users who defined surrounding public open spaces as being far away from the own neighbourhoods were 0.082 times more likely to dismiss such facilities as more inaccessible than those who felt that such facilities were within reach ($\beta = -2.5$; $p < 0.001$). The size of the urban area from which the public open space user came from also mattered. Users from the much bigger cities of Addis Ababa and Dire Dawa were more likely to identify their publiblic open spaces as in accessible than those who came from the much smaller towns of Nekemte and Chancho. These results were however not significant ($p > 0.5$). Another significant factor ($p < 0.001$) was the attractiveness and/or aesthetic appeal associated with the concerned public open spaces. Many users felt that the public open

spaces were less attractive and aesthetially appealing. Since the beta estimate is positive, such users were 19.054 times likely to dismiss such public facilities as inaccessible more than those who thought otherwise. Several reasons were advanced. Most users felt that the bulk of public open spaces were not monitored and maintained regularly. Most facilities were characterised as dirty owing to indiscriminate disposal of solidwaste. The supportive infractructure such as access roads, equipment for public tolilets and water taps was also reported to be in dire state.

	B	S.E.	Wald	Df	p-value	Exp(B)
Type of user	.027	.934	.001	1	.977	1.027
Typology of public space	-.560	.234	5.750	1	.016	.571
Size of parcel	-.655	.245	7.140	1	.008	.519
Observed open space function	-4.961	.842	34.725	1	.000	.007
Income status	2.837	.520	29.787	1	.000	17.068
Distance to open space facility	-2.500	.510	24.008	1	.000	.082
Size of urban area	-.018	.414	.002	1	.965	.982
Aesthetic appeal/attractiveness	2.947	.456	41.811	1	.000	19.054
Constant	3.249	1.174	7.658	1	.006	25.774

Table 2. Test parameters for the binary logistic model.

5 DISCUSSION

Despite their utmost significance to urban sustainable development (Miller, 1988; Grey, 1996; Teal et al., 1998), public open spaces are often poorly accessible to many urban dwellers in developing countries such as Ethipia. The use and enjoyment of public open space has been compromised by a variety of actors related to their accessibility. The aesthetic/design approach as expoused by Cooper Marcus and Francis (1998) was found to be a significan factor affecting access to and subsequently the use and enjoyment of public open space by urban dwellers. Most public open spaces in the sampled four towns are from meeting the minimum requirements of sustainable accessibilty as they are poorly designed and less aesthetically appealing. A more functionalistic perspective to utility derived by users of public open space (Goliˇcnik, 2010) revealed that a sizable number of parcels are not serving their intended purpose and are therefore (by implication) excluding other urban dwellers from enjting the benefits from such facilities. Such a challenge – of creating creating inclusive urban spaces for contemporary and future use is not unique to spatial planners and/or urban designers in Ethiopia. Many other research scholars concur that there is a generally high level of uncertainty among spatial planners and/or urban designers that the places they design for certain type of activities and occupation will serve the intended needs of users well (Ward Thompson, 2002; van Kamp et al., 2003; Maruani and Amit-Cohen, 2007; Matsouka and Kaplan, 2008; Goliˇcnik and Thompson, 2010). The mismatch between intended and actual use of public open space in the sample cases presented is largely as a result of weak development control mechanisms, whihas seen illegal land use activities competing for space. Contesting usesing have been in the form orm of waste disposal, illegal land use developments such as informal settlements, informal business, urban agriculture and livestock grazing.

The analysis concurs with findings from elsewhere that the the utility derived from the open space depends on the distance to and the size of the parcel (Anas, 1978; Wu and Platinga, 2003). The hierachical classification and distribution of public open space parcels was however not found to be a plausible expalnation to limited access to large parcels by many users. Rather, results revealed that most municipalities were failing to meet the minimum required ratio standard set by the National Urban Planning Institute (NUPI) a proffesional body for urban planners in Ethiopia. Such supply constraints are on one hand as a result of resource constraints and on the other hand as a result of rising urbanization rates which has seen the distance between urban populations and the natural environment expand in most cities around the world (Li et al, 2005).

The notion that different spatial planning approaches breed different urban forms that ultimately govern the resultant level of sustainable accessibility (Williams et al., 2000; Sorenson, 2001) is not misplaced. This analysis revealed that access to public open spaces in high income neighbourhoods whose urban mophorlogy

was better (in relative terms) when compared to those of low income neighbourhoods were more accessible. Such better urban forms are in part a reflection of the active involvemnt of high income residences in matters concerning the planning and management of public open spaces. Such involvement is crucial as it assists spatial planning agencies to fostering socially sustainable open space landscapes and processes (Jansson and lindgren, 2012).

If sustainable accessibity is to become a reality in urban Ethiopia, a number of interventions are required. At the more operational level, municipal officials should deal with all types of maintenance, upkeep and development of public open spaces. In addition to maintenace of vegetation, there is need for municipal authorities to engage in routine cleaning, installation and maintenance of equipment in all public open spaces. The installation aspect should also extent to creating physical security features that will fortress the bulk of public open space facility to avoid encroachment of other illegal land use activities. At a more strategic planning level and tactical levels, spatial planning agencies in Ethiopia, should encourage more collaboration with public space users so as to align their future spaces with user needs.

6 CONCLUSION

Urban planning practices of many cities today are in constant mutation as spatial planning and/or urban design authorities seek to find sustainable solutions in recreating inclusive urban spaces. Using accessibility to public open space facilities as a predictor variable, this analysi sought assess the extent to which a sample of four Ethiopian towns and/or cities were designed according to human scale and other aspirations. Results revealed that revealed that most public open spaces are less attractive and difficult to access. At a more general level, three major factors are to blame. These include absence of a land use (re)mixing strategy, weak development controls that have seen some open spaces giving way to illegal land uses and the general absence of quality infrastructure in existing open spaces. The most affected households reside in poor neighbourhoods. Only a spatial planning strategy that is guided by a known land use (re) mixing strategy would ensure improved accessibility to open spaces. Such an effort however needs to be complemented by strategies that strive to strengthen the current development control mechanisms and the fortressing of open spaces that are under immense pressure from other competing uses. A major facelift on the attractiveness of existing open spaces through the provision of quality infrastructure is also required.

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Stakeholder Process in the City of Bruck an der Mur: Lessons Learned in Developing a Vision and Designing an Action Plan for a Smart City

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1 ABSTRACT

Select The City of Bruck an der Mur is located in the alpine space of Austria at the convergence of the rivers Mur and Mürz. As an industrial and commercial centre of the region Bruck/Kapfenberg/Leoben in Upper Styria with a population of about 12.500, the city faces multiple challenges such as a declining population, a dwindling communal budget and competition for space. Therefore, the city council and the mayor of Bruck decided to engage in a multi-stakeholder process within the Fit4Set smart energy initiative (Austrian Klima- und Energiefonds). The objective of that process was to build a new image and work towards a smart city by taking a holistic approach emphasizing urban planning and quality of life aspects as well as energy and resource efficiency issues in order to achieve climate protection. About 30 stakeholders from universities, research institutes, the City of Bruck an der Mur, transport companies, industry, politics as well as non-profit organisations came together to develop the future of the city in an open, participative and creative process.

The stakeholder process was divided into 3 moderated workshops: in a first step, the stakeholders developed a vision as to what the city should offer in 2050. The stakeholders then developed a roadmap listing measures in all urban sectors nessecary to achieve a smart city vision. Lastly, participants drew up an action plan for the immediate future that enables the City to implement a number of innovative and integrated planning measures towards climate protection and a higher quality of life. Before, between and after the workshops numerous, very crucial bilaterial discussions took place between members of the consortium and project management in order to provide room for information exchange, critique and feedback. Project management kept the mayor of Bruck closely informed about all steps throughout the process.

This paper describes and analyses the stakeholder process and provides the lessons learned in the process. These include the importance of involving all relevant stakeholders, the crucial role of trust and open communication and the high value individuals place on quality of life issues and the adaptive approach required by all participants to carry such a process through to the end. The stakeholder process enabled the city for the first time ever to openly discuss critical topics in a large forum and to work toward the common goal of developing a smart city.

2 INTRODUCTION

Amongst other issues, the smart city concept advocates an integrated planning framework at an urban scale and aims at profiting from synergies between strategic measures in different fields of activity. The city of Bruck an der Mur is one of the cities selected for grants by the Austrian Klima- und Energiefonds in the Fit4Set funding framework.

Bruck an der Mur has a population of 12.500 inhabitants and is the district capital of an industry hotspot located at the confluence between Mur and Mürz rivers in Austria. Hence, Bruck an der Mur represents one of the most important traffic junctions in Austria. Its residential areas and industrial structures are strongly determined by its geographical situation, and characterised by great density and only little open space. Due to this situation, public facilities, residential and recreational areas for citizens, commerce and tourism as well as transport infrastructure need to coexist in a sustainable way with industrial and business facilities in a confined geographical area. Beyond this, Bruck an der Mur is confronted with a constant decline in population since the early 1970s. Hence, economics, urban planning and development, buildings, energy supply, mobility, supply and disposal systems as well as communication become central fields of action and need to be considered in an integrated way when it comes to decision making (DiNucci R., et al, 2010). To

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date, the implementation of such integrated and interdisciplinary strategies has been impeded because of conflicting interests and the lack of coordination and communication rather than due to technological issues.

Therefore, a stakeholder process was initiated to involve all relevant local stakeholders including local authorities and administration, industrial representatives, representatives of local housing companies and political representatives in a process to shape a common vision for the future of the city and draft a set of measures and projects which would contribute to tackle the main issues Bruck an der Mur is confronted with. The aim of the paper is to introduce the stakeholder process which took place in Bruck an der Mur, highlight and analyse the different phases of this process and present some lessons learned.

3 STAKEHOLDER PROCESS

3.1 Role of Stakeholders

The smart city topic is highly integrative and deals with a broad set of issues. Because of its integrative character, many stakeholders from diverse fields and organisations need to be involved very early on in the process and motivated to participate and contribute. Therefore a large number of individuals respresenting a diverse set of organisations were invited to participate in the process. With that the process and decisions resulting from it are better legitimized and chances are much higher that innovative climate protection projects are realised (Nordström, E. et al, 2010). It is crucial to not only involve public authorities, but to also motivate those who will actually have to implement the projects. Those include representatives from industry, hospitals, public transit companies, residential construction companies, real estate companies and developers (Sinning, H. et al., 2011). The term stakeholder takes into account that stakeholders‘ specific interests and their options to act diverge (Albrechts, L., 2003).

The stakeholder process in the Smart City Bruck project included an all encompassing communication and coordination process with workshops and numerous coordination meetings. The following diverse set of stakeholders with different duties, responsibilities and roles was integrated in the process:

- Municipality and associated businesses: project coordination, making available information and documents for appraisals and analyses, critical reflection of the process, developing ideas and concepts
- Technical project team: Analyses, formulating technical requirements, designing communication and cooperation process, developing concepts
- Mayor and city council: political backing and decision-making
- Project Management: networking, organizing the communication and coordination process, lobbying and coordinating between mayor, stakeholder and the project team
- Stakeholders: generation of ideas, critical reflexion, feasibility
- Urban sociologist: motivation, formulating the guiding concept
- Moderation: designing the communication and cooperaton process and selecting methods and exercises for the workshops.

The involvement of these stakeholders in the different phases of the processes in Bruck an der Mur is visualized in table 1.

3.2 Methodology

The stakeholder process lasted about 6 months and consisted of several preparation and research phases and three one to two-day moderated workshops (see table 2) with the objective to develop a vision, a roadmap and lastly an action plan for projects in the City of Bruck an der Mur. In the workshops, most exercises were done in small groups of 5-8 persons and the results were then presented to and discussed in the plenary. Participants from the following organisations belonged to the core project team (Unversity of Leoben, AIT, the City of Bruck, Stadtwerke, Mürztaler Verkehrsbetriebe, verkehrplus GmbH, Voest Alpine Austria Draht, Norske Skog, LKH Bruck, Biomasse Heizkraftwerk). In addition to that, non-profit organisations, sociologists and members of city council also participated in the workshops. All participants acted as multipliers in their respective organizations and were instrumental in conveying the message to those who were unable to participate.

Most workshop participants demonstrated from the very beginning a strong interest in the process and a high desire to achieve results that would further the interests of each stakeholder and his/her organisation as well as the city of Bruck. Some participants initially were hesitant with their contributions and had to get used to working in this very open, participative workshop atmosphere. Discussions were at times highly controversial which is typical for stakeholder processes (Maguire, B., 2011). The mayor personally supported the process and participated part time in all workshops. The following table illustrates the main methods applied during the process.

Stakeholder process phases, dates and number of participants in the workshops	Municipality	Technical project team	Mayor	Project manager	Stakeholders	Urban Sociologist	Moderator
1 Coordination phase	■		■	■			
2 Kick-off Meeting	■	■		■			
3 Workshop 1, Oct. 3-4, 2011 (40)	■	■	■	■	■		■
4 Coordination phase	■	■		■		■	
5 Workshop 2, Nov. 10-12, 2011 (30)	■	■	■	■	■	■	■
6 Coordination phase	■	■	■	■		■	
7 Workshop 3, Dec. 20, 2011, (30)	■	■	■	■	■	■	■
8 Coordination phase	■	■	■			■	

Table 1: Integration of stakeholders

Workshops/Date	**Methods**
Coordination Phase 1	Data gathering, stakeholder coordination, workshop preparation
Workshop 1 - Vision, Oct. 3-4, 2011	'future conference'- holistic, systems-oriented, topics covering past (last 10 years), present, future **Small group sessions => vision**
Research phase 2	Data gathering, data analysis, energy and CO_2 emission modelling, bilateral discussions between project partners, interviews, sociological analysis, workshop preparation
Workshop 2 .- Roadmap, Nov. 11-12, 2011	Sociological analysis of Bruck an der Mur Energy demand and supply scenarios until 2050 and assessment in terms of CO_2 emissions Travel demand and traffic emissions model (CO_2) for all modes World Cafe, small group sessions **Assessment of all measures => roadmap**
Research phase 3	Bilateral discussion, needs analysis of town segments, workshop preparation
Workshop 3 – Action plan, Dec. 20, 2011	Presentations, small group sessions Determining requirements for all 5 geographic areas **Concretising of 5 project ideas => action plan**

Table 2: Methods applied during stakeholder process

3.3 Results

The results of the workshops as illustrated in table 3 below reflect the diversity of participants' backgrounds and interests. The holistic approach with the focus on achieving a high quality living and working environment in an attractive location for business, living and recreational activities was carried through the entire process. The overarching issues of a shrinking and ageing population and the high level of industrialisation were driving discussions and the need for changes in the urban environment. Energy and mobility issues were considered important, but only two of many topics that needed consideration. During the workshops, it repeatedly became evident that the smart city concept with its focus on integrated urban planning provided a very good basis for discussions and an opportunity to take into account a broad set of topics. Participants expressed the wish to implement many of the smaller project ideas generated during discussions even without external funding opportunities.

Workshops/Date	Results
Workshop 1 - Vision, Oct. 3-4, 2011	**Past and present**: major issues- demographic change, social and societal issues, economic needs and employment, traffic and mobility, energy, politics, financial markets, construction/living situation, health, quality of life **Future – Vision**: alternative forms of energy and combinations thereof, cultural and creative think-tank, excellent education opportunities at all levels, new living facilities, new mobility concepts, public participation, concept 'kurze Wege' (small distances), need for a change in values
Workshop 2 .- Roadmap, Nov. 11-12, 2011	**Guiding concept** – Lebens(t)raum am Fluss (living along the river – a dream come true)-all other issues were fit into this concept **Energy demand** and **supply scenarios** presented in terms of CO_2 emissions: Industrial energy use 8 times higher than residential energy use, separate scenarios for both sectors **Multi-modal traffic demand model** for Bruck an der Mur: CO_2 emissions for all modes presented **Measures for roadmap** developed and assessed in following areas: mobility/traffic, energy/energy efficiency, renewables, industry and urban planning
Workshop 3 – Action plan, Dec. 20, 2011	Bruck an der Mur divided into **6 geographic areas**: Grazer Vorstadt – smart economy, Altstadt – smart downtown, Bahnhofsviertel – smart mobility, neuer Siedlungsraum –smartest living, bestehender Siedlungsraum – smart living and Gewässer – smart streams – developed requirements and needs for each area Five **potential projects** discussed in-depth: -Eco-electricity for households: 100% of households obtain electricity from renewables -City reframing: telemetric approaches, public participation, public space central -Smart climate place: telemetric approaches, regional products -Mobility management: improve public transit connections, reduce automobile traffic, find innovative multi-modal options -LED for public streets: install LED in public places to improve lighting

Table 3: Results of Workshops 1-3

4 LESSONS LEARNED

A number of crucial lessons can be drawn from this stakeholder process and applied in similar activities in other communities. The outcomes may lead to concrete demonstration activities in the future. The stakeholder process can be considered successful for the following main reasons:

- Stakeholders: a large number of stakeholders from various different backgrounds and organisations were involved early on in the process, attended all three workshops and were very much engaged in the at times controversial discussions. This did not only guarantee that they felt included and could contribute, but it also helped legitimize the process and enabled stakeholders to bring in their individual knowledge and interests. During the process, it became transparent that a lot of ideas could not have been developed without the power of collective knowledge of all stakeholders. Because of an open and adaptable process design, stakeholders could also develop trust and become used to the process and each other.
- Professional moderation: the moderator provided appropriate and flexible methods depending on the needs of the stakeholders and the process in order to achieve the objectives set during the three workshops. She also set the stage for a very open and transparent process during all workshops.
- Project management: the project manager was highly engaged, professional and diplomatic and knew the city and ist political environment very well. He also was well-known in the community. He spent a lot of time in bilateral discussions between workshops with project partners to inform, gather data and develop project ideas. He also regularly informed the major about current project activities and new and potenially sensitive information to ensure project success.
- Sociological impetus: the stakeholders became highly motivated when an urban sociologist provided input to workshop participants as to how the city might be able to change its image from an industrial town to an attractive town along rivers and provide better access to them. He also emphasised the importance of public participation in the urban improvement process.

- Building on strengths: Bruck an der Mur benefitted from being able to build on existing activities. A lot of activities such as increasing the capacity of the biomass district heating plant, suggestions to improve energy efficiency from industrial partners, refurbishment of the train station and associated mobility-related project ideas as well as ideas to improve the attractiveness and livability of the town to turn it into a more viable business location had already been in discussion or under way.
- Focus on holistic, integrative urban redevelopment: issues surrounding the topics of energy and mobility only played a minor role. Those topics could have played a much more prominent role given the fact the project was mainly aimed at considering energy and mobility issues. Instead, it was much more important to all stakeholders to view the city as an urban environment with a broad set of issues that should all be looked at simultaneously in order to find viable long-term solutions. Participants wanted to work toward a higher quality of life in the face of a shrinking population, a dwindling communal budget and economic competitiveness in the region. During the discussions mobility and energy topics were woven into project ideas rather than being the drivers for specific projects.
- Funding impetus: it needs to be stated very clearly that this process and with it the opportunity to renew the city of Bruck would never have taken place without the funding impetus provided by the Fit4Set programme. Given the budgetary constraints in communities at the moment, initiatives such as this stakeholder process or the construction of demonstration projects would never have occurred.
- Large pool of project ideas: aside from the actual project ideas relevant for the next call, the stakeholders developed numerous project ideas that can be developed step by step in the future. They vary in size and financial volume and most of them will require additional public or private funding. Nevertheless, some like providing better access to the river Mur at some key access points could be implemented very soon. Both, big demonstration projects and small projects all work toward the common objective of achieving a high quality of life in a high quality environment where the rivers and streams play a much more prominent role.

5 CONCLUSIONS AND NEXT STEPS

The city of Bruck an der Mur is a highly industrialised city facing demographic problems such as a declining and ageing population, competition for space and budgetary constraints. In an effort to reduce conflicts and find viable, long-term solutions, the city engaged in a large stakeholder process involving a variety of local stakeholders including the city of Bruck an der Mur, city council, industry, business, energy providers, public transit companies, mobility firms, non-profit organisations, research organisations, and universities. In the course of the 6 months long stakeholder process dealing with urban development and climate protection issues, stakeholders developed a vision for 2050, a roadmap and an action plan for a smart city.

The smart city approach offered a new way to find integrated and interdisciplinary solutions to existing problems. The holistic approach allowed all stakeholders to develop interlinked ideas for the entire urban region and to take advantage of synergies when applying measures in different fields simultaneously toward the same objectives.

Lessons learned from this process are numerous and can and should be considered in similar processes in different communities. They include the important role of a diverse set of engaged stakeholders who have the opportunity to contribute in an open, engaging and trusting environment. Project management was instrumental in keeping all participants informed, passing along new and sensitive information when appropriate and involving key individuals. An urban sociologist provided highly motivating input and a guiding concept (Lebens(t)raum am Fluss) that was carried through the entire process and will certainly live on even beyond this project.

5.1 Next steps

Bruck an der Mur submitted a proposal in the second Fit4Set programme call which focuses on the historic town centre of Bruck an der Mur with its large urban development potential. The project „Smart historic site Bruck an der Mur“ will deal with climate protection and restructuring and refurbishing parts of the existing old town. An integrated planning concept with interlinked demonstration projects in the historic old town is supposed to show how climate protection measures and measures to improve quality of life can counteract

population decline. The following topics will be dealt with integratively in the project: mobility management, creating attractive public space, energy networks, communal supply and disposal systems, buildings as well as information and communication technologies. It is also planned to intensify communication with the population, because everyone's life style (consumer behaviour, mobility, leisure activities) determines the success of local climate protection and quality of life measures.

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Sustainable Urban Development in Germany in the 1990s – a Situation Report after 20 Years

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1 ABSTRACT

Already in the 1980s the subject of sustainable urban development was a recognised and coming issue. In this process significant research and development work was done by the now defunct company of POET GmbH and the IfEU GmbH first in West Germany and later also in the eastern parts of Germany. Coming from a solid engineering foundation of project work and research into the structure and efficiency, especially regarding energy and environmental issues, as well as the community political processes, they were among the pioneers of public-private-partnering in urban development. The two companies found themselves in a unique position to react to the German reunification and the ensuing period of transition, to use the unhoped for degrees of planning and development flexibilities.

Now – almost 20 years later – we can look at some of these research and development projects, and have a first discussion on their sustainability success. In this paper and the accompanying presentation, we will take a research project from western Germany (1986 to 1995), the developing understanding of which went directly into the design and execution of a real urban development project in eastern Germany (1991 to 1994), and look how the latter has stood the test of time over 20 years.

What can be learned when comparing the original thought processes with the current status of reality? All these projects were both situation driven (in time and in space), and implemented the developing knowledge on sustainability, as a methodology to ensure project longterm success.

Having been party to this process, as managing employees and researchers in these companies at that time, and having access both to the documentation and other then leading engineers and planners involved, the authors can give a unique perspective covering the whole time period.

At present a new relevance developes in this activity field. The current urban development schemes in China, India and many other places of the world are of such scales, that questions of doing it right, while doing it timely, are of prime significance. At the same time, we are facing a situation, in which within the coming 40 years the whole energy supply and distribution system of the world – including China and India – will need to be 100% restructured and reworked. We need a whole new quality of urban flexibility, and a resurgence of a full consideration of the human scale, even in gigantic projects, to achieve the path to urban sustainability.

Taking proven experience in sustainable urban development and engineering, what will be the tasking and quality expectation of urban design and development in the coming years and decades? System changes will require mental, philosophical, and educational changes in human minds, encompassing developers, planners, architects, and engineers. So, what do we need to learn, and how do we teach it, fast and to many humans, in a short time?

2 BASELINE THOUGHTS ON ECOLOGY IN URBAN DEVELOPMENT – A SITUATION APPRAISAL OF THE DEVELOPING UNDERSTANDING IN THE 1980S

Starting with the Club of Rome "The Limits to Growth"[1] in 1972 a period of developing consciousness on the unsustainability of western societies' urban developments ensued. This was characterized by a multitude of developing descriptions for problems, solutions, and designations for whole fields of interest. Nomenclature and its meaning was and is still in a state of partially defined flux – misunderstanding and misrepresentation abound(ed). Then in 1987, the world first learned the meaning of the word sustainability and the multitude of its facets in the UN Brundtland Report .

Words like "environmental", "ecological", and then even the then new "sustainable" were and are used sometimes interchangeable. Very often with different understandings of their meanings and definitions, especially as pertaining to different trades, and in different languages and cultures.

[1] for our pathway to experience see the reference listing on publications and projects provided for the subjects "sustainable urban planning and engineering" and "energy systems and waste management" at the end

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For the reason of retaining a reflection of this state of affaires, in the following appraisal of the time, the words "ecology" or "ecological" have been retained – even though by today's understanding it would be more often be replaced by "urban sustainability", "environmental sustainability" or "sustainability" (without qualification).

During the mid 1980s Hermann Laistner approached the field of sustainable urban development with an interdisciplinary experience, gathered by actively developing the area of "energy efficiency consulting" through a series of research and pilot projects starting in the late 1970s. He was selected as the key researcher, developing the chapter on urban supply systems, within the team and scope of a German federal research project on "Ecology in Urban Zoning" (Ökologie in der Bauleitplanung) .

Within this technical field at that time, the traditional biological definition of "ecology" was found to be unsuitable to the application on human society and infrastructure. A new approach to the definition of "ecology" needed to be found and developed. Our situation appraisal and train of thought back then was:

The central European landscape, dominated by civilization, is endangered. The consequences of uncaring use of the available natural resources by the industrialized civilization are visible and undeniable. Even more troubling are the reactions of soil, water and athmosphere to the continuouse careless production of artificial products, with the most varied characteristics. It therefore must be the tasking of future human action to protect the still remaining resources from complete depletion and devastation. This demands a careful approach, and the limiting of needless use, as well as the reclaiming and reuse of our process materials.

The civilized landscape, created by humanity, is no longer capable to cope with the effluents of our industrial societies. Product and contamination concentrations in soil, water and atmosphere grow steadily, and our so called "clean-up measures" don't eliminate them, but simply transfer them from one carrier medium to another. Our aim must therefore be to keep the production of materials, and therefore the number of material transformation processes, at a low level. This is not the call for "back to the stone-age", but the tasking to our highly industrialized society to set it's aims towards preferably innovative and efficient future developments.[2]

From this analysis the technically founded working-definition of „ecological" became:

"Avoid and reduce the material transformation processes, while at the same time develop and strengthen mitigation mechanisms"

By now this has developed into the "mantra" of the energy managerment engineers:

AVOID – REDUCE – COMBINE

A principle just codified in the last two years in the ISO 50001 and EN 16001 standards on Energy Management Systems.

Back to our situation appraisal between 1985 and 1996. Upon closer inspection, the applications of this working definition onto the field of urban development were found to be many, and can only be charactericed in short hereafter.

3 OUR STARTING POINT – AN ECOLOGICAL EVALUATION OF PUBLIC SUPPLY/DISPOSAL NETWORKS – THEN AND NOW – A SHORT APRAISAL OVER 20 YEARS

Being engineers, trained in the technical aspects of urban and energy systems, our approach was to inspect our everyday technical supply system structur in a first step.

Starting with considering the aspects of soil protection, our attention was drawn to the there burried pipes and cables of public supply systems. Taking up the discussions on leakage and enroute losses, new demands on the line quality, leakage protection, as well as regular maintenance were developed as a first step. This however proved to be only an intensified system of fault detection and repair, of our urban buried systems, existing in general below our public roads and walkways. Overall, this encompasses not only operational pipe and cable systems, but a multitude of historical relics.

Digging up holes regularly seems to be an unavoidable result of this historically developed system.

[2] Citation from „Der moderne Infrastrukturkanal" published 14.04.1993. chapter 1. Einführung in das Thema – translated 2012.

3.1 Water Supply Systems

The existing system in many industrialized countries was and is largely non-sensical. It carfully extracts raw water out of the ground, streams and lakes, then processes and desinfects this raw water carefully to the highest quality potable water standards. Then we use it undifferentiated for hygienic and cleaning applications, as well as for toilet flushing, car washing, industrial applications, and irrigation, or fire fighting. The large majority of those applications do not necessarily need hygienic potable drinking water.

A differentiation according to water use is needed. This then leads to the installation of rainwater runoff collection in cicterns of single houses or whole developments. Or as very widely used in dry climates the grey water collection for black water flushing use. However driving this technology is the growing scarcety of water in ever larger areas of the world – not in, nor by, the still "water fat"[3] industrial countries.

3.2 Sewage and Precipitation Drainage Systems

Especially in southern Germany, the wide spread combination of sewage and rain water drainage in one pipe still existing is technically obsolete, but historically and fiscally at present not correctable. The separation and treatment of household black water from precipitation run-off must be instated now in accordance with law, while just 20 years ago this was just the reverse. In modern systems black water needs to be directed in as concentrated form as feasible to treatment plants, well contained and monitored. While precipitation runoff needs to be dealt with as local as possible. In principle precipitation water should be retained locally even in urban sealed areas. Meaning – as far as a suitable geology is present – soil infiltration or surface run-off in open ditch systems, preferably unpaved and planted, into natural run-off beds.

3.3 Waste Disposal

The undifferentiating throw-away and cover-up depositing of wastes of all kinds, still prevalent in Germany throughout the 1980s and 1990s has been replaced by a whole industry of waste processing, geared for profitable recycling of materials. However, as long as the so called "thermal reuse" of materials is classified as a form of recycling of materials at present, we have still have a ways to go. Only the non reusable waste components should be burned for heat and electricity generation. Burning it in our definition book means destroying any materials' useful characteristics – and that we don't classify as recycling unless heat energy it is the only useful characteristic remaining in a collected material.

3.4 Heat Energy Supply Systems

Historically one can see that the generation of heat energy came from old wood stoves, through the fossil fuels coal, oil, and gas and now increasingly returns to regenerative carbon e.g. wood pellet, bio gas, and solar thermal systems as heat source. This exemplifies the increasing importance of the renewable resource of our forests.

Using the heat potential of our excess heat in industry and in the generation of electricity has spawned both metropolitan urban district heating networks, but also smaller more rural network sizes fed by Building block heat-electricity co-generation plants. By now whole villages are being supplied with heat and electricity by such plants using biogas as renewable fuel. Currently a whole new structure of debates and applications develops in this area.

3.5 Electrical Power

Up until a few years ago, ever since the 1930s, industrial countries have developed a highly centralized electrical power production, and large interconnected distribution grid systems. Power plants were for a very long time thought to be only efficient and profitable, if they reached a certain economy of scale. Using our traditional system of economic evaluation – which blatantly disregards any and all environmental issues other than raw material extraction and those that produce an accountable bill – huge burdens coming from this scaling up were non-chalantly postponed into the future. World wide we still don't face up to the fact, that nuclear reactor waste is an as yet TOTALLY UNSOLVED engineering problem, with us for only 60 years now. The issue of fossil fuel induced climate change is just beginning to make headways into peoples minds.

[3] "water fat" is a wording created by Frank Herbert in his novel "Dune". It signifies the unconscious and uncaring dependency on the plentiful availability of water by a society and its members.

At present however, we see a wide scale restructuring of decentralized energy production happening in Germany and various other European countries. This actually mostly stabilizes the local electrical networks, as less electricity has to be transported to the consumers through the long cables from the central grid elements. However, localized and at times of low demand and high production of e.g. wind or photo voltaic generators, the electricity systems require a whole new system of grid management architecture.

3.6 Telecommunication

In the 1980s West Germany was just at the beginning of implementing the then "new" technology of cable TV. Telecommunication was solely copper cable based and for most of the country and the world limited to twisted pair analog telefone lines. In the 1990s it already became very clear, that with the coming IT network technology and the new glass fiber transmission technology a wholesale effort of "recableing" of Europe was needed.

Now we can use every cable and the "airwaves" for communication, and we have in many places a plethora of choice regarding providers and technology. In fact we see a return to the combined service provider of telephone, TV, IT and mobile communication in out technological societies. These competing communication companies now strive to cover economically as much turf = people and businesses as possible, driving again a recabling and growing antennae-jungles of multiplicity in the name of competition ideology.

Any understanding, that the product needs competion but the pathway doesn't, so prevalent in roads, rails, gas-pipes and electrical power grids, is totally lost on that business area of our societies. In effect – while the power consumption of our individual appliances has continually and significantly been reduced over the last 20 years, the IT revolution has ensured, that we still need more electricity than ever before – because we all need to have so many computers and IT gadgets more, to "survive" our daily toils nowadays.

3.7 Reviving an old idea – Utility Tunnels

Remembering the above definition of ecology, an observable, simple to check urban supply system should be our aim. And, not surprisingly such systems exist, and have proven their usefulness since the middle of the 19th century. They even have a name: UTILITY TUNNELS. Today they are mostly used in industrial facilities and within large public infrastructure like universities, airports, hospitals, or civic centers.

It is however noteworthy, that even though many such systems exist in the public spaces in the former eastern block countries, this subject has been virtually banned from the education and training of urban engineers and city planners. In all of Germany, Austria and Switzerland, to our knowledge, no focused academic courses are currently in existence on this subject. This serves to illustrate that the ecological working definition of avoid, reduce, and innovate has not yet even sustainably reached the academy.

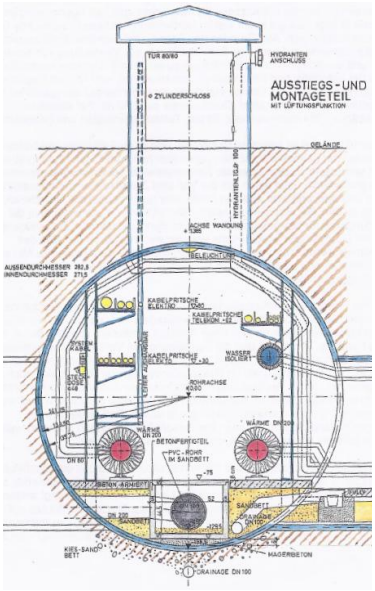

Fig. 1: Sustainable underground system development for urban development area = the utility tunnel picture excerpt from research final report Abb. 17,

Coming from the system analysis above, within the research project "Ecological Business Park Mainz-South" (Ökologischer Wirtschaftspark Mainz-Süd) executed for the Federal Ministry of Construction (BMBau) from 1986 until 1995, therefore not only sustainability aspects of the urban surface development were considered. A significant chapter was reserved on how to better, and more long-term sustainably, deal with all the "stuff" we burry in the ground. The old idea of the "utility tunnel" (Infrastrukturkanal, Leitungsgang, Werkleitungsstollen, Sammelkanal, Kollektor, urban galery, common duct, galerie techniques, just to cover some of this technologies' names in at least 3 languages) which has been successfully used since 1865 in Europe was reconsidered and creatively applied to the research project. To this and its effects see more in the presentation "Utility Tunnels – proven sustainability above and below ground" by us in these same conference proceedings.

Suffice it to say here – we've sucessfully achieved REAL NO DIGGING situations in urban development (meaning also – no horizontal boreholes), achieving longer road surface stability and other benefitial effects.

4 URBAN DEVELOPMENT – FROM "STRENGTHENING THE COMPENSATION FUNCTIONS" TO "SUSTAINABILITY DESIGN AND OPERATION"

Within the above cited federal research project "Ecological Business Park Mainz-South"5, the initial question was:

"Why do business and industrial areas so often degrade into industrial wastelands – which then have to be expensively cleaned up and recycled?"

The contrast to housing developments, which retain or even rise in value during their time of use, is evident and striking. In the process of developing the research project we went, together with the other involved partners, especially the City of Mainz Planning Authority, through various planned steps to come to valid results. Towards the midterm of the project a situation developed unexpectedly, called "the German reunification", that enabled us (POET mbH as Designers & IfEU mbH as Researchers) to implement the just gained insights in a real East German development project – the Business Park Wachau North – located now in the City of Markkleeberg, directly south of the City of Leipzig in Saxony .

This paper will in the following describe the considerations developed in Mainz-South, while the congress presentation accompanying it will show their implementation at Wachau-North and how the area has stood the test of time over 20 years. Short conclusions on the individual success or applicability at the Wachau project are the end of each chapter

4.1 Laying the Base – Understanding the Situation

The initial step performed in Mainz-South was an in depth ecological situation analysis performed by the project partners "ifp – Institut für Planungsdaten – Offenbach", "igi – ingenieurgeologisches Institut S. Niedermeyer – Westheim", and "IfEU mbH". An intensive involvement of many branches of the City of Mainz administrative offices brought to the table considerations and aspects of demography and statistics, economy, traffic and transportation, tourism and recreation and many more.

This in depth look at the whole area of the southern city and open areas up to the next built up neighbouring communities on all sides was the foundation of all future considerations.

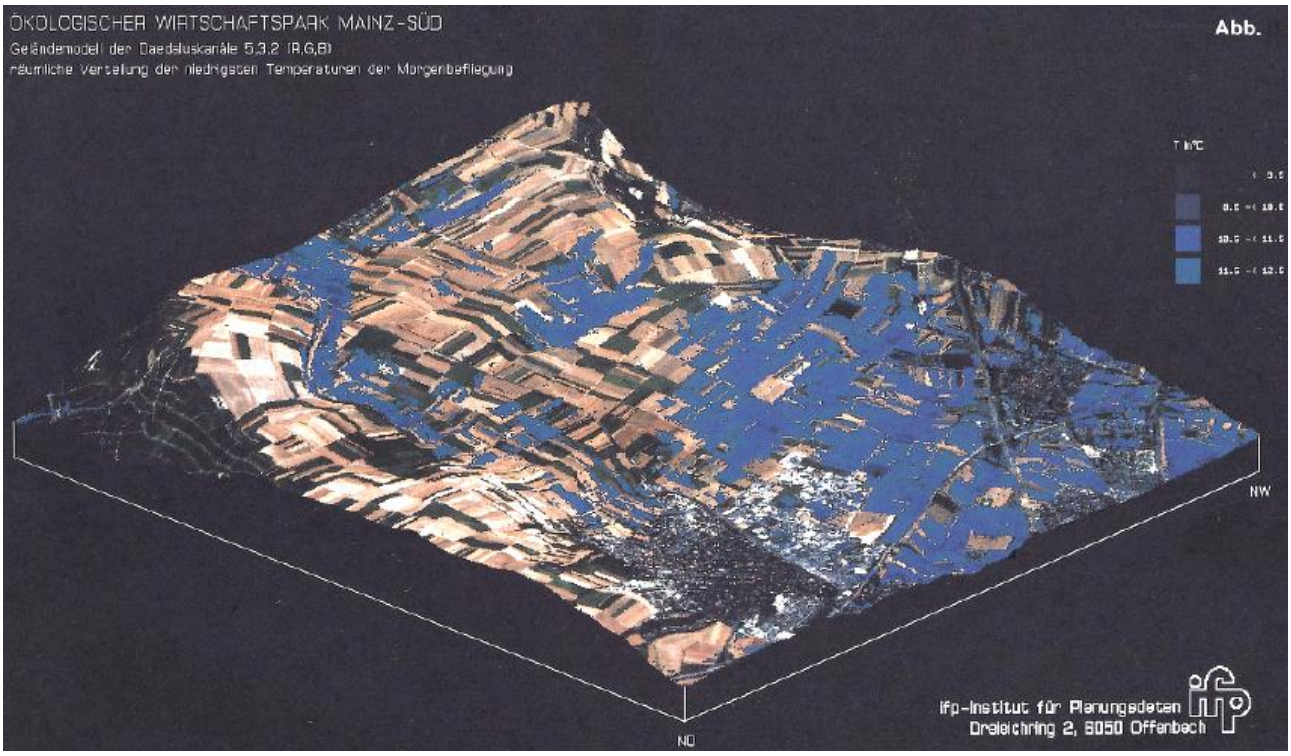

Fig. 2: Ecologically considered area in relation to identified urban business/industrial development area. sketch overlay on picture excerpt from research final report5 Abb. 3

At the time this was begun in 1986, this kind of initial study was not necessarily yet part of the normal process of developing an urban zoning at all. This research project was intended to produce an example documentation for others, later to be copied: how to conduct such an in depth effort. Therefore it was important to identify a complete situation picture regarding hydro-geology, climate impact on temperatures and ventilation, topography, biotopes and biotope potentials, and identification of possible business areas and compensating green or open areas to create a sustainable end solution. Nowadays this scope would still be widened by a consideration of endangered or protected species in the areas.

This is the only step that was not equally performed in Wachau, as by the time of our involvement the detailed development area there had already been defined and partially marketed to investors.

4.2 Sealing the Landscape = Contaminating the Ground

A first analysis came to the conclusion that the unattractive but “seemingly” practical approach of total surface paving had to be considered to be one of the main reasons for the business areas' decline into wastelands. It maximizes technical surfaces that need expensive maintenance (always in short supply in competitive environments). It also maximizes and focuses run-off, which in turn leads to both flooding effects downstream, and the concentration of contaminations at main leakage or seepage points. Rendering parts of the areas virtually useless because of "health hazards" after sometimes surprisingly short times. These effects are compounded by the VERY WRONG assumption of most people operating and working in such sealed surface areas, that "a little spillage is alright – it can't go into the ground anyway".

The longer this process, the worse, and worst of all – our long term involvement with sewage systems taught us – is the military operator. Regardless of nationality or ideology, they are closely followed by the energy production and chemical industries. National security and easy subsidized profits seem to trump all considerations – and the results are accordingly, as we've continuously found through all the various conversion, survey and design projects over now a 40 year plus period of engineering lifes.
This insight led us to the planning approach for the open ground – limited surface paving – conception of Mainz-South and the susequent execution of this at the Business Park Wachau-North.

4.3 Defining the Urban Structure and Access

As with any urban development an initial urban access structure was developed, considering transportation systems (road axes, public transport, parking), and urban gravity center structur.

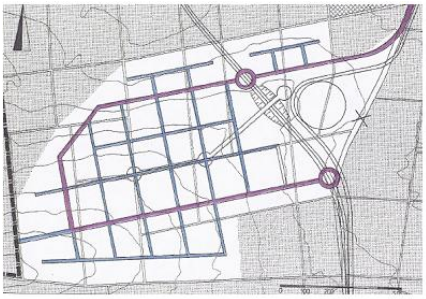

Fig. 3: road grid

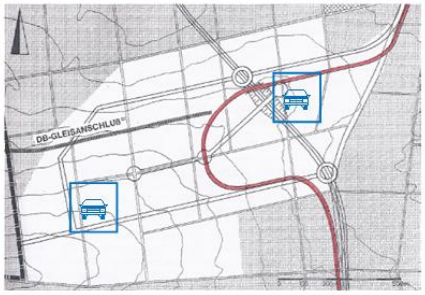

Fig. 4: public transport (rail) & parking

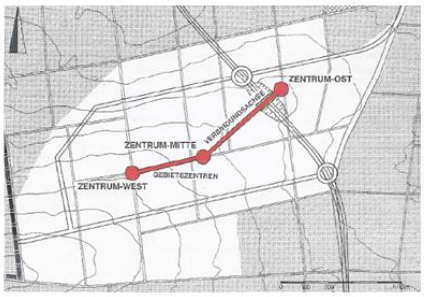

Fig. 5: centres structure

of the urban business / industrial development area
picture excerpt from research final report[5] Abb. 11, 12, 13, 19

An important consideration for urban sustainability, it turns out, is to consider the need of humans, to need places of "interest" to congregate. It helps to consider compatible and non compatible functionalities, and then develop focus points within the access grid, that are helpful to the users, e.g. to use sustainable transport, to switch from an access to area transport mode to an inside area transport mode, to find other facilities that enable secondary tasks like shopping for food on the way to/from work, etc.

Regarding the acceptance of urban mass transport or other public transport, understanding the "human" limitations on the acceptance of such systems, and the direct dependence of human decission making on the subjectively experienced level of comfort of the individual is crucial. To successfully develop a transportation access mix for any business or industrial area, which is not automatically heavily biased towards the use of cars for all other comers by the required road dimensions for trucking access is not a trivial issue.

Urban/rural comparative experience shows that car use for short to medium distances of travel correlates very closely with the availability of easy parking at both ends of the way. For people to consistently forego the use of their cars, requires parking problems at both ends, but ALSO very comfortable, preferably more direct public transport AND pedestrian routes to and from the stations. The later possibly at least with some consideration as to adverse weather conditions, the former definitely at an adequately cheap fare price in relation to the average income.

Only if MOST or ALL of these conditions are met, will people even consider to forego using or even having a car – if their affluent enough to own one. Building a public transport system with stops every few kilometers, at city quarters, without walkways and in subtropical climate – as can be observed lately in Dubai UAE – will not decongest the road system. While building covered and weather protected walkways through building blocks and independent from the roads, as can be seen in Montreal Canada for many years now, will keep people using urban transit even in the dead of a Canadian winter. So pedestrian ways need not and should not necessarily follow roads. As feet are not round – we should all know and understand this.

And in Wachau in 1991, we also were still relearning these facts. So while the internal pedestrian routes are adequate and both bus and tram access or border the area, most traffic there is still by car, but numbers of public transport users are slowly growing – both due to increasing economic difficulties of the population and due to service improvements by the public transport operators.

4.4 Using Green Elements

as Long-term Structuring Design Elements

by making a concious decission to integrate open surface – high quality green corridors as value retaining elements into the urban zoning design of a mixed business and small industry development.

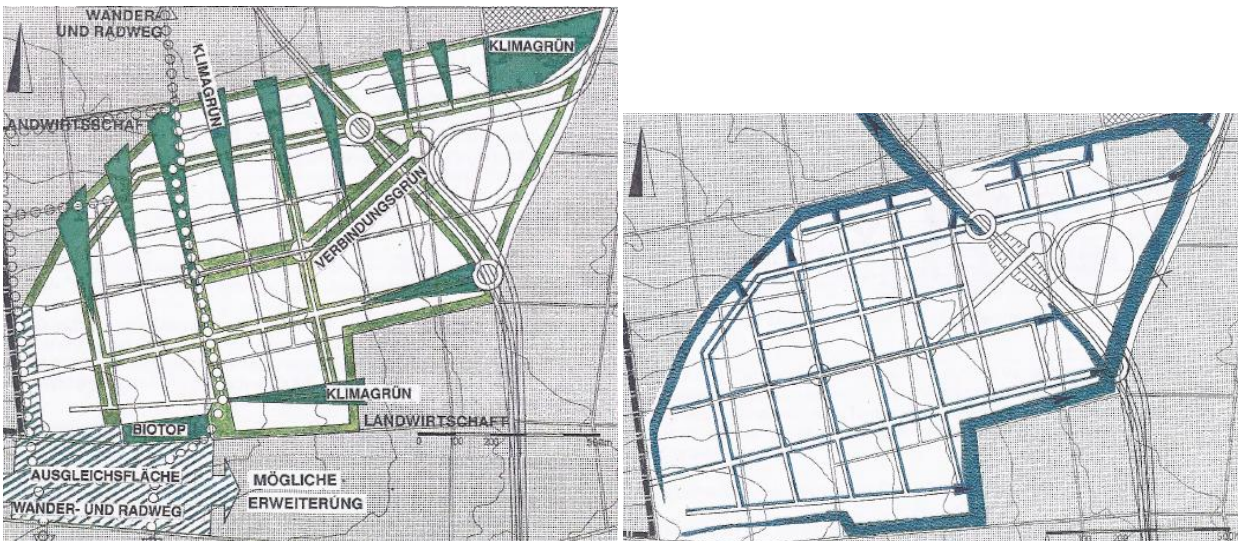

Fig. 6 (left): green zone grid, recreational – hiking and bicycling ways, of the urban business/industrial development area. Picture excerpt from research final report, Abb. 16, 18. Fig. 7 (right): Fig. 7: open ditch surface dewatering structure.

The research area – as can be seen in Fig. 2 above, was and to our knowledge[4] still is mostely used as farm land, and will remain also for a significant time in the future surrounded on all sides by farm land. It is situated right in between the city to the north and 4 or 5 smaller towns and settlements to the east, south and west. Accordingly both rural and farming traffic, as well as the recreational traffic of hikers and bicyclists, needs to be accommodated by the design of urban pathways with a rural "flair", to avoid untoward disruption of an important rural and recrational area close to the city.

The climatological analysis had shown that it is important to have "climate corridors" for temperature regulation, and to avoid undue wind turbulences as much as possible in the area. So the concept from the start girdled the whole area with a green zone, which also accomodates two main drainage ditches and facilities for surface runoff.

The road cross sections have been purposfully designed to have green stripes planted as boulevards, with trees and bushes on both sides, and ditches on either one or both sides. Parking is limited to one side on defined parking stripes only. Access to the individual business properties is limited to defined access points. Frontal parking areas, linking and paving building lines and road edges directly, are expressly prohibited by zoning rules application, and property sales contracts.

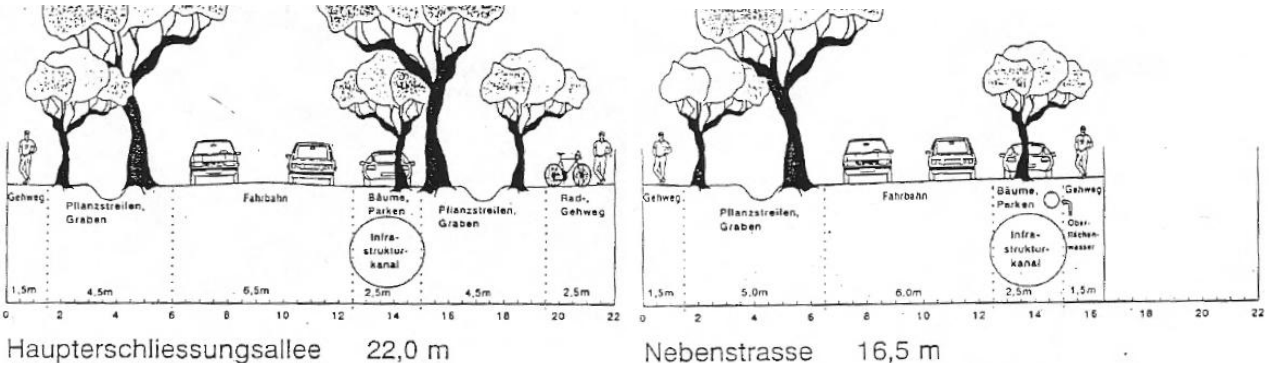

Fig. 8: standard road grid cross sections for main boulevards and side roads of the urban business/industrial development area

picture excerpt from research final report5 Abb. 15

This concept – which also has significant positive effect on the utility tunnel underground system and its surface penetrating elements – has been implemented in full, and enhanced by non-public, mandated green zones, and maximum property surface sealing limitation in Wachau-North. It has proven extraordinarily succesful there. The only comment by the manager of the still functioning development company there at a visit to the area in March 2012 was:

[4] according to Google Earth and Google Maps last checked on 22.03.2012

"Put curbstones on both edges of the roadsides – even the ditch side. Defined inflow-points to the green ditches limit the green area pollution with throw-away waste, and makes road sweeping easier for the sweeper drivers." – We took note, and learned.

as Economic Performance Enhancers

Both the open surface drainage in green ditches, open retention ponds with a continuous minimum standing water level, and the integrated planting, green zones, and roads structured as planted boulevards, create a green atmosphere in the business park. It was thought and hoped that this would have positive effects to:

- keep the area looking clean
- enhance level of moral with the employees in the area
- enhance corporate marketing and image building as well as client impressions when visiting

This design concept intended to test a possibly durable set of solutions has passed the reality check of time. In Wachau people have continuousely reported to prefer this working environment. With a short stroll, easily during break times or meal times, they can have their morning snack or lunch next to a "duck pond". This effect has been noticed by the business managers, who in turn report better performance and moral in their employees, as well as a very high marketing and client contact and recognition value effects for their businesses.

The aim to retain this green area character, and the property values continuously, has until now been achieved over the 20 year period. Properties of businesses that defaulted have easily, and at good value been resold. All lots but two are occupied, which is not at all the average for such areas in the eastern German states, even so long after reunification. Due to the attractiveness of the business park there are no empty buildings.

What we missed in Wachau's green areas according to local feedback were: spaces to place business location bulletain boards at the main road entries into the area

We've since applied this learned knowledge on urban design and successful elements to various other developments both of business and housing areas, small and large. We've continuousely found them to be an economic performance enhancer, starting with the property marketing at the beginning, and continuing on through the years, by keeping areas viable, values and supply level of service high, and maintenance an disruptions low.

Our overall conclusion on this is – humans are willing pay to have humane surroundings!

4.5 The Human Element in Urban Development

an integrated – target oriented, and feedback controlled, design & optimization process

Urban and regional planners, who are educated as such, have understood for a long time, that their field requires intensive coordination, balancing, and value choices between a multitude of hard and soft factors, impacting on any development situation and human society.

It is therefore only proper to demand such an integrated approach from the whole team of participating engineers, architects, planners, economists, investors and – last but not least – local politicians. And right there it starts to get difficult. Many interests create many interfaces, and not all are reconcilable.

We've found it highly helpful therefore to approach such projects with two main process instruments:

- comprehensive knowledge in the design team from day one onwards
- a known methodology, which we implement on the consent of our clients, and thereby create an operative framework of decision making, and target evaluation, with clear feedback mechanisms and consideration input of all involved parties.

We call this "integrated design in a network optimization process". It is based on developing a clear target canon, aimed to smoothly work within the legal framework of zoning and planning regulation. And to give due consideration to the political processes involved. While ensuring, that these are not hindered or interrupted for reasons of faulty, incomplete or unduely late design and document preparation.

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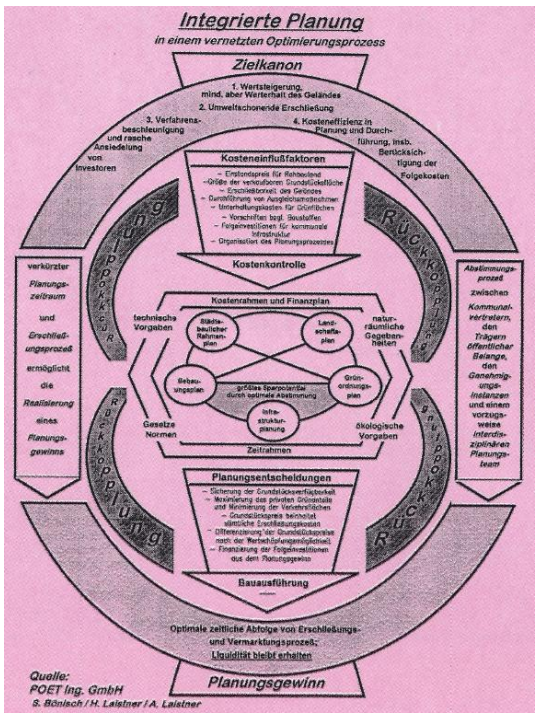

Fig. 10: integrated design – POET mbH company presentation

Our success at best in the Business Park Wachau-North development has been a fully completed legal zoning and development process within only 5 months between design contract and tendering of development construction works. And providing construction power to the first private property investor's construction site a scant 4 months after that.

4.5.2 - retaining knowledge and intentions by institutionalizing operations and their funding

Already prior to the research project Mainz-South, an increasing economic pressure started to develop within Germany regarding community finances. More and more the communities were suffering under an increased debt burden. When the opportunity came in the German reunification process to try something new, instead of the "old" strict public administrative structures and processes, we did. We used the idea of public-private-partnership structures. Instead of burdening newly created, understaffed village administrations in eastern Germany with all the ins and outs of a large development project, we suggested the creation of a privately structured, but in its majority publicly owned development company.

The relationship of 70% public ownership to 30% private ownership developed in Wachau from the fact, that the public side brought into the partnership both the property value, and all the public authority rights, while the private investor (one of the initial larger property investors interested in the area) supplied his organisation, banking and property marketing skills. This proportion proved to be fortuitous, as it created a situation in which, once profitability was achieved, the public side was the main beneficiary, as well as having "learned the business" so to speak. An unplanned withdrawing of the private investor, which in other PPP cases, so often leads to the public partner suddenly finding themselves teamed with a completely unknown new business partner, with completely new and different investment interests, did not happen.

Also the development concept from the start included a continuous income to the development company, from mainly two sources. Why – because we knew, that future upkeep was needed to ensure success – and at the time no public works structure was available. So why not build a development company into the kernel of a future public city works and supply company.

Its income to this day, is mainly generated from the sale of heating energy to the properties in the development area, and the sale of electricity to the grid through the open electricity market. To achieve this we designed and built a heat/power cogeneration plant in the development area. The secondary income is from the dues of an ownership cooperative of the property owners and users of the development area. All owners until now could be convinced, that this mandatory membership to enter the area, is worth its money – as this keeps the green areas, ditches and roads clean, the trees and bushes pruned and the marketing and property values up.

On the side – as operator of a heat/power plant the development company maintains the utility tunnel, the road surfaces and the street lighting. It has proven so succesful and effective, that when the village of Wachau was integrated into the City of Markkleeberg, the new city heads decided to turn over the development and operational works of a huge recreational lake and waterway development to the south of the city (slowly converting the old lean coal strip mining pits) to the development company – which is therefore currently designing and building a waterway lock for recreational ship traffic.

5 CONCLUSION AND OUTLOOK

It can be said, that the development ideas, which were developed in the late 1980s with the support of the German Federal Ministry for Construction, Zoning, Urban Development, the German Federal Ministry for Research and Technology, and many state and local authorities and research partners have passed their first stage test of time in the unforeseen but fortuitous implementation project at Wachau-North. While many of the research projects of the time were designated "Modellvorhaben = Demonstration Project", only few could be implemented against the inertia of the status quo, and the often uncoordinated pressures of investment and political interests. However – now we have this and other demonstration projects to study.

On the other hand, POET mbH and IfEU mbH did not arrive at this level of knowledge all at once. We went through a long process of idea development and successive implementation trial – one or two ideas at the time all through the 1980s and 1990s. The focus of this paper on only two projects – Mainz-South and Wachau-North – only reflects the unusual confluence of research and implementation chances taken – a rare situation for analysis of the development of ideas and their testing over time.

There is however the future to consider. And while – as an attendee to the realcorp now for quite some time – we realize that these ideas have spread, we do still percieve a pronounced lack of understanding for the human requirements and conditions. Especially, when confronted with large to huge to gigantic projects all over the world, we must state emphatically, that the universities and trade schools for engineers and city planners are NOT YET getting the message across.

We are still educating whole generations of architects, planners, engineers and economists who have not a clue what sustainability means. Above all else, and apart from all the many elaborated and sophisticated definitions that are put onto this single word:

Sustainability means – it has to last & humans have to like it to make an effort to make it last.

To get people to make the effort – the direction the finger is pointing could not not be clearer:

Start remembering, and take consideration of your and others' humanity, and integrate human and humane requirements into your technical, creative, administrative or economic thought processes.

Until and unless you do – nothing of you and your effort and work will remain in time.

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The Effect of Fourth Dimension on the Behavior of Urban Dwellers

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1 ABSTRACT

Although it seems that urban design is limited to three dimensions but in fact the factor of "Time" as a fourth dimension should not be ignored.

As Kevin Lynch said in urban spaces people feel passing time by two items; first, an organized repetition and second, estimated activities and Irreversible changes (instead of repeating).

We live in the places which have time in. Patrick Geddes mentioned that city is more than a place, but it's a show in time.

The first way of feeling passing time is to consider about environmental events repetition such as seasons or days and nights. The main life cycle is based on natural cycles. The effect of these natural cycles on human activities should be considered in urban design process. In different time of days and nights the urban spaces will be different either.

On the other hand, today the men's life cycle is not just depended on natural cycle .Sunshine and sunsets are not the point of start and ending. In parallel with breaking place limitation- with electronic communications- Krietzman believed that the past time limitations are now going to break. He also mentioned that it is not far to call these days society"24 hours society" and it is an introduction of "New World".

By the weakness of time structures, the"24 hours society" has been created, so the usage of timing and activities patterns increase or decrease in different ways . By having the time of night –which cannot be possible without electrical devices- we don't create more time but we can use the time more effectively.

breaking time limitation have been reached more freedom. If the differences between days and nights, work days and weekends disappear, what changes will be appear in the peoples life? More freedom and more diversity will be found which are confusing at first. In one "24hours society" the activities patterns and using urban spaces create based on demands and priorities of urban dwellers and it cannot be predictable easily.

The disadvantage of" 24hours society" is that it reduces people communications, so it leads the society to Individualism and reduces social connections which was formed in public places.

The urban designers should know the behavior patterns and activities. They should know how to increase some activities which occur in the specific time and recognized how to use some events in order to increase some specific activities.

Although many lines and political boundries has divided human society into different groups with their own nationality and culture , but the human nature is still similar.So it can say that most of the mens reactions in urban spaces might be predictable. Sice that the most of reactions rise from emotions and human nature.such as feeling fears, happieness,greif,tendency to be among the other people and communication.

But what will happen to them in "24hour city"? It is clear that multifunctional buildings, appropriate lighting and people appereance in urban spaces can be the structures of this society.

In this article we want to find out the effect of urban design on people behavior in 24 hours. We try to find normal and obnormal behaviors and propose some recommendation in order to avoid abnormal activities and increase the normal ones.

So to reach that, we analysis three public spaces in different times of 24 hours of one day and compare people behaviors in them and the reasons of their differences. It should be mentioned that in this article the emphasis is on urban users not only the spaces but finally according to the results, the new form for that urban space will be suggested and say that if the concept of 24 hour city is responsive for that area and if it can improve it or not. What happened after midnight? What about the first hours of the day?

Is it a good idea to encourage people to come out or just like the fairy tales after midnight there is no sign of living in the city? Should people conquer their fears and go out of their shelters or its better to keep their solitude?

2 THE DESCRIPTION OF BEHAVIOR

The method of doing an activity is called "behavior". The human behavior is an outcome from his needs and motivations, the environment potentials, the image of the world which caused by his perception and the meaning of this image (Lang, 1987). So an activity when effected by one of those iems will cause different behaviors. moreover behavior is strongly caused by culture and society (pakzad ,2009).

2.1 The effect of space on behavior

The environment is something which surrounds the people. The part that men reflect to, is called" behavior environment" (Lang, 1987).

The environment can be the source of perception, knowing, effectiveness, and spatial behavior. Two last items are completely influenced by the moral patterns .These pattern, have interaction with needs and human motivations. There are two viewpoints about the amount of environmental effect on the behaviors: first the opportunities of the environment (it means that people can choose among verified opportunities) and second one the existence of possibility in it (in a specific area, the possibility of some reactions than the other ones increase) (bell & the others,1990, portiens 1977).

The space as a physical part of environment can effect on the behaviors and control it .but about the activities the environment can just increase or decrease the possibility of doing some activities so the effect of environment on behaviors are stronger than activities. Its why that in design process,instead of activities , behaviors should be considered (pakzad ,2009).

Montgomery says that the soft infrastructures such as programs, activities, and verified festivals are as important as hard infrastructures (e.g. buildings and spaces). To encourage people for appearance in public spaces it is must to create attractive, functional and secure places instead of just increasing urban facilities (Montgomery, 1999).

As it mentioned above, the environment and users have mutual effect on each other. So it's obvious that the items which organized to create a 24hours urban space might be different by the others usual item. At least there would be some instruction for them. Therefore these items have their own effect on the space users. They can force some behaviors and activities. They can permit the user sit, or walk. Stay calm or play with a loud voice. Feel safe or walking fast to get away from that scary place. Besides the users have their own effect on the environment. Their cultures, traditions, their habits and hobbies can be effective on the form of urban space and sometimes the policy of government or the tendency of client for designing a specific area will change the design path.

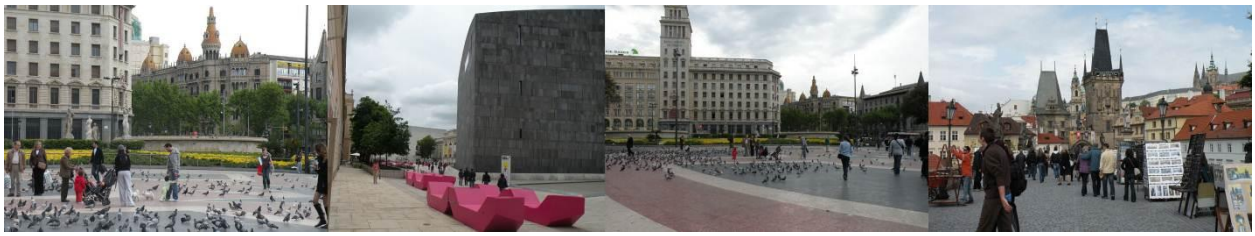
2.2 The Public Urban Space design and its impact on behavior

Kolkohn(1989) have two description for urban space: Social space and artificial(constructed)space. The artificial space is more about physical space, so what architects consider is "morphology of space". (The way that space effect on our perception and the meaning which can be found out) (Madanipour, 2008)

In a conference hall which the furniture have been placed formally there will be rarely conversation between people, while if the decoration changes, the result will be change either. This instance shows that design is an important item in space creating, but it is not the only effective item, since what happens in the spaces is mostly related to the users. Gans(1968) believes that there are differences between the spaces which have potential themselves and offer a spectrum of opportunities and the spaces which are created by usage and function of people.

The urban designers create the environment with potential in , while people create real environment. The urban designer is not the one who determine a specific activity and behavior ,but he is the person who provides the possibility of doing some behaviors and actions(Carmona, Matthew, 1996).

Public Space no. 1: Shiraz,Iran, Shahrdary Square Photographer:Anahita Mahmoudi, 2012



Public Space no. 2: Arranged right to left: Praha (Czech Republic), Barcelona (Spain) ,Bratislava(Slovakia), Vienna (Austria). Photographer: Anahita Mahmoudi, 2009, 2010.

Pubic Space no. 3: right to left: Praha (Czech Republic), Barcelona (Spain) ,Bratislava(Slovakia), Vienna (Austria), Istanbul (Turkey). Photographer: Anahita Mahmoudi, 2009, 2010, 2012.

Public spaces	Ledge design	Surrounding by buildings	Form	Lighting	Furniture	Perspective	Car passing
Public space no.1	no	No limitation, in the same level with street	line	adequate	Just one or two seat benches with long distance from each other	open	Motorcycles and biking in the side walk area
Public space no.2	no	yes	Square and rectangle	adequate	adequate	open	no (just tram and emergency cars)
Public space no.3	Multifunctional buildings, designed facades,	yes	Square, rectangle and line	adequate	adequate	open	no (just tram and emergency cars)

Public Space	fountains	Multi media	Integrated ** with third place	Possibility of public meeting	vegetation	Shopping area
Public space no.1	no	No (just some LCDs for advertisements)	no	yes	Seasonal trees	no
Public space no.2	no	no	yes	yes	no	yes
Public space no.3	no	no	yes	yes	no	yes

Aldenburg in his book (a good excellent place) mentions that third place is a friendly and informal public space where people gathers, far from work and home(1999). Third places are intermediate places between people and their society. Frequently these places are cultural and amusement, such as the cafes beside Paris street, or coffee shops in Wien, etc. (Carmona, Matthew, 1996).

3 SPACE AND TIME

By passing time, spaces are formed as the living place and the quality of passing time gives meaning to the spaces. Space and time are dependent together.

At the same time both the “change and stability of environment” are important. The urban designer should know how the environment change and find out which items stay calm and which ones change.

They should consider the effect of day-night cycle and seasons on men’s activities. In the different times of days and nights the perception and usage of the urban space is different either. It means that in different time of a day-or generally a year- the users and the way of their activities in urban space are different. for example in weekends one space specialized to kids and employment women and in the other days it’s a place for elderly and housewives. Of course there is no written low to limit the function of space for specific group or specific time, but its people which decide to use it in their own style. So it is reasonable that according to the time, the users change – in both aspects of amount and sort - and so do the activities (Carmona, Matthew, 1996).

One of the reasons that the “multifunctional” buildings and spaces suggested is the effect of them on creating more active and dynamic urban spaces. The key point is focus on putting different functions in one place.

Krietzmen knows the “one- functional buildings and spaces” as “one time spaces”. He mentioned about the spaces which are used in specific times of the day. He believes that in one 24 hours society the urban spaces should live 24 hours a day either (Krietzmen, 1999).

Among all thse 13 items which mentioned above, in authors opinion the factors of "lighting" and " surrounding" are more important than the others,since good and enough lighting makes the users fell safe and secure . places with enough lighting prevent the criminal activities or at least decrease them.

It seems that the public spaces which are just some straight lines decrease the communications and lead the users to individualism. especially when there are some seats in the place, people will sit down there and looking directly to the streets or the shops (depends on the side of seat) and usually not interested in new conversation with strangers, while on the other hand, in some places with the form of square or a closed loop people feels more comfortable, and the increasing of eye contact can make people close together or creates possibility of new communications.

Also the factor of surrounding area makes an important role to give the users the sense of place, since when people found themselves in an area which is closed by some buildings, some attractive functions, and beautiful view and landscape, inside, he feels belonging to place. By arrange some simple programs by urban managements in the public spaces strangers will know each other and so gradually the unpleasant sense of "strangers are scary" disappear. (like some common activities (playing in a team , singing a song together, doing some matches like kite running, or feeding animals, etc.). All of these activities can be some effected motivations to encourage people to appear in public places and act according to society accepted rules. Moreover the tangible and subtle control of polices and their appearance in public spaces make the environment safe.

These arrangements can make a pleasant evening and day for people. But what about nights? Two items make nights scary. First the lack of enough light (that increase the possibility of crimes) and second the lack of people. Except lighting which mentioned before, the 24hours functions make the place dynamic and alive during night time. Some functions such as super markets, hotels, restaurants, cinema and theatres, dancing clubs, are the places which most of the times have customer. Also some terminals (bus, metro, taxi, and airport) work until midnight and the appearance of passengers and the users help to make the area safe. It should consider that the dream of 24hours public spaces just limited into some places and not all the urban spaces. However they can design in an appropriate distance from the other regions and have this ability to provide facilities for their neighbourhood. It will be better if city divided in to some region. Each region has its own 24hours public space with its specific functions and facilities. Someway it will be the beating heart of the region. But it would be dangerous if all the consideration and designing just centralised in one place and besides the layers behind these ledges and out of this centre, everything drown in darkness and silence. Therefore its better that the major streets lead to somewhere near this centre (it increases the escape ways in a case of dangers), also an adequate lighting is not only for centre but also for all parts of the region is recommended.

4 CONCLUSION

It's clear that not only people effect on its surrounded area but also the evvironment has its own impact on people. This impact sometimes caused by social factors such as culture , government policy , traditions or sometimes it just caused by design of some place and the concept of designer in order to make people do some specific activities.besides some design points , the factor of time is considerable.

Most of the urban spaces during day hours are active and dynamic, but in the night time there are going to be some scary place and sometimes full of homeless, beggers and criminals. Some scences like that prevent the appereance of urban dwellers in night. To reduce these views, the exictance of some 24hours activity are necessary. In the weekends and summer nights, the people are in the street and public spaces over midnight but in winter and during work days, these appereance come down. Providing some facilities which are always entertaing and attractive for people improve the urban space. Also settlei down some functions which are 24hours open and service to users, such as terminals , stations, hotels , bars,clubs etc. Moreover its better that each region all around the city has its own 24hour public space that depended to the area of region the number of them can be different (between 1 -4).These spaces with reasonable distances by each other will be the beating heart of the region and make the area always active and safe. There are thirteen important items (such as ledge, form, multi media, lighting, furniture…) that considrating about them in urban design process make the urban space more pleasant and satisfied for the urban dwellers.

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The Resource-Saving Enterprise Zone Liesing

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1 ABSTRACT

The third sector is essential for economic activity of cities and therefore needs to be provided with respective resources. Such resources are - among others - space of sufficient quality and the possibility for companies to pursue economic activity uninterruptedly. In many urban regions though, economic zones get under rising pressure from other uses and are deprived of the resources they need. They get pushed further and further to the margin of urban areas and onto lower quality sites. This trend is critical, as it aggravates urban sprawl, excessive land use, high transport activity and might even make companies migrate out to competing sites. In fact, it poses a risk to the quality of life and the competitivity of urban regions and therefore has to be banned.

So, the question is: How can areas that permit economic activities to be pursued in an undisturbed way be provided inside the urban compound in the long run? And how can good co-functioning with other urban uses be guaranteed?

This paper presents an innovative approach to this issue by describing the project "Resource-saving Enterprise Zone Liesing", which aims at not only preserving an existing industrial zone undergoing structural changes, but also at developing it into an attractive, future-proof and resource-efficient economic area. Structures and tools which foster its economic activity and minimise conflicts with other uses are provided. As a result, an appealing, high-end business quarter inside the urban compound is created and backed-up for the future.

2 THE PROJECT "RESOURCE-SAVING ENTERPRISE ZONE LIESING"

2.1 Project Background

The project area is 240 hectares large and comprises 563 companies of various sizes and branches. It is situated in the south of Vienna at the border to lower Austria.

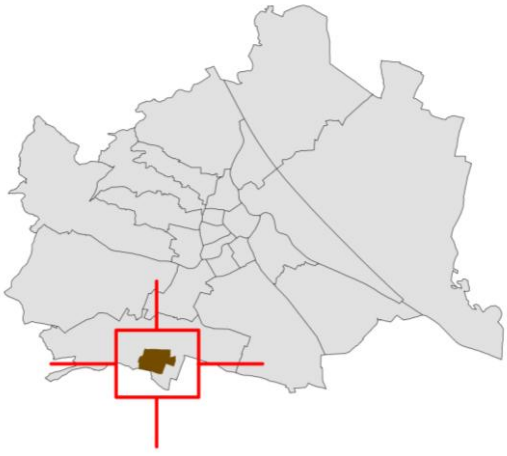

Fig. 1: Location of the Enterprise Zone Liesing

The area is widely known as „Industriegebiet Liesing" (industrial area Liesing), although just a small number of the enterprises can still be called industrial in the traditional sense. The number of trade firms, offices or transport companies is constantly growing in the zone. Besides that, an official set of development aims for the area or a targeted strategy for attracting businesses has not yet been developed. As a result, the area is very diverse and unstructured.

Concerning the physical appearance of the zone, it has to be stated that there is a lot of untapped potential. At the moment, the area lacks satisfying design of buildings, public space or green areas, especially in areas at greater distance to the main roads. There is also a considerable amount of vacancies and brownfields.

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Furthermore, the zone lacks specific identity among the local businesses as well as among the general public. Its identity as traditional industrial zone got lost when big industrial enterprises closed down or relocated. At the moment, the zone has no strong identity that it could use in competition against other zones.

As a consequence, the enterprise zone – despite favourable site conditions - lost importance for politics, administration and businesses. The main focus of their activities has shifted to exploiting free or unused lots without paying attention to the development of the business zone as a whole. As a result, the overall design is weak, the uses are very heterogeneous and some big key areas in the center of the zone are at risk of becoming shopping or housing areas.

To controvert these tendencies, to back up the zone and to develop it into an attractive and future-proof enterprise zone, the project described in this paper was launched. The focus on "resource-efficiency" was chosen because it is generally seen as standard for future-oriented, long-term urban planning. Furthermore, there are some main enterprises in the zone (e.g. bakery "Der Mann") which have already implemented innovative solutions for efficiency measures and can be used as beacon for the over 500 remaining businesses. Through using these model businesses as leading forces as well as working out spatial strategies for the development of the zone as a whole, a strong identity as resource-efficient enterprise zone shall be achieved and serve as attractor to new businesses.

The project is co-founded by the European Fund for Regional Development and lasts from 10/2010 to 12/2013. It is a clear aim to set up sustainable structures that persist beyond the formal end of the project time frame.

2.2 Project Aims

The operational aims of the project "Resource-saving Enterprise Zone Liesing" are the following:

- To establish a district management („Quartiersmanagement") on site as a service for companies
- To establish the brand „Resource-Saving Enterprise Zone Liesing" and to integrate the local companies into brand development
- To improve resource - efficiency on all levels in the zone
- To secure jobs in the zone and to attract new businesses
- To design a comprising masterplan and create an attractive urban environment
- To secure the enterprise zone as location also for companies with high emissions
- To foster cooperation of property owners, businesses, science and research
- To integrate the local companies and site owners into the process of decision making
- To develop suggestions for improving the infrastructure for employees as well as employers
- To develop suggestions for adjusting the legal framework of building and corporate law
- To stimulate the property market and improve the use of free spatial ressources
- To raise awareness for the enterprise zone among the inhabitants in the neighbourhood

2.3 Project Structure

To achieve these aims, the following work packages have been designed:

- Establishing and implementing a district management ("Quartiersmanagement")
- SWOT analysis of the area
- Establishing and implementing a brand and communications concept
- Stimulating resource-efficient economic activity
- Stimulating the real – estate market
- Developing a masterplan with resource-efficiency measures

By now, work package 1, 2, 3 and 5 have been successfully accomplished, 4 and 6 are ongoing. Work package 1, the district management, is the core of the project and lasts for its entire time frame.

In this paper, the focus lies not so much on describing the actual situation of the area or the work packages, but rather on the project`s integrative approach of adressing all relevant stakeholders in the process. Furthermore, a comprising picture of the numerous measures taken to turn the industrial zone into a resource-efficient, attractive business quarter will be given.

3 INTEGRATION OF ALL RELEVANT STAKEHOLDERS INTO THE DEVELOPMENT PROCESS

3.1 Cooperation on Political Level

For this project, the most important players for urban economic development of Vienna have joined in cooperation: the steering committee is made up by representatives of the Vienna Chamber of Commerce, the Vienna Business Agency and the City of Vienna (Municipal Planning Department MA 21B). This means that several different politic points of view as well as a large number of different stakeholders on municipal and district level are represented in the decision making process. As the three players are represented in the steering committee which decides unanimously, cooperative decision-making is fostered. This collaboration is of particular importance, because it creates the necessary capacity to act and to implement the project results.

3.2 The District Management ("Quartiersmanagement") as a service for companies

The district management ("Quartiersmanagement") is the core of the project. Through installing a district manager ("Quartiersmanagerin"), whose primary task is to serve as a pivotal point and service department for companies in the enterprise zone, a strong signal of support is sent to the companies. As it is a main aspect to integrate the businesses into the development process of the zone as much as possible, their opinions shall be heard and considered. This is the task of the district manager: motivate the business and land owners to participate in the development process and bring in own ideas, as it is them who will be the stakeholders of the zone`s development in the long run.

The district management office is located at the center of the zone and interested parties are welcome to drop by with any issue concerning their working and living in the area. It is designed as one-stop-shop providing information about funding, contact points, relevant developments, interesting events or research activities that might be interesting for companies and other stakeholders. It is the first place where business and land owners as well as inhabitants can carry their concerns and ideas to.

The manager herself initiates projects, discussions and networks and encourages relevant stakeholders to cooperate and become active in and for the zone. The main part of her work is to transfer knowledge and to stimulate communication and cooperation of all parties by establishing networks, developing and communicating new ideas and clarifying the way to their implementation.

Her main tools are information and discussion events, the homepage www.ig-liesing.at, periodical newsletters and personal interviews. Furthermore, specific surveys concerning sustainability in the area supply her with in-depth knowledge, and a brand and communications concept enables effective public relations.

This service is unique for business areas in Vienna and centralises the information flow for all the relevant parties, be it companies, land owners, project developers or district and government officials. It offers one main contact person for any issue relevant for the economic area. This shall provide support for the already located businesses as well make it easy and attractive for interested companies to settle in the enterprize zone.

3.3 A Broader Perspective: Integration of Neighbours and Companies outside the Economic Zone

To adress the development of the area in a comprehensive way, it is necessary to also take its surroundings into account. This means getting into contact with neighbours as well as companies located in the rest of the district or even further away.

As the enterprise zone is surrounded by housing areas, it is particularly important to get into contact with neighbours in order to prevent conflicts of uses. The neighbours` issues are analysed by personal interviews and by cooperation with local neighbourhood associations. The neighbours are being constantly informed by

press work and newsletters and invited to activities in the zone, especially when it comes to free space issues and temporary use, as the Enterprise Zone Liesing shall be a place for working as much as living.

Besides the neighbours, it is also advisable to have a broader horizon concerning the companies taken into account. It is a definite intent of the project to also cooperate with companies outside the industrial zone if they are willing to. That might be a neighbouring company participating in joint renewable energy use or a spatially more distant company cooperating in a research project.

4 RESOURCE-EFFICIENCY ON ALL LEVELS

4.1 Resource-efficient Design of the Area

As sustainability goes beyond the entity of a single company, a broad set of surrounding factors has to be considered when developing an enterprise zone in a resource-efficient way. These factors are, e.g., referring to transport, open and green space, architecture, the real estate market, social systems, structures of land use, local supply, contamination and brownfields, technical infrastructure or the image of the zone. To deal with these these factors in the project area, four studies have been contracted out:

- A detailed SWOT analysis
- A transport expertise
- An open and green space expertise
- A masterplan

In these studies, the aspects described above are dealt with in depth. At first, a detailed analysis of the strenghts, weaknesses, opportunities and threats (SWOT) of the zone is pursued and based on that, ideas and measures for the area are suggested and rated. These ideas will be comprised in a masterplan, which is expected for the second half of 2013 and will provide recommendations and sustainability guidelines for stakeholders in planning.

In the course of the studies, business and land owners as well as neighbours are adressed by interviews, workshops and other events. This is to constantly integrate the various players in and around the area into the analysis and the implementation process. The district manager has a catalyst function for the zone and the studies provide her with the necessary knowledge, but they also serve as tools for adressing the relevant players.

4.2 Resource-efficient Economic Activity

Besides the spatial approach, it is of course crucial to promote sustainability on the business level. To achieve this, businesses in the area are constantly informed about technological developments, funding opportunities, advice programs etc. by newsletters, events and personal consultation of the district manager. They shall be motivated to implement innovative ideas, draw from existing advice ressources and think beyond their own business unit.

It is a priority of the project to promote existing (often underused) expert consultation programs rather than to set up new programs. One of these existing programs is the ÖkobusinessPlan (ÖBP) Vienna, a service by the City of Vienna. It offers general advice as well as specific consultation concerning resource-efficient economic activities to companies. Results of ÖBP – related projects in the zone are, for example: halving the cutting loss of circuit boards or bringing down the water use in their production by 40%.

Before our project started, only 16 of the 563 companies in the industrial zone participated in the (subsidised) ÖBP. The aim is to raise that number to at least 100 consultations as well as promote the other existing consultation offers, e.g. state expert advice programs about mobility management. The part of the district manager here is to provide basic information about expert advice offers, to get the relevant players into contact and to support the business owners in implementing their projects.

Besides the single-business level, there is enormous resource-saving potential in the enterprise zone that could be adressed on the meso-level, that is by cooperation of businesses. Fields of cooperation are e.g. renewable energies, waste disposal or water and process energy use. Attractive for cooperation might be, for example, the solar energy field: forming a group of businesses that build a joint solar panel of considerable size and work out an energy contracting scheme to provide energy for parts of or the whole industrial zone.

To stimulate initiatives like this, ideas have to be substantiated, stakeholders have to be motivated and the path to realisation has to be made clear. This is the task of another study contracted out in March: it will identify specific projects, calculate costs and benefits of their realisation and show the necessary technical, financial, legal and organisational steps to implementation. The district manager again is the one to communicate the results of the study, get the necessary players together and provide support with implementation.

5 OUTLOOK

In 2011, the district management was installed and right now, it is at full service. The first public events have taken place, the website and newsletters have been worked out and the district manager is in permanent contact with the relevant players. In spring 2012, the SWOT analysis and the brand and communications concept have been completed.

During the months to come, the focus will be on intensifying the expert advice events concerning resource-efficiency for the companies and on getting company and land owners motivated to implement projects. The study about the resource-efficiency potentials in the area will serve as a basis for this task and be completed in autumn. Furthermore, joint work with research institutions will be intensified. Cooperation programs with the University of Technology and the University of Natural Resources and Life Sciences in Vienna have been set up and will be executed in autumn. Besides that, the public relations work will be increased, as the brand and communications concept is ready for implementation.

6 CONCLUSION

The project "Resource-saving Enterprise Zone Liesing" offers an innovative approach to the problem of fragmentation and out-migration of enterprise zones. Through the comprising measures of the project – with the district management at its core - high-quality space for economic activity is assured inside the urban compound, which offers security of investment and a long-term perspective for development.

The various actions towards augmenting resource-efficiency shall enable a development leap of the former industrial zone towards a future-oriented business area with a strong and attractive reputation. Furthermore, the explicit project aim of integrating business owners and other relevant parties into the development process shall guarantee the pursuing of the suggested path after the project deadline. Through this, conflicts with other urban uses are minimised and the companies are enabled to contribute their essential share to the functioning of a city in the long run. The result of the project will be a modernised, resource-efficient and stable business area that is attractive to innovative companies of various sectors.

The Walkable City – the Concept of Stockholm

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1 ABSTRACT

This paper shows how the City of Stockholm currently works on the implementation of its new City Plan "The Walkable City - Stockholm City Plan 2010". The City's planning is subjugated to the norm of sustainability, a human oriented approach and the goals to create an open, connected and healthy city. The City's Vision 2030 provides the guiding thinking for important strategic planning issues[1] that laid the ground for the City Plan which contains four strategies for sustainable growth: strengthen central Stockholm, focus on strategic nodes, connect city areas and create a lively urban environment in all of Stockholm. Together with nine overarching focus areas of the plan, the strategies intend to make Stockholm denser, better integrated and functionally mixed. The City Plan has a new spatial approach in comparison to the former comprehensive plan of 1999 i.e. several previous planning principles had to be changed. The current implementation of the City Plan tries to find ways and acceptance of changing Stockholm's former distinct spatial patterns and develop new spaces for 150,000 people as well as many new infrastructure investments.

Three examples of strategically important urban planning approaches seen from a helicopter perspective are illustrated:

- The Royal Seaport project as an environmentally "world class" extension of central Stockholm
- Collaboration in Kista Science City as one of nine strategic nodes with ICT as a development engine
- A programme for connecting the nodes of Högdalen and Farsta as new form of planning

2 STRONG GROWTH NEEDS NEW CONCEPTS

In 2008 the City Council of Stockholm decided that it was time for a new comprehensive plan to be prepared. The old comprehensive plan of 1999 should be replaced as a strong growth and new challenges urged politicians and planners to come up with a new concept for Stockholm's future development. The City Plan "The Walkable City - Stockholm City Plan 2010" of course partly built upon the former plan but many guiding planning ideas have changed compared to former planning intentions. It also invents the form of continuous comprehensive planning i.e. thematic or geographic completions are made when necessary.

The comprehensive plan of 1999 was introduced as a plan that "has to build upon sustainable development and what was created by its inhabitants during several centuries".[2] The planners' intent was in first place to keep the city's existing morphology consisting of inner city and its clear distinction from various forms of suburbs (e.g. garden cities, metro suburbs). "An important starting point for the millennium shift's comprehensive planning is that the city shall develop with a maintained soul and its existing characteristics."[3] This rather conservative attitude has to been seen from a perspective of a decennium (1991-1999) of economic crisis and a modest population growth. Until that date Stockholm was internationally seen as a city with very clear spatial patterns. The overall planning goals of 1999 did not change that policy i.e. they did not require substantial spatial expansion. Existing built-up areas and infrastructure could be sustained without bigger extensions and new investments. The city should grow inwards and more or less keep its existing morphology.

In this respect, a very important decision of the City Council was made 1994 saying that brown field development has priority to the use of green areas.[4] Hammarby Sjöstad[5] has become a pioneering example for this planning perspective towards ecocycle thinking and sustainable development in Stockholm. With this guiding example, the planning approach of Stockholm has changed considerably compared to the 1990-context and principles. The new planning approach was also the starting point when preparing the current

[1] City of Stockholm: Vision 2030 – a guide to the future, Stockholm, 2007
[2] Kallstenius, Per: Utsikt från en bro, page 232-248, in: Synnemar (ed.): Stockholm blir en storstad, Stockholm, 1998
[3] Dito, p. 236
[4] Kallstenius, Per: Minne och vision, Stockholm, 2011
[5] For more information on this city district development project (1995-2012): www.hammarbysjostad.se

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City Plan. It became necessary in order to keep pace with high growth rates but also in order to implement the rising ambitions of sustainability and an increased influence of private stakeholders.

2.1 Demographic and economic growth – a reality to deal with

Stockholm is a strongly growing city, from 0.86 million inhabitants (density: 4,580 inh/km²) today to probably one million in year 2025, i.e. a growth rate of approximately 1.5 percent/year. This corresponds to the high growth rate in the Stockholm County in general, which is expected to grow from 2.1 million inhabitants (2011) to 2.6 million people in 2030.[6] Half the population growth is based on natural growth and half on an immigration surplus whereof immigration from abroad clearly dominates. Planning institutions on both within the county and the City of Stockholm recognise this development and handle it in an affirmative way in its planning efforts. This means that the City's planning has to assure 100,000 new housing units until 2030 i.e. approximately 5,000 units/year. Although this is a high figure it will not be enough due to an accumulated lack of housing. There have been big shortcomings in new production rates during the last 20 years where only one third of the needed new accommodations were built. The consequences are strongly raising prices for owner occupied flats (around 6 500 Euro/m² in central areas),[7] new production of mostly expensive housing projects, long queues to rental flats (currently 5-20 years waiting time depending on the list!), lack of ten thousands of student rooms, segregation and growing commuting distances.[8] The City's planning recognises these problems and has approximately 11,000 housing units in its current detailed plans ready for building. However the private stakeholders do not keep pace due to their foremost economic prin¬ciples of starting building projects only where high profits are to be expected. The City uses different tools to adjust that: dialogue, negotiations, different forms of contracts, using the own power as real estate owner. The City also tries to get a better geographical balance of new housing projects i.e. to start more projects in less attractive areas (suburbs, economically weak southern parts) and not only in central parts of Stockholm.

The immigration pressure is high due to a very positive economic development during the last few years where the global and European crisis luckily was not very marked in Stockholm. Stockholm can be described as the economic engine of Sweden, where the service sector strongly dominates (> 90%) and the innovation potential is high. Many head quarters of international enterprises, Governmental functions, big and stable clusters (ICT, clean-tech, life-sciences, financial sector, creative industries, tourism, etc.), high-quality universities and a well developed R&D sector but also stable framework conditions create good conditions for business and new jobs. It is estimated that the number of working places will grow from 1.1 million (2010) to 1.3-1.4 million in 2030 in Stockholm county[9] whereof 40-50 percent will occur in Stockholm (today 480 000 working places). This growth is mainly expected to take place in the service sector. The challenge for planning in Stockholm is to establish new business locations, mainly to achieve Stockholm's goal to have mixed urban areas, thus providing high-quality business locations that can be combined with housing and good public transport and logistic offers. Here also the question of creating urban density comes in. How can higher densities of housing and business be established when at the same time e.g. traffic disturbances, access to high-quality green areas and health have to be considered?

A third overarching challenge, as in most European cities, is the growing road traffic due to enhanced economic activities, higher incomes and changes in leisure attitudes. Despite the fact that 60 percent of the City's inhabitants use public transport in order to go to/from the inner city parts and nearly 70 percent walk or bike when moving within the inner city parts of Stockholm,[10] road traffic causes severe problems regar¬ding bad air quality, congestion, noise and accidents. Especially the strong and enduring increase of goods transports is important to tackle. Moreover, public transport and walking/bicycling have to be given even more priority in order to be able to solve the massive road traffic problems of a growing city region. This is the case in Stockholm's new Accessibility Plan[11] which gives clear priority to public transport,

[6] SLL Tillväxt, miljö och regionplanering: Befolkning, sysselsättning och inkomster i Östra Mellansverige, Stockholm, 2012
[7] Pezzei, Kristina: Das schwedische Volksheim ist zu klein geworden, in: Immobilien Wirtschaft, 12-01/2012, p.44-46
[8] Regional Planning Office Stockholm: Stockholm - OECD-report, 2006 and follow-up report 2011, Stockholm 2006/2011
[9] Dito fotenote 3
[10] Stockholm Transport: Facts on SL and Stockholm County, Stockholm, 2009
[11] City of Stockholm: Accessibility strategy (draft), Stockholm, 2011

walking and biking. Other efforts to reduce road traffic are high parking fees, low parking norms in new projects (0.7 parking lots/housing unit), new city logistic concepts, more exclusive bus lanes, many new bicycle lanes and new pedestrian friendly infrastructure. This will help to reduce car dominance within the city, to give space to public transport, to connect the cities' various districts and to create a more functionally mixed, human friendly city with high quality of public spaces.

2.2 The City Plan's main intentions

The City Plan of 2010 is both a "traditional" comprehensive land use plan and at the same time a strategic navigation instrument that guides the city's various administrations and companies. The City Plan and the Regional Development for the Stockholm Region 2030[12] were elaborated simultaneously (2007-2010) which guarantees the continuity of principal development strategies and principles for both the region and the city: polycentricity, density and functional mix, priority to public transport, sustainable land use (brown field development) and a careful interplay between green and built-up areas. Social and economic aspects are well integrated parts of both plans. The City Plan also points out 21 major urban development areas and the 30 most important transport infrastructure projects in the coming 20 years. The City Plan is well in line with current urban planning theory, European standards and important guiding documents such as ESDP and the Leipzig Charter on sustainable European cities. Sustainable thinking is well established in the City Plan.

The City Plan has been worked out by broad dialogue and stakeholder processes with a particular focus on the involvement of academia, the private sector, schools and associations. The exchange with property developers and construction firms has been quite important to make realistic sugges¬tions for the city's future. Another initiative towards citizens was "Phone and we will be there" which resulted in over 200 meetings throughout the city. The work was even accompanied by an EIA, an analysis of social effects and a report showing the most important conflicts between goals in the implementation of the plan's strategies. The City Plan also specifies principles and guiding development orientation for underlying programme work, detailed planning and building permits. NB that the City Plan is a guiding plan and not a legally binding document.

The City Plan presents four strategies for sustainable growth: strengthening of the central parts of Stockholm, a particular focus on nine strategic nodes, the connection of city areas which until now have been separated and the creation of a vibrant urban environment in all of Stockholm. This is illustrated in the figure below. Together with nine overarching focus areas/goals of the plan the strategies are intended to make Stockholm denser, cleaner, safer, better integrated and more functionally mixed. Generally, Stockholm's major landholdings increase the opportunities to achieve the goals of Vision 2030 and the City Plan.

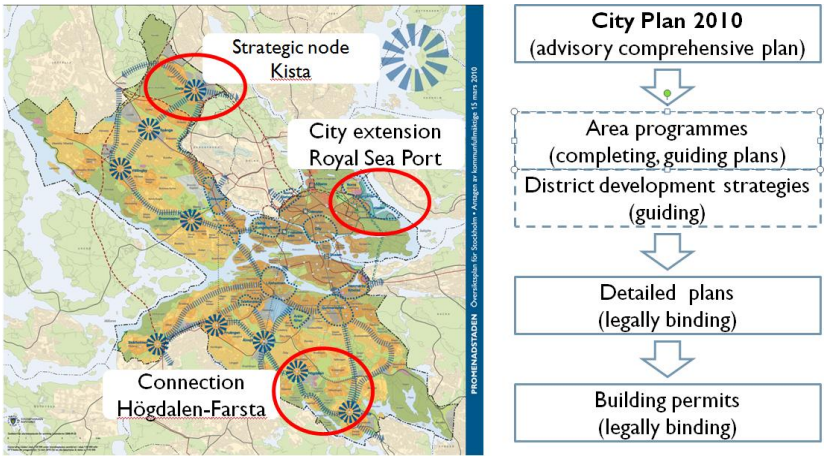

Fig. 1: Stockholm City Plan, chosen examples of strategic planning areas and hierarchy of plans in the Swedish system.

The central area of Stockholm will be extended along several strategic development areas which are all brown field areas or former industrial zones/harbors e.g. the Royal Seaport. This will provide new diverse city areas that support Stockholm's competitiveness, sustainable mobility i.e. walking/cycling and connect

[12] Regional Planning Office Stockholm: Regional Development for the Stockholm Region - RUFS 2030, Stockholm, 2010

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hitherto isolated areas. In practice, this means expanding the inner city beyond its historic borders which is a big change in Stockholm's planning philosophy. The current distinct morphology is disappearing.

Structurally the efforts to strengthen nine strategic nodes and to create new connecting corridors, containing housing, improved green areas and infrastructure, between to date non-integrated city areas shall contribute to restrengthen the city's suburban context e.g. planning programme for the connection "Högdalen-Farsta". Even this is a planning effort that leaves behind the former concepts of clearly defined areas and form new mixed and better interrelated areas. Examples of strategic nodes such as e.g. "Kista Science City" provide evidence for the need of working together over sector borders, public-private partnerships and involving academia in order to create new vital, well-functioning and resilient city areas.

Another new approach in Stockholm is to work with "continuous comprehensive planning" i.e. to leave behind the former idea of creating a completely new city plan every now and then. This concept creates flexibility and clear planning intentions, but it does not restrict innovations and necessary new arrangements. It includes to producing guiding planning documents which deepen the City Plan i.e. a new energy plan, a new green plan and a new concept of what good quality architecture should stand for in Stockholm (called "Architecture Stockholm"). It also means to work out various area programmes and district development strategies. It even comprises intensified collaboration processes, especially in the early planning stages.

3 THREE EXAMPLES OF STRATEGIC PLANNING APPROACHES

Three cases will show how the City Plan is implemented. For more detailed information on these development areas a visit to the City of Stockholm's website[13] is recommended.

3.1 Royal Seaport project - an environmentally "world class" extension of central Stockholm

One example of the city's extension is the Stockholm Royal Seaport project[14] on a harbour brown field area (236 ha) which will comprise 10,000 dwellings and 30,000 working places i.e. mixed urban functions. It will offer a new entry point from the Baltic Sea. Transport options are subway, tram (to be built), biogas bus and boat. The new district shall be fossil-free in 2030 and adapted to climate change effects. Another goal is to achieve 1.5 ton CO_2 emissions/district inhabitant in 2020. The area is a test bed for new urban technologies, business models and commercial concepts: ICT solutions i.e. substituting and optimizing transportation, smart grid systems, combined energy systems, resilient green planning, eco-cycle solutions and climate-neutral lifestyle concepts. This is to be done in close cooperation between the City, the port, academic institutions and private stakeholders as well as the Clinton Climate Initiative.[15]

The work is guided by a general vision for the entire district which bill be built up in 2030. Three development programmes for the three different district parts are successively worked out in order to clarify the vision's targets. In order to achieve the high environmental ambitions each developer and company involved has signed a particular contract with the City to guarantee that best (new) techniques and very high standards are applied. Detailed plans and exploitation contracts combined with action programmes then set severe and differentiated sustainability goals (building standards, transport solutions, green areas, urban technical solutions such as energy, water, sewage, streets/public spaces) for every real estate. These goals and standards require much more than demanded by current laws and rules. The increased expenditures of these efforts will result in costs of 7,000-7,500 Euros per square meter of a new owner occupied flat which excludes many people from buying a flat and live there. A measure of the City to dampen this negative cost effect is to guarantee a high number of rental flats.

The Royal Seaport extends the borders of the inner city. Dense mixed use is a major criterion to achieve a lively urban environment.[16] High urban density in this area means mid-rise blocks (4-10 storeys) integrated with small parks, green facades and roofs. Also the street network is crucial to succeed in connecting the new dense area to the existing inner city parts. It links the city's public spaces and is a basic prerequisite for integration and exchange. Barrier free mobility for pedestrians and cyclists is an important planning aim, too.

[13] City development issues: http://international.stockholm.se/. Look for: Future Stockholm
[14] City of Stockholm: Stockholm Royal Seaport, Vision 2030, Stockholm 2009
[15] Information on CCI: http://www.clintonfoundation.org/what-we-do/clinton-climate-initiative/cities/climate-positive
[16] Regionplanekontoret: Tätare Stockholm, rapport 8:2009, Stockholm, 2009

How all this will work out will depend on the success of the chosen integrated planning approach and on how rather restricting EU-norms (air quality, noise) can be handled.

3.2 Kista – a role model for other strategic nodes in Stockholm

Since the year 2000 the strategic node Kista Science City[17] has been developed (115,000 inhabitants) from a merely industrial area into a mixed urban district. The area is part of a new regional city core and borders on four municipalities, all of which have agreed on a shared vision for Kista. It involves joint initiatives as housing, transport networks, public transit, economic development and higher education. Totally 65,000 people work in Kista's 8,500 companies. Kista is by now a world leader in ICT providing 23,000 high quality work places in 1,100 ICT companies which is an extreme concentration of expertise and innovation potential. A science city (currently 7,000 students, 1,000 researchers) is being created where many different sectors interact: academia, real estate and housing, culture, recreation, services and high tech businesses. Thus the specialty of Kista is its progress in working together. "Cooperating, networking, influencing!" this is the device of Kista's business and research communities. Different networking platforms are established where individuals from different companies can meet in the area. In terms of the implementation of the City Plan's intentions this is a sort of role model of processing for other strategic nodes in Stockholm.

In Kista land prices are generally high which makes it possible to construct a dense and mixed district.[18] Spatially, Kista's development is supported by heavy investments in infrastructure, increased accessibility and improved links to the surrounding municipalities and districts. Work is done to join street networks, focus on central corridors and develop new buildings in order to strengthen the area's cohesion and attractivity. Even the values of the nearby situated Järva nature reserve are integrated in Kista's development.

3.3 Connection programme Högdalen – Farsta: a trial to use a new planning tool

As a means to fill the gap between the City Plan and detailed planning a new tool is tested: a planning programme for connecting the nodes Högdalen and Farsta.[19] The City Council's commission to work on this started in 2009, which means that the programme was elaborated parallel to the City Plan. The programme follows the planning law's steps and rules. It shall render possible to smoothen detailed planning and to improve the understanding of local communities for the overall development needs. The intention is to establish a new thinking what a connection between two so far isolated areas can contain. Of course it comprises new transport infrastructure, but foremost the ambition to establish new green passageways of walking/cycling, better public transport links, new housing and urban corridors as well as new functions for recreation and improved ecological values of these the "in-between-areas". At the same even this trial to connect two so far distinct areas will change the urban morphology, in this case in a suburban area.

The consultation phase in 2011 however showed that people in these areas are not so keen on being spatially more connected. NIMBY effects aroused, too. There were critical voices concerning the suggested intrusion into green areas, exploitation too close to shore areas and housing forms (e.g. semi-detached houses) that are regarded as impropriate. Another problem is to find ways of financing the suggested new corridors and improved green areas.

4 CONCLUSION

Urban planning is a complex issue. Coming up with new spatial development concepts as in the City Plan means that planners have to be prepared to convince many different stakeholder groups. This requires diffe¬rent and partly new communication forms and processes in order to reach people and create necessary insights. New forms of planning (e.g. connecting urban areas) is a way to implement sustainable ideas. However urban planning cannot continue to be investment driven only. It must deliver suggestions which open up for a dynamic, creative and attractive city development based on user driven solutions. The form of conti¬nuous comprehensive planning unlocks for that. It is flexible and can react on new global requirements.

Stockholm's political goals of a sustainable, dense, healthy city with resilient ecosystems and high living qualities are transfered into spatial planning concepts. The chosen examples above are pilote projects. They

[17] More information on Kista Science City: http://en.kista.com/
[18] Regionplanekontoret: Tätare regionala stadskärnor, rapport 4:2011, Stockholm, 2011
[19] City of Stockholm: program för sambandet Högdalen-Farsta, samrådsförslag, Stockholm, 2010

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show that planning solutions must include ecocycle approaches, the use of local resources, all kind of networks, improved interfaces and collaboration between sectors, amplified stakeholders processes, interdisciplinaire teams, new business models and of course holistic longterm thinking in order to form a city that does well in a world of a prospective nine billion people.

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Three Dimensional Mixtures of Different Activities in Buildings around Railway Stations in Tokyo – Shibuya, Azabu-Juban and Kasai

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1 ABSTRACT

In Japan, there are several major "building types" according to the purposes of building, such as apartment building, commercial building or office building. However, actual activities inside buildings are sometimes different from original purposes of the buildings and different activities are often mixed in a single building. Japanese urban cities are consisted of mixtures of different building types and activities, which eventually complicate street images and also attract people visiting the cities. Though such mixtures of activities characterize Japanese cities, there are a few researches which figure the mixtures. In this paper, we clarify the characteristics of three-dimensional mixtures, as research activities in buildings nearby three railway stations in Tokyo, and visualize the activities from past to present in the following method: 1) count up activities in each building, 2) draw figures of urban section, 3) color-code each unit according to the activity.

Information of usage in each property is collected by surveying present activities of 370 buildings from the nameplates of mailbox at the entrance of the buildings. Information of past activities of 130 buildings is also collected from the map data 10 and 20 years ago. These survey were done in three areas in Tokyo were selected. The first area is Shibuya, which has developed since Meiji era as one of the most bustling places in Tokyo. The second area is Azabu-juban located in south-central district of Tokyo, developed as a local midtown. The third area is Kasai, a relatively new residential area around 15 minutes away from the center of Tokyo.

Main findings of this research are as follows; In Shibuya case, there are many mixtures near the station, and the rate of office units in an apartment building goes down gradually with the distance. At Azabu-Juban, usages as office in an apartment exist at random, and this tendency doesn't change over the years. At Kasai, there were many units which have had user's name on nameplates until 2000. However, in 2010, number of anonymous units without user's name has increased rapidly.

2 INTRODUCTION

In Japan, rules and regulations on landscapes or building types are loose compared with many Western countries. As a result, variety of shapes and usages of buildings exist. Then, diriment kind of buildings mix in neighborhood. For instance, at classical areas with many wooden low-rise houses, some modern high-rise buildings stand. Mixtures of many kind of buildings means mixtures of many types of usages of land and buildings in the area. Such diversity gives image of complexity and sometimes attracts people visiting Japanese urban cities. As part of this trend, not only mixture of many shapes and usages of buildings, mixtures of different activities inside buildings, which didn't designed at planning phase of architecture, are found. We know many offices, shops and service activities are in dwelling units of apartment building. By the contraries, some people dwell in office buildings. Control of users' activities tend not to be done and mixtures of activities inside buildings tend to be ignored. However, for the residents in apartment buildings, mixture of different activities is not welcomed state from viewpoint of security, privacy and comfort because unspecified people enter the common space for residents.

These mixed activities inside buildings cannot be distinguished from its façade. Even from nameplates on the mail boxes or doors because many people living in apartment buildings don't show their names for outsiders. It is difficult to grasp ratio of residents and non-residents. Relations between mixture of different activities and trend of anonymities of resident in apartment buildings are not focused and clarified, but it is supposed that people living in commercial purposed buildings or apartment buildings highly used in non residential uses tend not to show their information even it is small information like "names". It may show loss of the community at area societies.

There are several research on mixture of activities. Hatori analyzes mixture in buildings locate on Tokyo 23 wards by using NRR (Non resident-ratio) that is ratio of non resident units inside of the building and is calculated from "The Zenrin Zmap town2" and "the GIS data of the Tokyo metropolitan government". This

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study clarifies that over 20 % buildings have different usage from the original. And also clarifies that mixtures of activities are prone to occur low floor in the buildings. Hibata focuses on mixture of non residential uses in the residential zone around Yamanote Railway Line in sub-center of Tokyo. Ant it analyzes mixture of non residential uses by area characteristics, traffic convenience, zone district, and temporal-spatial change. Yamaga researches 13 business zones in Tokyo by defining "Usage Section" which color-codes cross-section diagrams of buildings with 53 patterns of categorized usages. Yamaga finds peculiar characters in each district from Usage section. It demonstrates diversity of those business zones.

These previous researches show that mixtures of activities have three-dimensional characters and characters of mixtures of activities are different by area. Therefore this study analysis mixtures of activities three-dimensionally in three local areas. by collecting past-to-present data of names of buildings dwellers. Units without information of dwellers names are also recorded. Also, characteristics of dwellers inside buildings are not found data. Mixtures and distributions of activities inside buildings are horizontally and vertically visualized.

3 DEFINITION AND METHOD

3.1 Definitions

Mixed rate

Mixed rate is a ratio of different usage from the original usage in the building. When define number of whole units in each building that can contract as "W", and number of units that don't conform to original usage as "a". Mixed rate is presented "a / W".

Non – named rate

Non-named rate is a ratio of non-named mailboxes that locate on building entrance. And such non-named mailbox can categorize two types. One is the case that there are no people who use those units. And other is the case that there are used by the contractants but they don't named on their nameplate because of security. But, it is already fully-clarified that latter case is the large part from questionnaire to the managers of the buildings. So, in this paper, assume all case is the latter. When define number of whole units as "W", and number of units that don't exist name on the nameplate of the mailboxes as "b". Non-named rate is presented "b / W".

3.2 Investigation method of usage in the building

Survey

In this research, authors collect activity data of the units from the name on the mailboxes in the building. And collect such data from three areas in Tokyo – Shibuya, Azabu-juban and Kasa. These areas have different histories, size of city block. The fields of survey is nearby the railway station of these areas, and list up other characteristics (distribution character of the building type, use district etc.) on the Table 1. Also, do this survey to apartment buildings and buildings that can't recognize its original usage from façade. And this survey conducted between August, 2010 and July, 2011.

- Shibuya

Shibuya is the one of most bustling area in Tokyo. But Shibuya has also residential area. There are commerce buildings very near of the station, and high-rise buildings also exist. And number of detached houses and low-rise buildings is increase with increasing distance from Shibuya station. And this area has developed from Meiji period (1880's). So old and new buildings are mixing. 104 buildings that locate on between Shibuya station and Kyu-yamate dori Avenue are chosen.

- Azabu-juban

Azabu-juban locates on Minato ward where is the center of Tokyo metropolitan area. This area has developed as city for merchants from Edo period (16th century). And Roppongi or Ebisu where are famous area to the foreigners are near from this area. As consequence of this history, blocks of this area are divide smaller than other area and various ages and usages of buildings are mixing. 272 building that locate on

south-west side of Azabu-juban station where gathers many residential buildings or office buildings are chosen.

- Kasai

Kasai locates on 15 minutes away from Tokyo station and there is new commuter twon. There are many commercial buildings near the station, but there are almost residential buildings with increasing distance. This area's characteristics is there has been farmland since urbanize plan started about 40 years ago. So blocks are larger than other area. And because of this, building area is also large and there are many building has over 100 units. 318 building that locate on between Kasai station and Nishi-kasai station and along the main streets are chosen.

Counting past activities from ZENRIN bekki data

In this research, it is very important to analyze usages inside of the buildings of the past. So authors collect such past data. By using ZENRIN bekki data that is on the appendix of the ZENRIN map, we can collect decennial data from units' name, and that data is almost same to our survey's data because that data also has gathered from mailboxes in the buildings or questionnaire to the people who live. But this data exist only specific buildings. So there are some buildings that can't collect usages of the buildings. We use 1990 and 2000 data.

	Shibuya	Azabu-Juban	Kasai
number of surveyed buildings	104	272	318
main building type	commercial building apartment building	commercial building apartment building	large apartment building commercial only building
use district	commercial district, category 2 residential district, category 2 low-rise exclusive residential district	commercial district, neighborhood commercial district	commercial district, neighborhood commercial district, quasi industrial district, category 1 residential district
history	from Meiji period	from Edo period	from past 40 years
land price[2)]	4.88 million yen / tsubo[(3)]	4.11 million yen / tsubo	1.26millon yen / tsubo

Table 1: characteristics of areas and other profile

4 TWO DIMENSIONAL ANALYSIS OF MIXTURE OF ACTIVITIES

We draw Mixed rate and Non-named rate of each areas by using GIS (Geographic Information System) and analyze these distribution tendency. The maps of result show on the Table 2.

4.1 Shibuya

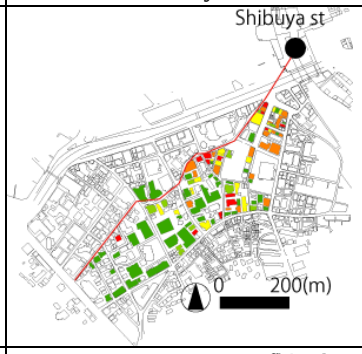
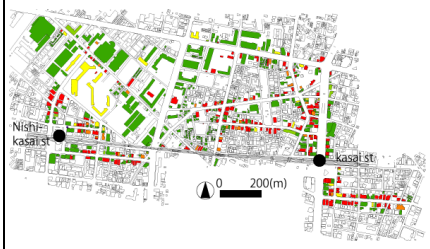
Character of Shibuya is that Mixed rate is gradually decrease with distance from the station. And by contrast, Non-named rate gradually increase. Use district gives great effect to this trend. There is commercial district nearby the station and use district changes to category 2 low-rise exclusive residential district around 300m away from the station. And these districts affect to Mixed rate and Non-named rate.

4.2 Azabu-Juban

Character of Azabu-juban is that two indicators spread widely in the area. This is also strong effect of use district. Commercial district is the use district. However this area has developed also for merchant, so there are many demands for living and for business. By consequence of this, Azabu-juban has this characteristic.

4.3 Kasai

Character of Kasai is that there are a lot of high Non-named rate buildings. In addition, a lot of buildings have over 80 % Non-named rate. However, from aspect of Mixed rate, Kasai's buildings indicate low value and this result shows that activities are distribute correctly in this area.

	Shibuya	Azabu-Juban	Kasai
Mixed rate			
Non-named rate			

0.000 - 0.200 0.201 - 0.400 0.401 - 0.600 0.601 - 0.800 0.801 - 1.000

Table 2: result of each indicator in 2010 of each area

5 THREE DIMENSIONAL ANALYSIS OF MIXTURE OF ACTIVITIES

The distribution characteristics of each area are written in section 3. And in this section, we choice one street from each area which has characters of distribution and connects to station directly, and then, draw urban section of these streets. Then, by using data from survey and ZENRIN bekki data, we color-code each unit of 1990, 2000 and 2010. The chosen streets are the red lines on the Table 2. And urban sections of these streets are shown figure 1, 2 and 3. As a result of color-code from type of business, almost retailing stores or restaurants, those colored red or orange, locate on the lower floor. And other industries don't have relation with number of floor.

5.1 Shibuya

Character of this area is that, same to two dimensional analysis, commercial of office activities inside of the building is decrease. And this character has not changed 20 years. In building No. B - 13 in 2010 case (in 2000: No. B – 12, in 1990: No. B - 12), there are almost used for residence in 20 years ago but different activities from the original usage gradually increase and there is most units are used for office now. And farther than 500m from station, there are mostly low-rise detached houses.

5.2 Azabu-Juban

Case of Azabu-juban, distance from station doesn't have relation with mixture of activities. During this 20 years, mode of mixture has not changed in this area and activities has mixed at random in almost all buildings.

5.3 Kasai

Case of Kasai, number of non-named units increases sharply 2000 to 2010. Look at building No. B – 7 (in 2000: No. B – 7, in 1990: No. B - 7) , some units had changed to non-named 1990 to 2000, but during 2000 to 2010 almost all units have changed to non-named.

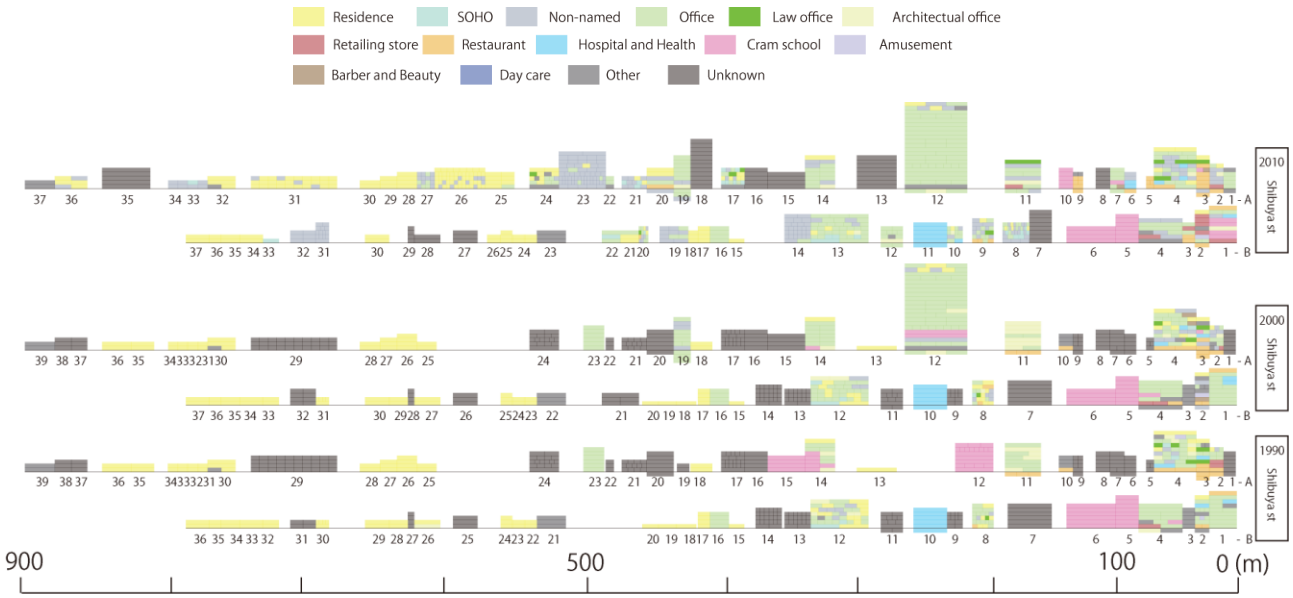
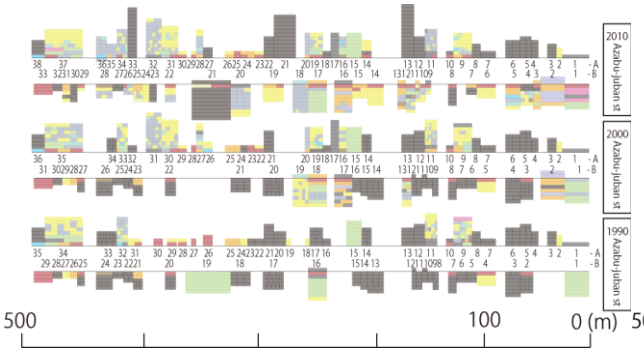


Figure 1: Urban section of Shibuya



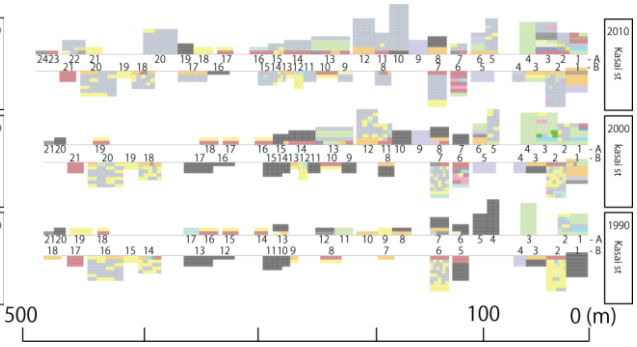


Figure 2:Urban section of Azabu-juban. Figure 3: Urban section of Kasai.

6 CONCLUSION

Through two and three dimensional analysis of mixtures of activities inside of the buildings, authors clarify some characters.

6.1 Two dimensional mixture

- Use district is affecting to the distribution tendencies every areas. Mixed rate is high in commercial district and Non-named rate is large value in residential district.

- In Shibuya, Non-named rate goes up with increasing distance from station.

- In Azabu-juban each indicators distributes at random regardless position or building type of the buildings.

- In Kasai, activities of units are separated depending on the building types or the original usages of the units and Mixed rate is indicated small value. But Non-named rate is very high and many residential buildings are over 80 %.

6.2 Three dimensional mixture

- In this investigation, we clarify that distribution or its change tendency is not depending on floor number excluding retailing stores or restaurant.

- In Shibuya case, there are many office units that have changed from residential usage. And the majority of building type becomes low-rise detached house more than 500m from the station.

- In Azabu-juban, it is same that mixture distribution is at random through three years, but usages change intensely in the building.

- In Kasai, during 2000 and 2010, Non-named units slightly increase no relation to floor number.

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Note

(1) Survey term covers to 2011, however, relating to analysis is do every 10 years in this paper, so standardize all data "2010" for descriptive purpose.

(2) This land price is average price of land that away from the each station between 5 and 10 minutes.

(3) Tsubo is a Japanese traditional unit that is used when measure area. 1 tsubo is equal to around 3.3 m2.

TURaS: Transitioning to Urban Resilience and Sustainability

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1 ABSTRACT

The TURaS Project brings together neighbourhood communities, researchers, local authority and urban councils as well as small or medium enterprises (SMEs), in order to research, develop, demonstrate and disseminate transition strategies and scenarios to enable European cities and their rural interfaces to build vitally-needed resilience in the face of significant sustainability challenges. This paper is an illustration of how the TURaS Project will carry out research in collaboration with communities, agencies and institutions within selected cities, with the target of moving towards a reduction of their ecological footprint through proposing new visions, feasible strategies, spatial scenarios and guidance tools to help cities address these challenges. This paper illustrates how the impact of these new approaches will be measured across participating cities and a final set of strategies and tools will be developed for demonstration, dissemination and exploitation in other European cities. Community representatives and SMEs are integral to all aspects of the project, and specific measures have been put in place to ensure the optimal economic impact of the project is achieved. While there are numerous studies into resilience and urbanisation, little is known of the impact that participation by different kinds of urban stakeholders may have on communities and environments, or the effects that greener environments may have on communities and human health. This paper will conclude by showing how TURaS will explore these themes, leading to a stronger understanding of how to mainstream sustainability in urban areas.

2 INTRODUCTION

The extent and financial cost of global biodiversity loss related to unprecedented urban growth is only just being realised. From pollinator declines to the loss of coastal protection services, anthropogenic-driven loss of ecosystem services have impacted communities, governments and industry worldwide. Built upon old models of high density living and economic development, Europe's cities are beginning to encounter detrimental environmental impacts. Responding to these complex challenges requires a long-term and integrated approach to city planning and development, involving significant participation by all stakeholders towards a common goal. The TURaS Project has a design methodology that partners different institutions in research couplets (figure 1) within a resilience focused paradigm.

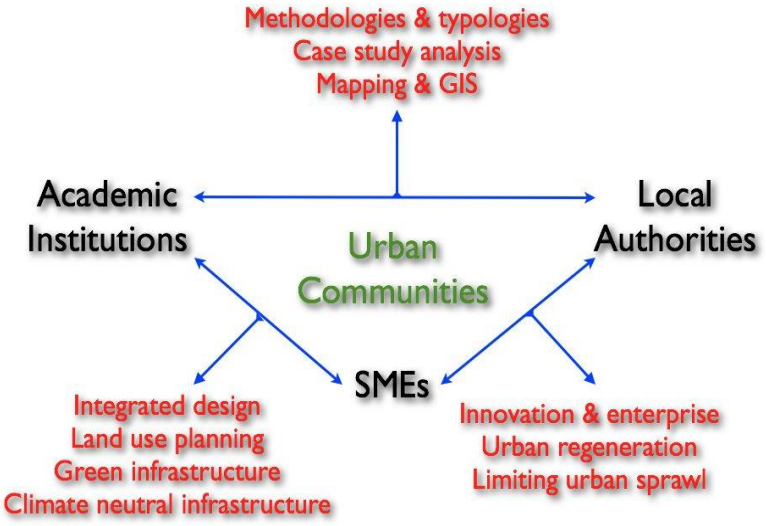

Fig. 1: Research typology of the TURaS twinning concept illustrating three expertise couplets and their respective areas of speciality (red). Central to the concept are urban communities in the form of local neighbourhoods or districts.

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2.1 Resilience

Resilience thinking derives from studies of ecosystem dynamics and conservation practice. It is an explanation of how complex ecological systems change and persist over time particularly with their interaction with human interference especially in relation to how systems recover from human-oriented environmental change. Resilience can have different meanings. It can be used to describe a response to environmental disturbance or how habitats and ecosystems can re-organise spontaneously after a disturbance. It can mean the capacity for adaptation within a system and, in relation to human systems, the ability to learn and adapt. Thus, resilience theory is at the root of what are known as social-ecological systems. These are the complex interactions between humans and ecosystems and have particular poignancy in urban settings. The notion of urban resilience is a relatively new concept and is still hotly debated. However, the TURaS Project has taken the ideas of resilience and aims to see how these ideas can be practically adopted.

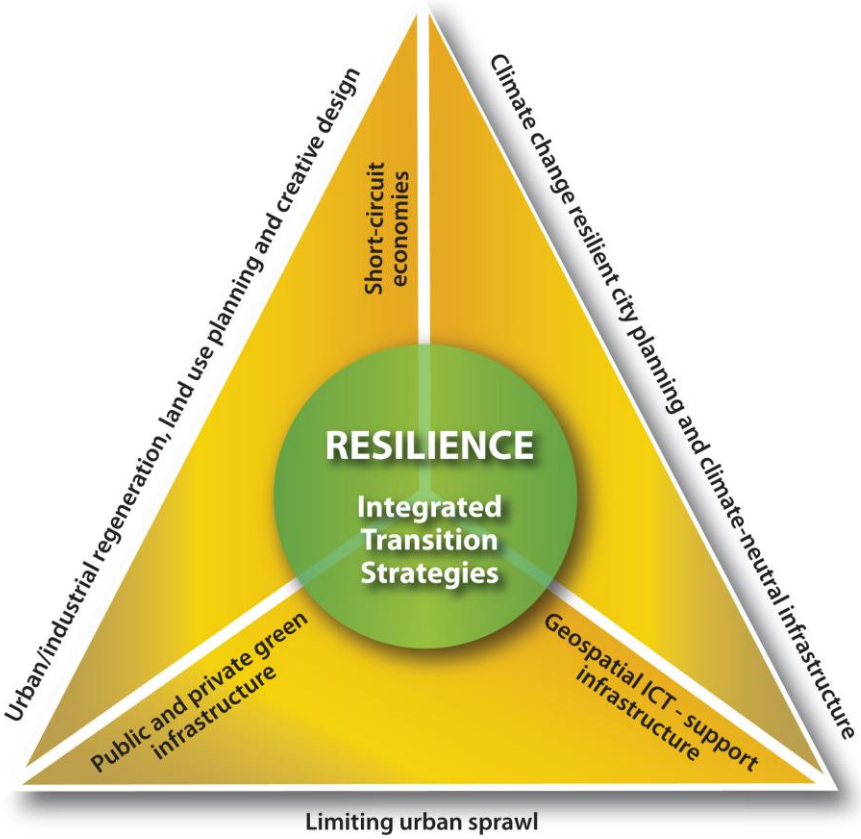

Fig. 2. Typology illustrating the six principal RTD work packages of the TURaS Project. All six are interconnected and inter-reliant with each other, and the ultimate focus is to establish mechanisms for building resilience into urban planning and design through integrated transition strategies.

2.2 Methodology

The cities represented in TURaS are representative of typical European regions in terms of size, geographical location and sustainability challenges. They include 6 European capital cities: Brussels, Dublin, London, Rome, Sofia, Ljubljana as well as other cities representing regional capitals and smaller cities including Nottingham, Seville, Rotterdam, Stuttgart, and Aalborg (Denmark). The TURaS Project will begin by developing a new infrastructure (currently under way) that will enable inventory, visualisation and analysis of a variety of aspects of urban resilience and sustainability. Provision of information infrastructures to support sustainable development and planning is still in its infancy. In the first phase of TURaS a new framework and process will be demonstrated for developing and using a geospatial information and communication technology (ICT) infrastructure at sub-city / neighbourhood scale, featuring relevant contextual as well as project-specific data. The most important and innovative element of the infrastructure will be its availability to local organisations and communities as a communication and project management tool. Using this infrastructure developed in the initial phase of the project, data will be collected and presented in a common format for a selected case study neighbourhood in each of the participating cities. In the next phase of the project, this case study data will be used to develop and test new approaches to build

increased urban resilience and reduce the urban ecological footprint of each participating city. Figure 2 illustrates the connectivity of the different approaches to building urban resilience, which will be developed in the TURaS Project and how these interact together to build urban resilience and reduce ecological footprints. The final phase of the TURaS Project involves the demonstration, dissemination and exploitation of results in other European cities with the ultimate target of motivating policy-makers, planners and managers at local, regional, national and international levels. Over the five year duration of the project, the feasibility of these new approaches will be tested in selected case study neighbourhoods and new measures to enable adaptive governance, collaborative decision-making, and behavioural change towards resilient and sustainable European cities will be tested.

3 DISCUSSION

Resilience is a contested and debated issue. For some it can mean a 'bouncing back' or recovery from disaster or serious impact to a status quo situation, where little has changed in planning and designing in the urban arena and a business-as-usual stance is taken. For others, resilience can mean a 'bouncing forward' to an awareness and acceptance of dangers and threats, and a thus there is a desire to change or modify the attitudes of urban communities and learn from past mistakes. This idea of resilience sees change as gradual and inevitable. Still others see resilience as a transformation act; a transition to a new urban development ideology and a mainstreaming of the original sustainabile development ideals. This sees resilience as a motivator for societal change. The TURaS project seeks to explore the latter, by developing strategies using differing disciplinary approaches. By using this synergistic approach, the TURaS Project may yield practical information that communities, designers, planners and policy-makers all seek in the cities of a modern Europe.

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Urban Nomads: How to Remix the Demography of the City

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1 ABSTRACT

Cities, nowadays, are scene of a fierce competition among citizens for resources. And as usual the rich and powerful have better access to jobs, amenities and facilities, even to natural features like climate zones. This sort of inequality has been accompanied with urbanism for such a long time that even it has been manifested in settlement patterns of the city. Rich are usually living in the north, while south us home to poor and center is occupied with business and industry and agriculture roam the perimeter.

It seems that we are bounded to these fixed patterns, and so does the efficiency of our cities. But for thousand years, human race had a more flexible way of living: Nomadism. The nomads travelled in order to have better access to resources, be it jobs, food or better climate. They invented kinds of mobile shelter and adapted a very flexible life style. They also developed a system of prediction and planning, upon the result of which they each time chose the destination, the trail and the how-to of their seasonal immigrations.

Nowadays, metropolitan areas has become so vast that they contain several distinctive zones of settlement, work and even various micro-climates. This variety offers a lot of dynamics yet we are stuck to our fixed homes, workplaces and lifestyles. And in this manner we impose a lot of costs to our cities and to ourselves. What if we could live like an urban nomad, a wanderer inside the city walls?

In this paper I propose inner city migration and Nomadism as way to cope with serious lack of resources in our urban areas. I'll try to study both Bedouins and modern urban nomads, and assessing the advantages and obstacles of moving toward nomadic lifestyle, whether remixing the demography of our cities, and not their physical features, could improve our living conditions? And also I'll try to propose an experimental framework for accommodating this lifestyle in Tehran, a megalopolis with around 9 millions population.

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Urbane Zentren für alle Menschen nutzbar machen

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1 ABSTRACT

Zur Urbanität gehört die Teilhabe aller Bevölkerungsgruppen an den Aktivitäten im öffentlichen Raum der Städte und Gemeinden. Noch finden sich in den Zentren für Versorgung und Freizeit und auf den Wegen zu ihnen zahlreiche Barrieren, die alten und behinderten Menschen den Zugang erschweren bzw. unmöglich machen.

Der Umbau zu barrierefreien Stadträumen hat begonnen. Er kann in Deutschland und in vielen anderen Staaten auf ein fast komplettes Paket von Gesetzen und Normen zum barrierefreien Bauen zurückgreifen. Allerdings wird es nicht möglich sein, diesen Umbau innerhalb weniger Jahre zu vollenden.

Es werden räumliche und zeitliche Strategien benötigt, die Bau- und Verkehrsmaßnahmen mit dem Einsatz von Informationstechnologien verknüpfen. Aus ersten Ansätzen in Städten lassen sich Anforderungen an das Instrumentarium für solche kommunalen Strategien ableiten.

2 URBANE ZENTREN FÜR ALLE MENSCHEN NUTZBAR MACHEN

2.1 Erklärung von Barzelona "Die Stadt und die Behinderten" von 1995

Nachdem 1995 im Rahmen der Europäischen Konferenz „Die Stadt und die Behinderten" teilnehmende Kommunen sich auf Ziele zur Teilhabe behinderter Menschen am urbanen Leben verständigten, traten in Europa viele Städte der „Erklärung von Barzelona" bei. In Deutschland sind es mittlerweile rund 50 Kommunen, die zur Umsetzung der „Erklärung von Barzelona" in Abstimmung mit ihren Behindertenbeiräten bzw. Behindertenbeauftragten Handlungskonzepte für eine barrierefreie Stadt aufstellen und fortschreiben.

Aufgrund der ausgeprägten wechselseitigen Abhängigkeiten der verschiedenen Maßnahmen der Handlungskonzepte, erweist es sich als notwendig, das kommunale Handeln stärker strategisch auszurichten. Dabei nehmen die urbanen Zentren eine Schlüsselstellung ein.

2.2 Zur Urbanität gehört die Teilhabe aller Bevölkerungsgruppen

Stadträume, in denen urbanes Leben stattfindet, sind Plätze, Boulevards und innerstädtische Parks. Platz meint eine Freifläche, um die sich öffentliche Einrichtungen, Geschäfte und Wohnquartiere gruppieren. Diese Freifläche eignet sich für Pausen, für das Zusammensitzen, zum Miteinander Spielen. Der Boulevard ist mehr als eine Straße. Er verfügt zusätzlich über Freiflächen in Anlehnung an Plätze, oft mit schattenspendenden Bäumen ausgestattet. Die Geschäfte und Gastronomie entlang des Boulevards zeichnen sich durch ein besonders attraktives Angebot aus. Städte, in denen es keinen Boulevard gibt, haben vielleicht eine Fußgängerzone mit vergleichbaren Attributen. Innerstädtische Parks zeichnen sich besonders dann durch urbanen Charakter aus, wenn die räumliche Beziehung zwischen öffentlichem Stadtraum und Grünanlage eng ist und in dem Park Räume bestehen, in denen ein Aufenthalt mit Kommunikation und öffentlichen Aktivitäten gepflegt wird: schachspielende ältere Menschen, kletternde Kinder, skatende Jugendliche, Gruppen, die Boule spielen und Menschen, die diese Aktivitäten von Sitzbänken aus betrachten.

Wenn man sich in diesen Stadträumen bewegt, fühlt man sich dem gesellschaftlichen Leben zugehörig. Wie wichtig diese immer wiederkehrende Erfahrung der Zugehörigkeit ist, wird einem oft erst bewusst, wenn man z. B. aus Krankheitsgründen über längere Zeit den öffentlichen Stadtraum nicht aufsuchen kann.

In den urbanen Stadträumen trifft man die Stadtgesellschaft in ihrer ganzen Breite an. Als Besucher einer fremden Stadt erkennt man hier zum Beispiel, ob es sich eher um eine junge oder ältere Stadtbevölkerung handelt. In einer sehr großen Stadt unterscheidet sich der Eindruck nach den Quartieren mit ihrer jeweiligen soziokulturellen Bevölkerungszusammensetzung.

Die Vielfalt und Gemischtheit der sich im öffentlichen Raum aufhaltenden Menschen macht einen großen Teil von dem aus, was wir in der europäischen Stadt unter dem Begriff Urbanität verstehen. Voraussetzung für diese Vielfalt ist auch Toleranz aber mehr noch Akzeptanz von Andersartigen sowie die gegenseitige Rücksichtnahme.

Für die Gestaltung des öffentlichen Raumes gab es von Anbeginn der Stadtentwicklung Bauvorschriften zur Gebrauchstauglichkeit dieses Raumes für verschiedene Nutzergruppen. Als Beispiel sei die Stadt Potsdam in der Nähe von Berlin genannt. Schon im 19. Jahrhundert war geregelt, dass zwischen dem stabilen tragfähigen Pflaster für Pferdewagen in den Straßen für Fußgänger glatt gepflasterte Laufspuren anzulegen sind.

2.3 Zahlreiche Barrieren erschweren den Zugang

Behinderte Menschen waren bis zu den 70er Jahren des 20. Jahrhunderts vom öffentlichen Leben stark ausgeschlossen. Alte Menschen machten nur einen geringen Anteil an der Bevölkerung aus und lebten relativ isoliert in den Familien bzw. in Heimen. Dies bildet den Hintergrund, dass die gebaute Umwelt noch bis heute in weiten Bereichen so gestaltet ist, dass alten und behinderten Menschen der Zugang erschwert bzw. unmöglich ist.

Noch in den 80er und 90er Jahren des 20. Jahrhunderts wurden im Rahmen von Wohnumfeldverbesserungs- und Stadterneuerungsmaßnahmen viele Straßen und Plätze relativ uneben gepflastert und mit abgestuften Ebenen versehen. Dadurch sind sie heute für Menschen im Rollstuhl oder mit Rollator schwer zu meistern.

Vorhandene Strukturen in den Städten wurden durchbrochen, so dass die Orientierung schwieriger wurde. Der Autoverkehr dominiert in den Stadträumen und fordert von den Fußgängern höchste Aufmerksamkeit. Er stellt für blinde und stark sehbehinderte sowie für alte Menschen ein besonders hohes Risiko dar, weil die Gefahr besteht, dass sie unbemerkt in den Fahrbahnbereich geraten. Zur Abgrenzung zwischen Fahrbahn und Gehweg bestehen hohe Borde, die von Menschen im Rollstuhl und von gehbehinderten Menschen nur mit Erschwernis überwunden werden.

Auch wenn ein modernes Einkaufszentrum oder eine neue Fußgängerzone barrierefrei gestaltet sind, fehlen häufig noch barrierefreie Wegeketten und ÖPNV-Reiseketten, um von allen Wohnquartieren diese zentralen Anlagen ohne Barrieren zu erreichen.

2.4 Der Umbau zu barrierefreien Stadträumen hat begonnen

Die Barrierefreiheit als Planungsprinzip stellt eine entscheidende Innovation dar, da es ihr gelingt, die Bedürfnisse von Menschen mit ganz unterschiedlichen Einschränkungen in ihren Bewegungsmöglichkeiten (Motorik) bzw. in ihrer Wahrnehmung (Sensorik) in eine gemeinsame technische und gestalterische Leitlinie zusammenzuführen. Dieses Planungsprinzip wurde bzw. wird für alle wesentlichen baulich gestalteten Lebensräume in Normen konkretisiert, also für

- öffentlich zugängliche Gebäude,
- öffentliche Verkehrs- und Freiräume,
- Wohnungen und Wohngebäude,
- Arbeitsstätten.

Hier einige sinngemäße Auszüge aus der aktuellen Normung barrierefreier Gebäude, baulicher Anlagen sowie Straßen, Wege, Plätze und Grünanlagen in Deutschland (DIN-Normen des Deutschen Instituts für Normung, Berlin). Vergleichbare Normen gibt es auch in Österreich, in der Schweiz und vielen anderen europäischen Staaten:

<u>Gehwege/Flächen für Fußgänger</u>

Die Fläche von barrierefreien Gehwegen muss nach dem Zwei-Sinne-Prinzip eindeutig erkennbar sein, d. h. visuell durch optischen Kontrast als auch taktil durch das Ertasten entweder entlang einer Kante oder einer gut unterscheidbaren Bodenstruktur. Je nach Funktion des Gehweges sind Mindestbreiten zu beachten, z. B. eine Mindestbreite von 150 cm bei einem Gehweg neben einer Straße. Der Bodenbelag muss erschütterungsarm, rutschfest und bei jeder Witterung sicher begehbar und mit dem Rollstuhl befahrbar sein. An Hindernissen soll ein optisch und taktil im Bodenbelag erkennbarer Leistreifen rechtzeitig mit ausreichendem Abstand herumführen. Ein zur Fahrbahn vorhandener Bord ist an Querungsstellen sowie neben barrierefreien PKW-Parkplätzen auf genau 3 cm abzusenken, damit er mit dem Rollstuhl überfahren und von einem blinden Menschen ertastet werden kann. Auch an die Längs- bzw. Querneigung der Wegefläche werden Anforderungen gestellt.

Eingangsbereiche von öffentlich zugänglichen Gebäuden

Öffentlich zugängliche Gebäude sind nicht nur Schulen und Rathäuser, also öffentliche Gebäude, sondern auch Gebäude, in denen sich Nutzungen mit öffentlichem Charakter befinden, z. B. Geschäfte, Gastronomie und Gesundheitseinrichtungen wie Arzt- und Therapiepraxen. Die Eingänge zu diesen Gebäuden bzw. Einrichtungen sollen gut auffindbar sein, visuell durch optischen Kontrast sowie taktil durch einen zum Eingang führenden Streifen im Bodenbelag. Eingangsbereiche zu öffentlich zugänglichen Gebäuden müssen stufenfrei und schwellenlos sein. Rampen und Aufzüge machen eventuell vorhandene Höhenunterschiede barrierefrei überwindbar. In einem solchen Eingangsbereich soll man sich sicher und geschützt aufhalten, sich orientieren und sich anmelden können. Dafür benötigt man Witterungsschutz, Beleuchtung sowie gut erkennbare Informationstafeln bzw. Klingel- und Sprechanlagen auf einer mittleren Bedienhöhe von 85 cm über Oberkante Fußboden. Vor und hinter den Türen wird eine ausreichende Bewegungs- und Rangierfläche (150 x 150 cm) benötigt. Die Türen müssen ohne großen Kraftaufwand betätigt werden können. Großflächige Glastüren bedürfen einer Sicherheitsmarkierung, ebenso eventuell vorhandene Stufen im Eingangsbereich.

2.5 Strategien für den barrierefreien Stadtumbau mit Nutzung von Geoinformationssystemen

Gesetze und Normen greifen bei „sowieso“ stattfindenden Baumaßnahmen und führen häufig nur zu isolierten baulichen Veränderungen. So kann z. B. der Umbau eines öffentlichen Gebäudes die Normen des barrierefreien Bauens beachten, wenn aber die Bushaltestelle in der Nähe des Gebäudes nicht barrierefrei ist, stellt sich die Erreichbarkeit für behinderte Menschen noch als eingeschränkt dar.

Immer mehr Städte verfolgen Konzepte einer kontinuierlichen Umsetzung von Barrierefreiheit:

Für kommunale Liegenschaftsbereiche werden – häufig angeregt von den Behindertenbeiräten bzw. Behindertenbeauftragten – Programme und Richtlinien aufgestellt. Manche Städte legen z. B. in einer Gebäuderichtlinie Anforderungen an die Barrierefreiheit bei Sanierungs- und Neubaumaßnahmen in ihrem eigenen Gebäudebestand fest. Andere beschließen Programme zur barrierefreien Umgestaltung von städtischen Grünanlagen und Parks. Programme enthalten Entscheidungen über Orte und Maßnahmen und damit auch das Setzen von sachlich begründeten Prioritäten.

Neben den Kommunen stellen auch die Unternehmen des öffentlichen Nahverkehrs sowie Straßenbauverwaltungen und -betriebe Leitlinien und Programme zur Barrierefreiheit auf. In vielen Städten fahren Niederflurstraßenbahnen und Niederflurbusse, die den Fahrgästen ein fast ebenes Ein- und Aussteigen ermöglichen.

Das seit 2002 in Deutschland geltende Bundesbehindertengleichstellungsgesetz sieht als weiteres Instrument Zielvereinbarungen von Mitgliedsorganisationen des Deutschen Behindertenrates mit Unternehmen, Vereinen oder öffentlichen Körperschaften vor, die in einem Zielvereinbarungsregister eingetragen werden. Eine besonders erfolgreiche Zielvereinbarung stellt das Programm der Deutschen Bahn dar. Barrierefrei umgebaut werden Bahnhöfe ab 1.000 Reisenden pro Tag. Die neu bestellten Fahrzeuge müssen barrierefrei gestaltet sein, die Reiseketten werden optimiert, eine Mobilitätszentrale bietet behinderten Fahrgästen eine Vielzahl von Dienstleistungen. Mittels Zielvereinbarungen lassen sich komplexere Verbesserungen ganzer Lebensräume erreichen, indem bauliche, technische und organisatorische Maßnahmen kombiniert werden.

Eine vollständige barrierefreie Umgestaltung der Städte ist auf absehbare Zeit nicht realisierbar. Die Stadt Zürich hat in ihrer Mobilitätsstrategie, Teilstrategie Behinderte, Betagte und Kinder (2003) ermittelt, dass die Kosten allein für eine konsequente Bordsteinabsenkung bei allen Fussgängerquerungen etwa 10 bis 20 Millionen Franken kosten würde.

Deshalb gilt es, nach Wegen zu suchen, die mit vertretbarem Aufwand eine barrierefreie Nutzbarkeit prioritärer Stadträume ermöglichen.

- Herstellen von Erreichbarkeiten wichtiger Zielpunkte wie öffentlichen Einrichtungen durch barrierefreie Wegeketten. Es muss sich nicht um den kürzesten und schnellsten Weg handeln, aber die barrierefreie Wegekette muss planbar und erkennbar sein.
- Eine Kategorie von Zielpunkten barrierefreier Wegeketten sollten Quartierszentren/Quartiersplätze darstellen, um die sich Wohnquartiere und Altenwohnprojekte gruppieren.
- Ausrichtung der Wegeketten am Hauptstraßennetz und an einer verständlichen Stadtstruktur.

Bei dieser Aufgabe werden Geoinformationssysteme einen wesentlichen Beitrag leisten.

Im Geografie-Fachbereich der Universität Augsburg wird ein Stadtplan für barrierefreie Mobilität entwickelt. Es handelt sich um einen wachsenden Plan, der seine Informationen von Bewohnern und Nutzern des Stadtraums erhält. Die Informationen werden in einem Geoinformationssystem festgehalten und sind über das Internet abrufbar. Die Erfassung der Daten ist in der Aufbauphase sehr aufwändig. Deshalb liegt der Plan erst für einen Teilbereich der Stadt Augsburg vor. Auf jeden Fall steckt in diesem Projekt ein großes Potential für eine verbesserte Mobilität behinderter Menschen. Mit Hilfe der Stadtplaninformationen können behinderte Menschen im Vorfeld ihre Wege planen, Arztpraxen, Geschäfte, Restaurants, Kultureinrichtungen nach deren barrierefreier Zugänglichkeit und Nutzbarkeit aussuchen.

Eine zusätzliche ebenfalls weitreichende Funktion eines solchen Stadtplans ist sein Informationsgehalt für die Planung. Der Stadtplan lässt eine Visualisierung von barrierefreien Wegeketten ebenso zu wie das Erkennen von Lücken. Auch der Grad der Versorgung mit barrierefrei gestalteten Infrastruktur- und Dienstleistungseinrichtungen könnte bei entsprechender Informationsdichte des Plans evaluierbar werden. Geplante Maßnahmen können hinsichtlich ihres Beitrages zu einem barrierefreien Stadtumbau bewertet und verglichen werden.

Eine weitere Chance bietet der Einsatz von Geoinformationssystemen für die vergleichende Bewertung von Städten und Stadtquartieren. Barrierefreiheit stellt ein Kriterium für den Grad der Nachhaltigkeit dieser Lebensräume dar. Darin, dass es in Zukunft möglich sein wird, die barrierefreie Qualität von städtischen Gebieten zu messen, liegt eine große Chance, dass behinderte Menschen durch systematischen und strategischen Stadtumbau am urbanen Leben gleichberechtigt teilhaben.

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Utility Tunnels – Proven Sustainability Above and Below Ground

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1 ABSTRACT

Utility tunnels have been elements of urban supply systems for almost two centuries now. However, their use and implementation is still less determined by urban planning and urban needs – and more by the qualities, preconceptions and determination of the urban managers in question. During the 1990s in the course of the German reunification process the fluidity of the urban management situation created opportunities for new approaches to this old technology.

In conjunction with landmark urban development projects on the path to urben sustainability, utility tunnels were used as one of the many instruments and approaches to achieve sustainable developments. Now – almost 20 years later we can look at these developments and the utility tunnels and have a first discussion on their sustainability success.

At present a new relevance developes in regard of this technology. The current urban development schemes in China, India and many other places of the world are of such scale, that questions of doing it right while doing it timely are of prime significance. At the same time, we are facing a situation, in which – within the coming 40 years – the whole energy supply and distribution system of the world – including China and India – will need to be 100% restructured and reworked. We need a whole new quality of system flexibility and reaction capacity in urban engineering to achieve the path to urban sustainability.

Taking proven experience in sustainable urban development and engineering, what are and will be the taskings and quality expectations to urban design and development in the coming years and decades? System changes will require mental, philosophical and educational changes in human minds – also those of the developers, planners, architects, and engineers. So what do we need to learn, and how do we teach it fast and to many of us in a short time?

2 HOW DID WE COME BY THE IDEA TO BUILD UTILITY TUNNELS?

In the 1980s, when considering the known damages, especially in the community pipeline networks transporting water and sewage, in a context of soil & aquifer protection, the technical and engineer community in Germany began to think about how to design better controlable systems. Ideas developed, like absolutely straight line house connections, or double pipes with leak detection systems.

Hermann Laistner injected into this discussion a rectangular infrastructure culvert (utility tunnel), large enough to be easily walked in. From this utility tunnel property and building connections could be constructed in a controllable way, while the main pipes and cables would be inside mounted and accessible. In the early and mid 1980s, these were rather theoretical thought constructs.

2.1 Research Focus "Ecological Development Concepts"

Working within the experimental research on urban development, such ideas however, could be injected for further consideration and detailing of concept. In the state capital of rhineland-palatia, the City of Mainz , the city planning authority – thematically lead by Dipl.-Ing. Jürgen Hoffmann – had applied for, and had been awarded, a federal research demonstration project on the development of an ecological business and industrial park. Hermann Laistner and his company IfEU, having worked succesfully in this research field before, and bringing both an understanding of the research process and the practical every day experience of urban development and supply system engineering into such projects, were selected to be the lead expert researchers for and together with the various offices of the City of Mainz.

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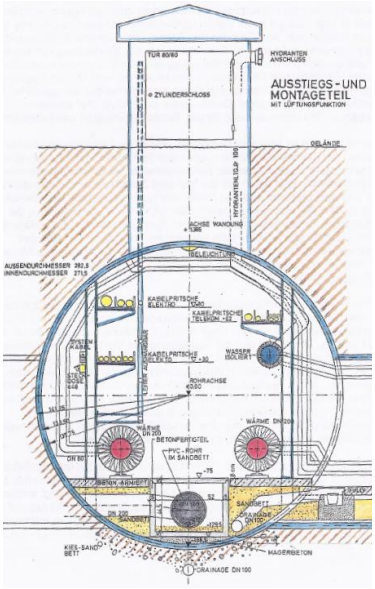

Fig. 1: Sustainable underground system development for urban development area = the utility tunnel picture excerpt from research final report[1] Abb. 17

The urban development tasking was started by an encompassing ecological evaluation study. It was intended to develop a purposfully structured occupation mixed area. A tram-way was to be a high quality public transport connection for the area. State roads were to be the vehicle access routes. In developing the key idea of orienting the developments along wide green corridors, with an explicite focus on empowering pedestrian traffic and their easy connection between public transport and work place. In this context the idea of an utility tunnel was first incorporated by us into a development project and injected into its discussion process.

2.2 The German Reunification

It was 1989 when we had these discussions and did the concept development of a utility tunnel for the City of Mainz. And then the German reunification came and all of a sudden totally new urban development taskings were to be tackled. Through our research we had, after the opening of East Germany, developed contacts to the "Bauakademie Leipzig", because they had written for the GDR (East Germany) the standards on utility tunnels – and nothing comparable was available within the West German standards.

At the time the main development tasking was to create business areas fast, to begin to satisfy the expectations of a better economic and supply situation after the long time of "managing dearth" during the final two decades of the socialist regime. Among the available development areas, in discussion and under review, were the huge refill areas of the lean-coal strip mines. After visiting such an area "Espenhain" next to Borna, we considered the special problems of the large differential ground settlements, that were to be expected in such an uneven industrial refill situation. The idea was to implement utility tunnels with a certain hull flexibility. So we came to look at the long proven corrugated steel culverts instead of the originally envisioned (traditional) concrete culverts. Requests on information regarding as yet undeveloped or unusual production elements of such steel culverts (e.g. bends, manholes, side-penetrations, e.g.) produced an intensive interest within one of the producers – the Austrian Voest-Alpine Krems Finaltechnik corporation.

In the meantime we were contracted to be the development planners and engineers for one specific such new business development in the small village of Wachau directly bordering on the City of Leipzig to the south. The situation there was driven by the need to inject at least a minimum of mandated urban planning into a situation already dominated by a large shopping center construction investor in the north-east corner of the area. Time was of the essence. All over the larger area and many parts of the eastern states of Germany, communities used their new found freedom of communal decission making and planning. Whereever one looked there were growing large billboards advertising business developments in the green fields next to the

[1] For more information and the literature references to this research project: "Modellvorhaben Mainz – Ökologischer Wirtschaftspark Mainz-Süd" please see the paper "Sustainable Urban Development in Germany in the 1990s – a situation report after 20 years" in these proceedings by the same authors

settlements. It was clear, that for the just developing small business and industrial structure in the changing society, there would be very shortly an over-availability of zoned business areas.

We used the many experiences gained in the 1970s and 1980s in urban development projects, development research, and a practised unterstanding of the community political process involved, to help Wachau to a speedy process and solution for the community development. We especially used all the readily developed ideas from the Mainz project. The overall situations were comparable. Close proximity to a city, just outside the city development, with tram-way access to the area, and outside but bounding state road connections.

When coming to the design and then the tendering process of the development construction works for the area, we had presented to the by then just founded PPP business park development company, the concept of using utility tunnels. As this was a known technology, used in most large urban developments of the GDR, this was a readily understood and agreed to concept. However, we did open up the tender to enable bidder proposals for the use of other tunnel materials then the well known concrete culverts. We defined the necessary cross sections and the intended inside installations, but left the material choice to the bidders. At the time, the steel culvert came in with the lowest price – and was selected. In the perpetual see-saw of cement and steel prices worldwide – steel was cheaper at the time.

2.3 The Learning Curve – Execution Problems

Even though the idea of the utility tunnel was nothing unusual in eastern Germany, there was significant concern, that the transition staff of West-German public servants (Wessies), which had been transfered into the East German civil authorities, would project their own rather limited expereince in this field, and reinstate all the problems that had limited the use of utility tunnels to universities, airports and private industry in the West. Individualized and legally protected compentences for supply and utility companies, public suppliers, and a resulting highly differentiated authority structure – with a seperate office for everything – had in the West effectively stifled most atempts to create combined public systems. And the utility tunnel very definitely is a combined services system.

So one of our first steps was to ask the TÜV Rheinland – Divission for Nuclear and Chemical Plants for a safety analysis of the utility tunnel we were designing. The result came in as expected – very positive, and disqualifying all the fake arguments against utility tunnels – while at the same time enhancing our understanding on the special considerations that needed to be given to this technology.

The easy part of engineering and planning work was to incorporate the utility tunnel into the community area zoning plan (Bebauungsplan) and have it politically decided upon by the council. It was a bit more difficult, and a learning process, to design and construct our first utility tunnel. For example – putting the utility tunnel system on a sloped grading to accomodate the function of the integrated gravity sewer and its connection to the Leipzig sewage system – was easy. Then however, coordinating the utility tunnel slopes with the surface profiling of the development area, so that the open surface drainage ditches and their road crossing culverts could be kept consistently safely above the utility tunnels, already became more difficult. Being under time pressure to achieve early marketability of the area was very helpful in the decission making process on this and other issues. Solutions had to be found and compromises could be reached easier.

2.4 Government Subsidies & Initial Discoveries on Utility Tunnel Economics

The decisison to build the utility tunnel system was made easier by the situation of a special canon of federal subsedies and special conditions for the development of business areas in East Germany at the time. Normally e.g. sewers would not be subsedised, the utility tunnel however, as a combined system, could be subsidised with 30% of construction costs including systems at the time. This subsidy more than balanced the expected higher investment costs.

Then we discovered an unplaned economic effect. Steel culverts can be built with a progress of up to 25 m per day completed tunnel hull. And immediatly after – later with – the backfill the internal systems installation started. Due to the fast backfill and closing of the surface, the road construction could progress with only a few days delay behind the hull construction. A fundamental difference in development process exists to the buried pipe and cable system. There road construction usually is delayed by weeks or months to commence only after completion of most or all pipes and cables underground.

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Property in the development area was consequently almost immediatly markteable. And buildings were already going up while we were still equipping the utility tunnel with the systems. This created an immediate and unexpected market advantage. Hleped by the fast approval process of the urban zoning process, by the state authorities (Regierungspräsidium Leipzig), and the decoupling of above and underground construction development, this area was the only one in the larger area of souther East Germany, that was able to sell accessible plots already during the summer of 1991. By enabling the investors and enterpreneurs to enact their own developments earlier, their acceptance of some accompanying unusual conditions of the business park, such as mandatory permanent green areas on their business property, and membership in an operations cooperative for the upkeep of the business park area, were a much easier sell than expected.

2.5 So What?

Why have such "anecdotal" story telling in a reviewed paper? Isn't that what you're asking yourself right now as reader? Because it illustrates and highlights an important and very dissatisfying state of affaires in urban supply and engineering of utility systems as a whole – not only regarding utility tunnels.

We're worldwide hide bound and turf cracy when it comes to the fictional independence of our supply systems owners and operators, and our authority and decission perogatives.

Why? Very often for reasons driven by the legal system and its developmen history in our countries. Among other reasons however not for a small part also, because academic education is dropping the ball! We all learn or teach intensively the ins and outs of our technical systems, don't we. Yes we do – the electrical engineer for the cables, the mechanical engineer for pipes and plant installations and their operation, the civil engineer about how to construct these under and above ground, and the architect and urban planner how to shape cities, environments and buildings to human needs and functionalities.

- And that's the point – WE'RE STOVE-PIPING OURSELVES ! -

And we're happily projecting this mental self-limitation onto generation after generation of young academics. We've so much dropped the ball on academic interdisciplinary training and team functionality, that it needed the totally destabilized administrative situation of the first few years of German reunification, to re-inject a combined services system into the public sphere again. And when the administrative system stabilized again – that came to an early end again.

AND THAT'S THE STARTING POINT FOR UTILITY TUNNELS IN OUR REALITY!

3 UTILITY TUNNELS – WHERE THEY COME FROM – WHERE THEY'RE GOING

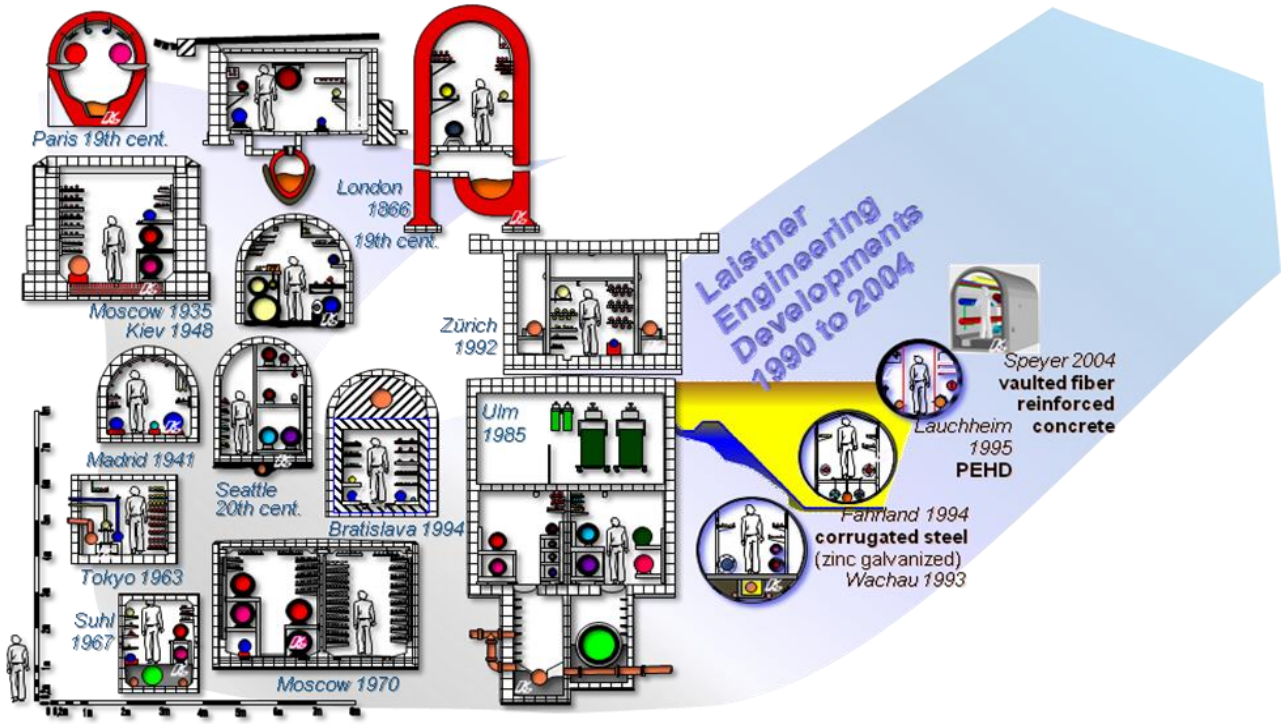

Fig. 2: Utility Tunnels since 1866 – worldwide and developing – pictures Axel Laistner 1994 to 2012 – use of fibre concrete was developed together with and first implemented by Carl Dupré GmbH & Co KG

As you can see above, there are many more utility tunnels than you probably thought. These depicted here are with the exception of Seattle and Ulm all public space utility tunnels. The latter two are university system utility tunnels. When we started into this field as described above – we teamed with the Prof. Knoflacher, at the Institute for Transport Planning and Transport Technology (IVV) of the TU Wien and the VOEST ALPINE KREMS FINALTECHNIK and jointly financed and conducted a privately funded research project into the technology. This produced 1 doctoral thesis and 5 diploma dissertations and a variety of publications from 1992 to 1997. From 1995 until 1997 and thanks to Prof. Jodl we even had a targeted graduate level course on the subject of utility tunnels offered at the Institute for Construction Operations and Construction Economics (IBB) of the TU Wien for civil engineering, architecture and mechanical engineering students. Together with Prof. Stein of the IKB of the Ruhr-Uni Bochum and the GSTT, working groups on the subject of utility tunnels were established in Germany and internationally within the ISTT.

Our intention was to produce a large enough critical education and knowledge base to enable this technology to finally become the accepted state of the art in urban engineering. Now 15 years on – we're again entering a phase of renewed interest in utility tunnels.[2] A little earlier than the historic cycle of 20 to 25 years hiatus and dormancy until the next engineering generation discovers this technology, which we had discovered in our research back all the way to the late 1800s. So we were at best only partially successful in our efforts.

Between 1991 and 2008 we were ourselves involved in designing, or instigating, and supporting the development of 10 utility tunnel systems or system modifications, 7 of which were built, and 4 of which pioniered new forms of hull materials or enlarged their field of suitable implementation. We've been responsiblly involved for the design of ~31 km of utility tunnels and constructed ~ 13.5 km to date. We've gathered experience with utility tunnels in ground water and in earthquakes – and not just as design parameters – but having to deal with the real thing happening. We'd in each situation designed for such known hazards, and the tunnels performed well. And we encountered unknown, or at least unexpected hazards, mostly originating from human thoughfulness and thoughlessness both. We've seen utility tunnels float in their construction ditches, and suffer from water incursion because the outside drainage protection system had been forgotten and needed to be rediscovered. With all this experience through 20 years we can unequivocally state:

There is no more effective, efficient, economic, safe, supply secure, environmental and sustainable urban supply and support systems technology than the Utility Tunnel !

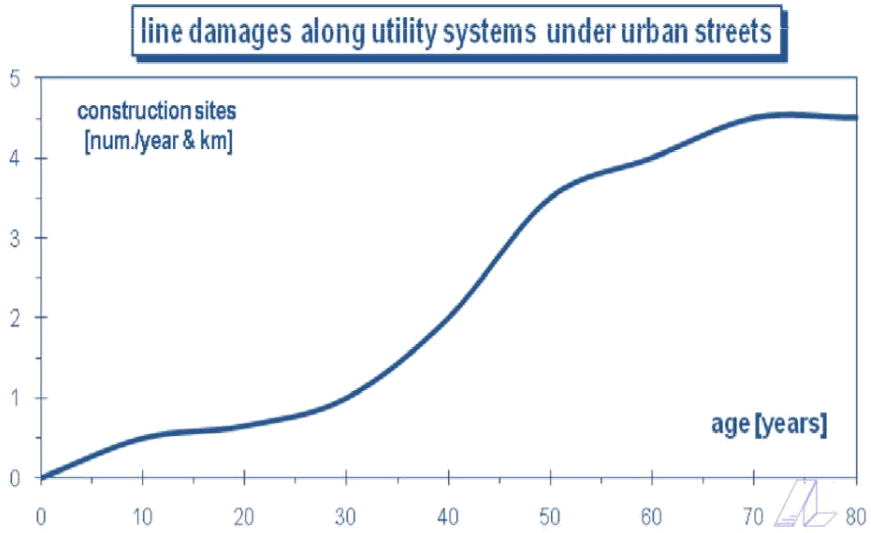

Fig. 3: Utility Faults per m Public Road – Age Dependency Axel Laistner 1995/2012

[2] in 2011/2012 we conducted visits to our utility tunnels for delegations from China, Sweden, Finland, Austria and were invited to present on the system in India

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3.1 Utility Tunnel Economics

Let's talk Reality about the Urban Underground

Our urban supply systems leak like sieves! Even a quick look into the literature makes this clear, and the constant sight of urban undergound construction is known to all of us. In 1994/95 we analyzed, with the help of the City of Wien, Austria their construction site database in the public road spaces. We present these results here again – as their impact is so grave, that it needs to be restated again and again.

Our societies spend immense sums of public money (a scarce commodity when lately we listened to the news) on pipes and cables under ground – and doesn't even know it. It's so well hidden in the scattered budgets and responsibilities, that on the whole not even the supply company itself has any idea what their reality of system maintenance by daily construction costs them per running meter of system line.

The reality check of this rare data[3] sends a clear message. Any private industry manager would call them crazy – not knowing the costs of operation of what in fact is their main method of product delivery to their paying clients – but such is the way we've structured our western urban engineering economy. Well as long as the client = the end-user of water, power, IT, etc. is willing to pay – it's an easy job, isn't it? It could be funny – if it wasn't so sad, and so bad for our urban societies.

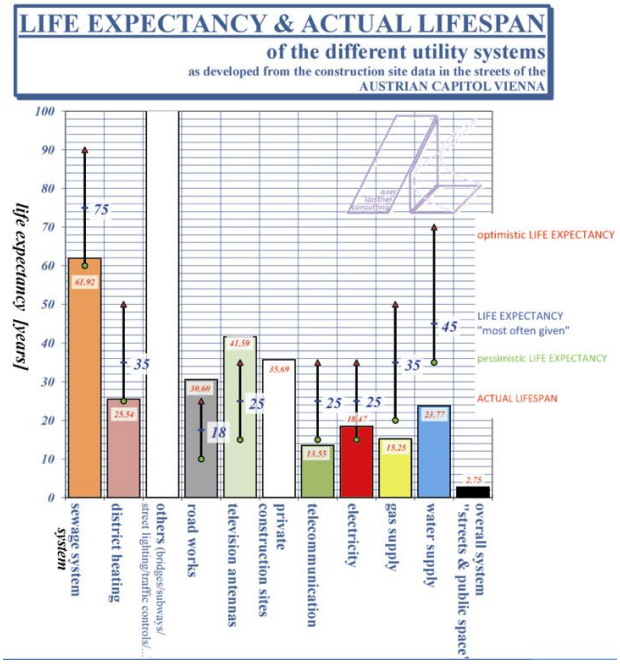

Fig. 4: Utility Systems real LIFETIME EXPECTANCY per m Pipe/Cableway Axel Laistner 1995/2012

We compiled the data and projected onto it assumed maintenance construction costs (fault repair, system enhancement etc.) and combined them with the real statistical life expectancies of the underground buried pipes and cables. Result was a system comparison between conventional construction and the utility tunnels for 7 Reference Projects using real construction costs from 5 projects (3 Utility Tunnels and 2 Conventional Constructions). In the end, we came up with a realistic economic picture of the comparative operational running maintenance cost per year and technical system and "m" Utility Tunnel as homogenizing unit.

The Utility Tunnel beats conventional construction hands down on operating costs. In many cases, even if the responsible utility tunnel owner would put aside a reconstruction and rehabilitation fund for the future. At present we're in the process of verifying the UT numbers for the three constructed systems as best as possible. Early indications of the returning information is, that the UT operational costs are even lower than estimated in 1995.

[3] most cities and towns – and most utility companies and supply system operators, have no clue about their real line costs – as the operate by strictly segregating larger construction sites as investment into their development divisions with a project based system monitored site by site, and their smaller maintenance by construction into their operational divisions, usually equipped to execute all measures with fixed rate contractors.

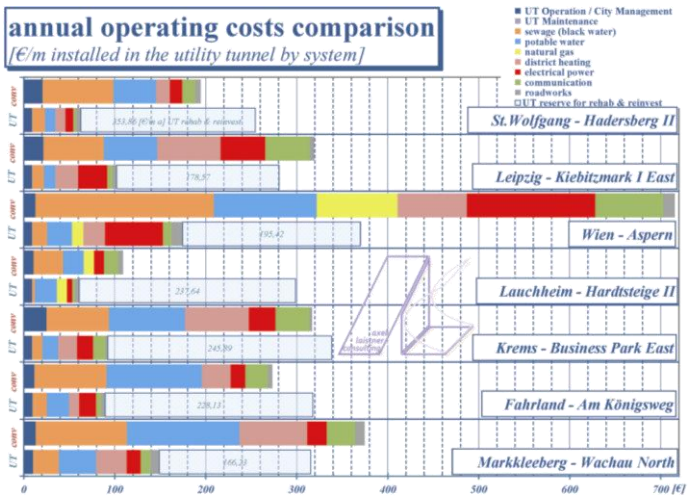

Fig. 5: Utility Systems with/without UT. Real Operational Cost Comparison, projected onto the base unit of 1 m Utility Tunnel – Axel Laistner 1995/2012

This comparison, by the way, is totally without economic costs of the normal conventional product losses (e.g. water leaks, sewage spills, cable-way resistance heat, etc.) all of which are much lower or non existent in a utility tunnel, as well as any discounting of the significantly longer road and surface stability over utility tunnels.

UTs beat buried pipes and cables operationally any day

Let's talk Cost of Urban Development

That might be so, you're maybe thinking at this time, but THE INVESTMENT COSTS of the utility tunnel will take care of that. So lets look at these investment costs, but in total, and with proper consideration of timelines of credit and repayment by the public investor, developing an urban area.

The first glance already shows, that the utility tunnel actually is only a small part of the developement costs. Even First-Prototype projects like Wachau have a fighting chance with the utility tunnel investment being recovered by the faster pay back of financing costs through the earlier marketing start of the property sales. Other considerations also come to the fore. Where it is difficult to built a utility tunnel (e.g.in a river flood plain like in Krems), this is equally so for the normal burried systems, and their extra protection and function requirements.

Where the utility system demand however is too low (e.g. in Lauchheim or St. Wolfgang, rural housing with only 25/65 individual buildings only) utility tunnels do significantly raise the property development costs to such an extent, that this cannot be compensated. So there is a lower limit of supply volumen and urban density that is needed or should be there in future projection, for a utility tunnel to be the implementation method of choice. Or to say it in another way. Because it needs to be large enough to be walked in, it is too large if only 25 to 65 single family homes in a spacious rural development are to be supplied and connected.

In our successful public utility tunnel projects (Wachau, Fahrland, Lauchheim,[4] Speyer), even including the utility tunnel investment costs, the development cost on the sales price of the developed property was identical to a conventional construction development. This was validated by other nearby conventional developments at the time.

Again, these costs depict single point in time development investment only. The do not consider that while the pipes and cables within a utility tunnel might last with a little maintenance for a verified 100+ years in some cases (e.g. London), while the pipes and cables in the ground will face major and/or point rehabilitation much, much earlier than that. The more congested the area the shorter the buried system lifetime.

[4] At Lauchheim – the worldwide first "High Density Polyethylene Hull" Utility Tunnel – the producer of the hull pipe sponsored the project as a demonstration prototype – accepting as payment the avoided conventional pipe construction costs of the city as calculated and expected from the original design conventional development design.

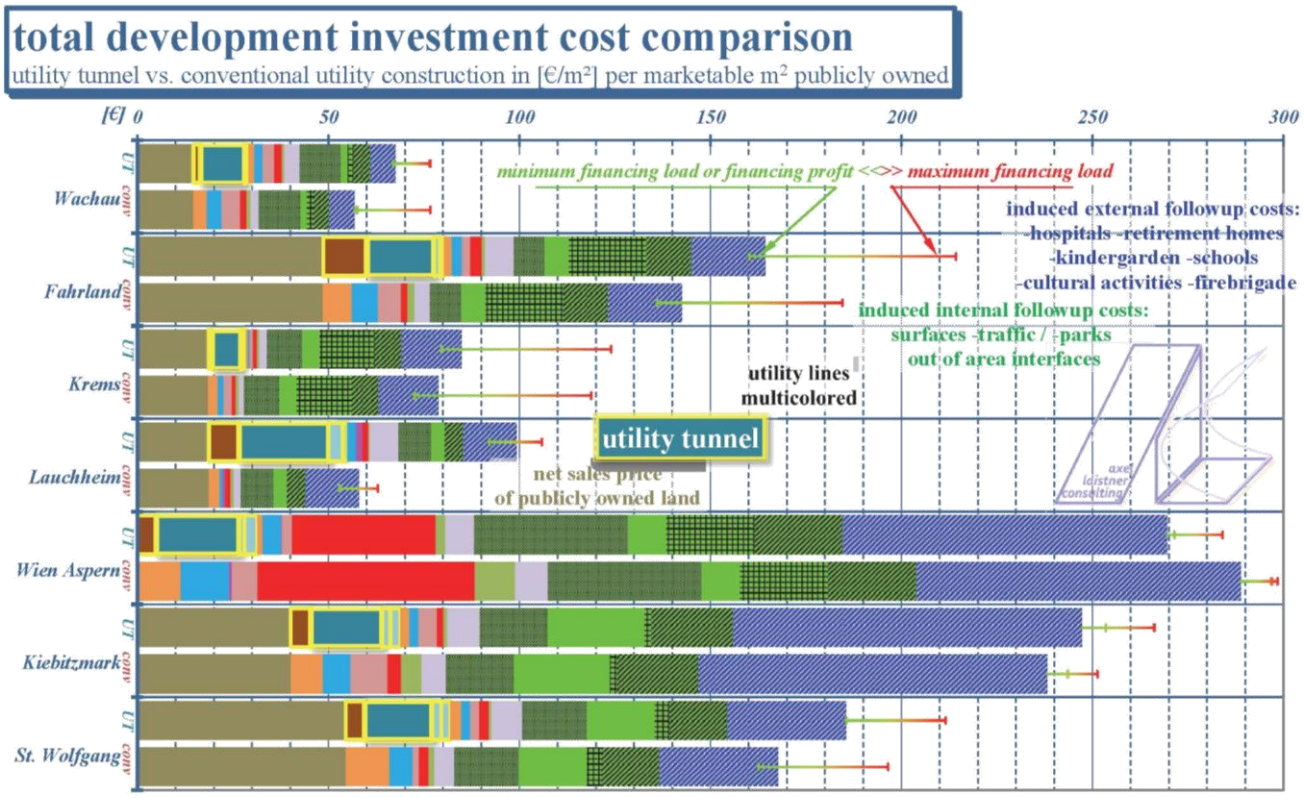

Fig. 6: Total Urban Development Costs: Comparison: Utility Systems with/without UT per m² marketable developed property Axel Laistner 1995/2012

Therefore also the effect on longevity of road surfaces is again NOT included in this depiction. With a utility tunnel road and surface conditions are truly only traffic and climate dependent, and can be extended by up to a factor of 2 in low load cases and 1.5 in high load cases. As the bearing layers of the surface are never interrupted, the total surface structure endurance and life expectancy is finally that, which is always calculated in the pavement design methods, as the surface is once built and then remains intact on an uninterrupted homogenous base.

Site inspections in Wachau, Fahrland and Lauchheim conducted in February 2012 have consistently shown, that even after 20 years most surfaces still look pristine, even like newly built. In Wachau due to an implementation of salt for snow clearing during the first years, the asphalt top-layer shows some degradation. However, even with the heavy loads of truck traffic in a business park – the road structure is still ok. No developing depressions as indication of bas instability, below frost damage, or developing water pipe leaks and breaks, or the like anywhere.

Taking these lifetime and system quality effects also into account, the utility tunnel beats conventional construction everywhere except in the budget sheets of one year only public budget calculations. These procedurally discount any future cost saving or producing effect of any technology, and therefore depict a significantly if not wholly wrong, but very prevalent, picture of the costs of urban development and the associated systems.

As currently in Germany communities are so cash strapped that a federal change of law is under consideration, allowing a community to bill property owners also for any future road and system rehabilitation works – this easy but shortsighted perception of cost might come under political pressure fast.

Let's talk Cooperation

Utility tunnels are unifying, combining systems. They therefore require poeple and institutions to cooperate, which they usually do in some form anyway, but not, maybe, so focused and in such an all encompassing group, of all technical supply system operators and engineers in an area.

A utility tunnel also is a plant facility – however, it is NOT a working place, and it classifies as an equivalent of a large storm drainage culvert in the German administrative system (only in Brandenburg is a building permit needed). But it needs – a little – but continuous maintenance (meaning – a well operated and upkept

utility tunnel needs a technical inspection walk through -every 3 to 6 months – and after all pipe and cable modification works). So foresight and consideration should be given who in the urban supply company structure takes on this operations job and why.

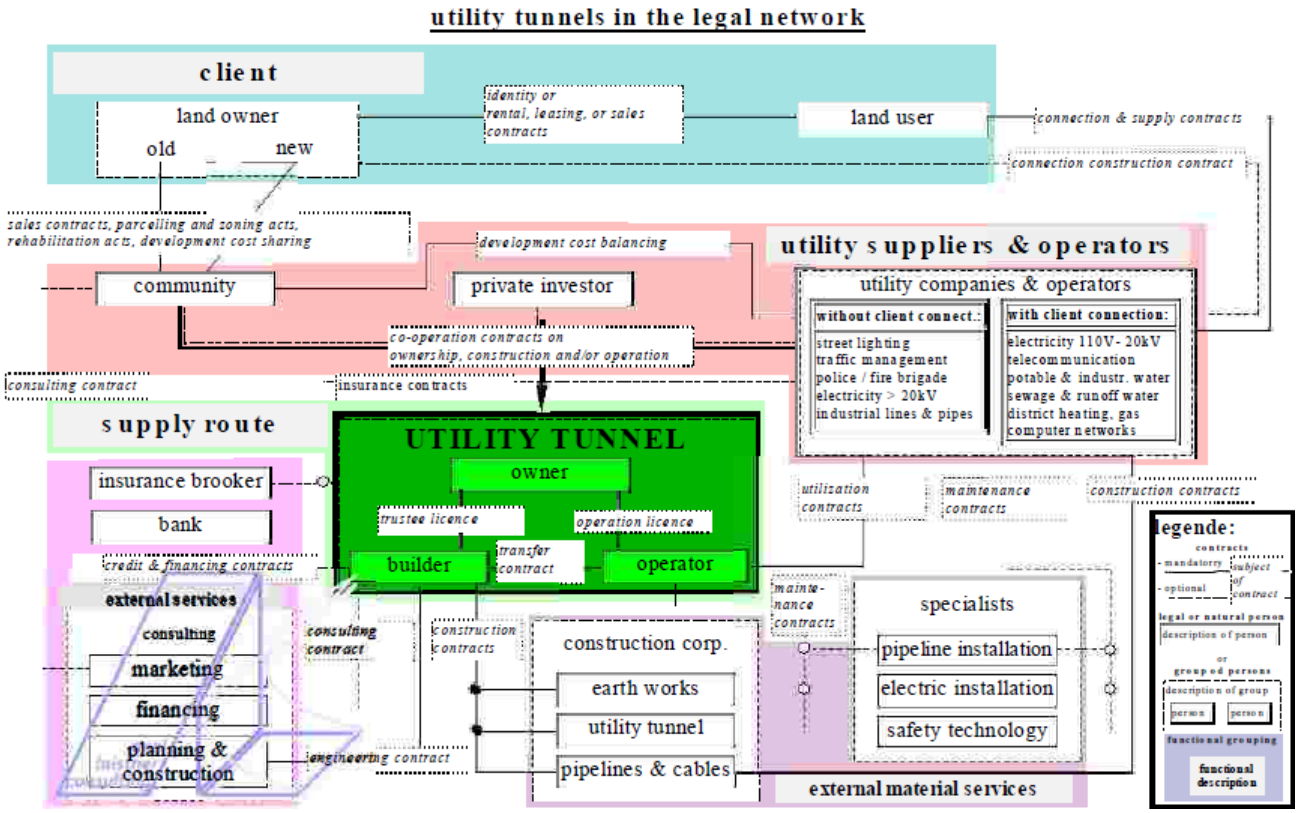

Fig. 7: Utility Tunnel in the network of Urban Legality – Axel Laistner 1995/2012

The Wachau solution – while it is a splendid example how PPP should work to enable and empower the public sector in the long term – is not necessarily the prefered one. Where there are other entities around, like city works corporations, power and transportation companies, why not have them do the job. They operate power plants and other equipment, and very well understand what needs maintenance and how much.

What a utility tunnel in a development fosters, is a sustained joint cooperation of all parties, also later during operation. A significant benefit in a future that requires all of us to find more cost effective, and longer lasting solutions. In our experience of between us almost 65 years as engineers – we believe from our own experience, that more often than not, the synergy is discovered in the cross trade cooperation.

4 CONCLUSION

Utility tunnels, those designed and build with our help and those discovered in our research, all have proven an unexpected longevity. Many even survived the city bombing of the second world are. If a single urban supply system technology can lay any claim at all to sustainability on a long-term time perspective – it's the utility tunnel.

Utility tunnels are the second hull around the transported media, they can have very benefitial side effects. One is absolute and easy leak and fault detection – another can be electro-magnetic-shock-shielding of cables against lightning or weapons impact – or the better power transmission due to lower cable temperatures.

After working in this field for 20 years, we know of 2 cable joint explosion, 2 water main breaks and 1 fire, in all the many utility tunnels around the world we know of (~ 35 UT systems). For sure, there must have been more faults, but this short list of faults is, what one city engineer of conventional systems, has in every small village on a half-yearly basis continuously! So again – no comparison here! Not even close.

However, utility tunnels are almost completely absent from our academic curricula and training, and from our technical standardization structure. The latter might be a boone – as it allows engineering knowledge, and sensibility to risks, to dominate utility tunnel design and operations. Simply following a cook-book recipy is out. The academic situation however is a shame. If at all this subject is touched within in the

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education of a young civil engineer or architect or planner, in maybe one lecture, of one course on principle technical systems for urban supply, at some universities.

This technology is not rocket science, but requires the understanding and cooperation of almost all engineering and architectural professions, and the inclusion of public and private administrators and managment. This is exactly what is meant when we all call for more team skills. That the teams by and large don't form by themselves in public development, is an indictment of the education of our city planners and engineers, as well as the administration structure of cities and their public works divisions overall.

Wherever – even in the public sector – there is a coherence of responsibilty (e.g. at universities, hospitals, or airports, or within private factory grounds) the utility tunnel is the technology of choice. It doesn't even need to be talked about – naturally it's expected to be part of any large development or modification project of such facilities.

We wonder why, or shouldn't we ?

Fig. 8 Steel Culvert Construction. Fig. 9 PEHD outfitted. Fig. 10 Steel Culvert outfitted. Fig. 11 Fibre Concrete outfitted. Pictures Axel Laistner and Hermann Laistner 1993 to 2004 – use of fibre concrete was developed together with and implemented by Carl Dupré GmbH & Co KG

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Wir schützen uns zu Tode. Schallschutz ohne Ende oder akustische Raumplanung?

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1 VORBEMERKUNG

Beschallungstechnologien, Verkehrslärm, neue Baumaterialien und -techniken, das Verschwinden von Ruhezeiten und -orten und andere vergleichbare Phänomene kennzeichnen die radikale Veränderung der akustischen Umwelt. Schwere gesundheitliche, wirtschaftliche und soziale Probleme sind im Gefolge zu konstatieren, wie die massive Zunahme von Erkrankungen auf Grund akustischer Einwirkungen beweist (Herzkreislauf, Tinnitus, Hörsturz, Morbus Menière, Konzentrationsstörungen u.a.).[1] Dies ist vor dem Hintergrund zu sehen, dass der Mensch den weitaus überwiegenden Teil von Schallwellen indirekt, also über Reflexion, und damit hauptsächlich über die gebaute Umgebung wahrnimmt. Herkömmliche Raumplanung integriert akustische Kriterien nur mangelhaft und durchgehend aus der Sicht von Lärmvermeidung, Lärmbekämpfung und Lärmschutz. Die Überwindung der Konzentration auf Lärm ist wohl Bedingung, um von Vermeidungs- zu Gestaltungsstrategien zu kommen.[2] Zu einer qualitativen Betrachtung des Akustischen eben, die als Grundlage einer akustischen Raumplanung diente. Die Erfassung des akustischen Raums als elementaren Lebens- und Planungsraum und die Entwicklung von Kriterien für die Beurteilung und Gestaltung dieses Raumes sind dabei Wegmarken.[3]

2 ANTHROPOLOGISCHE GRUNDLAGEN

Eine akustische Raumplanung muss naturgemäß auf den grundlegenden Funktionen und Charakteristika des auralen Apparates aufbauen. Er gewährleistet die Sinnesapparaturen Gleichgewicht, Orientierung und Hören. Diese drei werden zu einem Raumeindruck "verrechnet" und mit den anderen Sinnen abgeglichen. Diesen Vorgang nennt man Sinnesintegration. Räume, die einer dauernden sinnvollen Sinnesintegration abträglich sind, machen unglücklich und krank.[4]

Das Gleichgewicht wertet Informationen aus dem Flüssigkeitsstand im Gleichgewichtsorgan aus, die Orientierung die Laufzeiten der eintreffenden vielfach reflektierten Schallwellen im dreidimensionalen Raum, das Hören die Aufnahme und Interpretation von Schallwellen, auch die Veränderung der Frequenzen durch Reflexion.

Dieses komplexe Zusammenspiel gewährleistet folgende Leistungen: Warnfunktion, Kommunikation mittels Sprache, Orientierung und Positionierung im Raum, Gleichgewicht, Sinnesintegration, auraler Rückkopplungsmechanismus (efferente und afferente Verarbeitungstrategien).[5]

3 UMWELTGRUNDLAGEN

Die Frage, wie sich Gebäude und Gebäudegruppen verhalten, indem sie reflektieren, ist in jeder Hinsicht relevant. Denn dadurch ergibt sich Raum respektive Raumwahrnehmung. Besonders erkenntnisreich ist diese Analyse in ungewöhnlichen Bauzusammenhängen z.B. am oder gar im Wasser. Jede bauliche Tätigkeit in einem solchen Umfeld bedarf besonders intensiver akustischer Vorbereitung, um nicht ungewollte und unerwartete akustische Effekte zu erzielen: Verstärkungen, Schallleitung über weite Distanzen, Lärmverteilung über große Gebiete, reflektorische Frequenzungleichgewichte besonders im tiefen Hörbereich (Stressfaktorenanalyse) u. ä..[6]

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[1] vgl. Androsch, Peter/Sedmak, Florian: Hörstadt. Reiseführer durch die Welt des Hörens. Wien: Christian Brandstätter Verlag 2009.

[2] vgl. Bundesministerium für Land- und Forstwirtschaft, Umwelt- und Wasserwirtschaft. Hg., Handbuch Umgebungslärm. Minderung und Ruhevorsorge. Wien: AV + Astoria Druckzentrum GmbH. 2007

[3] vgl. Androsch, Peter / Bogendorfer, Anatol / Bosshard, Andres / Marckhgott, Johann / Pintar, Erich / Sedmak, Florian: Die Linzer Charta. 2009. http://www.hoerstadt.at/hoerstadt/die_linzer_charta.html. 20.10.2009.

[4] vgl. Unabhängiges Institut für Umweltfragen e. V. (Hg.): Physikalische & biologische Phänomene im Ohr beim Hören. Berlin: AGIT – Druck. 2005.

[5] vgl. Andreas Stoffels: Die kulturelle Dimension des Lärmhörens, Vortrag im 1. Hörstadt-Symposion "Viel Lärm(schutz) um nichts", Linz, Juni 2009

[6]

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Die Rolle der gebauten Umgebung hat sich im akustischen Sinne noch nie so schnell und nachhaltig verändert wie in den letzten 25 Jahren. Gebautes erfüllt gänzlich neue Funktionen, - und dies nahezu ohne Kenntnisnahme durch Architektur und Stadtplanung.[7] Einerseits "werfen" Verkehr und Beschallungstechniken Schall in ungekannter Fülle und Dauer gegen Fassaden, andererseits verhalten sich Fassaden neuen Typs durch industrielle Bautechniken unerwartet. Schallharte Materialien wie Glas, Metall und Beton "reflektieren" einen Großteil des auftreffenden Schalls und wirken damit wie Schall-Verstärker, was durchaus bis zur Verdoppelung von Lautstärken und damit zu gesundheitsrelevanten Belastungen führen kann. Genauso sind die Absorptions- versus Reflexionsverhältnisse bzgl. Frequenz und Struktur von Schallereignissen von Relevanz, besonders in Hinblick auf akustischen Stress mit allen bekannten und unbekannten Folgen. Schon diese akustische Rolle der gebauten Umgebung im Raumzusammenhang ist weitgehend unbeleuchtet, erst recht in Bezug auf die neuen Entwicklungen im Bereich der energetischen Nutzung von Fassadenflächen durch Photovoltaik, Solartechnik u.ä.[8]

Erforschung und technische Weiterentwicklung der Lärmverursacher im Verkehrsraum, baulicher Schutz vor Lärmbelastungen sind etabliert und stellen durchaus verankerte Bereiche in Stadt- und Verkehrsplanung bis zur Umweltpolitik dar. Die aktive Rolle der Verkehrsflussbetten findet dagegen wenig Widerhall in der theoretischen und praktischen akustischen Analyse. Die "Instrumentalität" von Straßen, Plätzen, Tunnels, Unterführungen, Brücken u.ä. braucht eine angemessene Berücksichtigung. Das "Flussbett" des Verkehrs beeinflusst die akustische Faktizität des Alltags grundlegend, denn über Schallreflexion erzielt Verkehrslärm größere Wirkung als über Direktschall, besonders in urbanen Gebieten.[9] Die Instrumentalität, konstituiert durch die Parameter Volumen, Form, Material und Oberfläche der gebauten oder natürlichen Gegebenheiten, die Schallformung also bedarf besonderer Aufmerksamkeit, weil durch und in ihr gesundheitliche und soziale Folgen generiert werden. Die Instrumentalität und die vertikale und horizontale Proportionalität von Schallreflexionen sind in Relation zu phylo- und ontogenetischen Dispositionen zu setzen, um Indizien einer adaptierten Raumplanung entwickeln zu können.[10]

4 AKUSTIK UND RAUMPLANUNG

Eine akustische Raumplanung muss mit einer konventionellen Raumplanung kompatibel sein. Und das in allen Abstufungen, die zwischen einer Mikro- und einer Makroperspektive liegen können. Eine akustische ist also einzubetten in die Funktion einer gesamthaften Raumplanung.[11]

Da dabei wohl in den meisten europäischen Raumkonzepten eine nachhaltige Raumentwicklung angestrebt wird, die die sozialen, wirtschaftlichen, rechtlichen und ökologischen Ansprüche an den Raum miteinander in Einklang bringt, unterstreicht die Notwendigkeit eines erhöhten akustischen Bewusstseinsstandes.[12]

Was ist der akustische Raum? Der akustische Raum ist alles, was wir hören. Also der Raum an sich. Unter raumplanerischen Kriterien handelt es sich also nicht um einen Teilraum, sondern eine Raumschicht. Vielleicht eine Raum-Wahrnehmungs-schicht. Die Schallwahrnehmung ist die Bedingung für Raumwahrnehmung.[13] Deshalb ist in raumplanerischer Hinsicht das Wort "Schallschutz" irrelevant. ("Luftschutz" wäre ein vergleichbares Wort aus der Welt des Atmens.)

5 ZIELE AKUSTISCHER RAUMPLANUNG

Die Ziele einer akustischen Raumplanung leiten sich ab aus dem Status quo der Umweltbedingungen, respektive deren fundamentaler Veränderung, und den Modi des auralen Apparates. Seine Funktionstüchtigkeit ist Bedingung nicht nur menschengerechter und menschenrechtskonformer

[7] vgl. Bogendofer, Anatol: Architektonische Nebensache? In: Modulor Magazin 1/2008. Boll Verlag. Urdorf, 2008.
[8] vgl. Braun, Markus Sebastian. Hg., facades. architectural details. Berlin: LVD – Gesellschaft für Datenverarbeitung. 2008
[9] vgl. Androsch, Peter: Die Strategie der Yrr. Unvollständiger Entwurf einer akustischen Aneigung von Wilhelmsburg. In: Metropole: Metrozonen 4, Berlin 2010, Hg. IBA Hamburg
[10] vgl. Szendy, Peter: Listen. A History of our Ears. New York: Fordham University Press. 2008.
[11] vgl. http://de.wikipedia.org/wiki/Raumplanung. 23. 2. 2011
[12] vgl. Hörstadt/Gratt, Wolfgang (Hg): Urban Vision Linz. Ganze Stadt, halber Lärm. Visionäre Grundsatzstudie. Typoskript. Linz, 2009.
[13] vgl. Blesser, Barry/ Salter, Linda-Ruth: Spaces Speak, Are You Listening? Experience Aural Architecture. Massachusetts: The MIT Press 2009.

Umgebungs- und Raumgestaltung, sondern möglichst hoher Lebensqualität und damit Arbeits-, Wohn- und Aufenthaltsqualität.

Die essentiellen Ziele zur Erreichung hoher akustischer Lebensqualität sind:

- Gewährleistung der Warnfunktion des Gehörs
- Optimierung der Kommunikationsbedingungen durch möglichst hohe Sprachverständlichkeit (innen wie außen)
- Gewährleistung der Orientierungsfunktion des auralen Apparates
- Gewährleistung der Gleichgewichtsfunktion des auralen Apparates
- Gewährleistung optimaler Sinnesintegration
- Gewährleistung auraler Rückkopplungsmechanismen, also einer ausgeglichenen efferenten und afferenten Schallinformationsverarbeitung
- Vermeidung gesundheitsschädlicher akustischer Ambientes und unerwünschter akustischer Phänomene
- Integration möglichst vieler Menschen mit Hörbeeinträchtigung in die Gesellschaft als Teilhabe am Leben
- Integration möglichst vieler Menschen mit Sehbeeinträchtigung durch reichhaltige akustische Orientierungsmöglichkeiten

6 METHODEN EINER AKUSTISCHEN RAUMPLANUNG

Als Teil einer gesamthaften Raumplanung müssen gleichwohl neue Methoden entwickelt werden. Nachdem die quantitative Erfassung akustischer Situationen im Bereich von Lärmschutz und Lärmbekämpfung durchaus zu Lautstärkesenkungen geführt hat, selten aber zur akustischer Lebensqualität, erfordert es neue, auch experimentelle Zugänge. Eine akustische Morphologie könnte dafür Richtschnur sein. Die Differenzierung der Ziele und die Methodenentwicklung wird die nächste Zeit der Forschung bestimmen.[14]

Instrumentalität und Zonierung sind korrespondierende Begriffe im Gefolge einer akustischen Morphologie. Das Wie-Sein akustischer Ereignisse ist erst durch die Instrumentalität des Raumes erfassbar. Der offene Raum, der Straßenzug, die Kreuzung, der Hof, die Eisenbahntrasse - das alles sind Instrumente, die Schall durch die vier Parameter Volumen, Form, Material und Oberfläche formen. Ihre Instrumentalität korrespondiert mit akustischer Zonierung.[15]

Der Anspruch, akustische Ambientes zu schaffen, in welchen das Warnorgan Ohr möglichst gut funktioniere oder möglichst hohe Sprachverständlichkeit herrsche, braucht das Begreifen der Instrumentalität. Dann könnte ein flexibler Lautstärkenabgleich durch divergierende Reflexions- und Absorptionsmuster und Verteilung in der Zeit gelingen. Orientierung erleichtern und Gleichgewicht geben durch akustische Referenzverläufe (innen und von innen nach außen und vice versa) ist eine weitere Aufgabe. (Übrigens eines der Grundprobleme des sogenannten Passivhauses.) Und die Gewährleistung optimaler Sinnesintegration und auraler Rückkopplungsmechanismen erfordern komplexe akustische Reflexionsmustern. Akustische Vielfalt ermöglicht die Entwicklung einer differenzierten Wahrnehmung. Das hieße, daß monotone und dominante Faktoren, die die Klangvielfalt beherrschen oder einebnen, zu vermeiden sind. Die Integration möglichst vieler Hörbeeinträchtigter in die Gesellschaft setzt voraus, daß die Anliegen eines Viertels der euroäischen Bevölkerung verstanden werden. Vermeidung dauerhafter Hintergrundbelastung, starken Nachhalls und großer Dynamikunterschiede ergäben sich aus dieser Perspektive.

Bauen und Architektur ist Schaffung von Raumqualität. Und Raumqualität ist per se eine akustische Qualität. Akustische Gestaltung ist daher eo ipso Architektur und Raumplanung und -gestaltung.[16] Damit könnten als erste Felder definiert werden: Integration der Ziele akustischer Raumplanung in alle Planungsprozesse so früh wie möglich, Entwicklung einer Methodik der Instrumentalität und Entwicklung

[14] vgl. Androsch, Peter: Wie wollen wir akustisch leben? In: Raum, Wien 2009
[15] vgl. Lampugnani, Vittorio Magnago: Die Stadt im 20. Jahrhundert. Visionen, Entwürfe, Gebautes. 2 Bd. Berlin: Verlag Klaus Wagenbach. 2010
[16] vgl. Androsch, Peter: Bauen ist Hören. In: Modulor Magazin 1/2008. Boll Verlag. Urdorf, 2008.

einer Methodik der qualitativen akustischen Zonierung. Weitere Felder - wie Klanggestaltung - müssen folgen.[17]

Der Titel von Neil Postmans Bestseller "Wir amüsieren und zu Tode" ist eigentlich ein Widerspruch in sich. Der Tod steht für etwas Negatives und Amüsieren für etwas Positives. Wie kann man sich zu Tode amüsieren? Postman beantwortet diese Frage aufsehenerregend in dieser doch sachlichen Abhandlung über die Unterhaltungsindustrie.[18]

So ähnlich stellt sich auch die Lage im Bereich Lärmschutz dar. Der positive Impetus des Schutzes hat sich über weite Strecken als Hemmschuh für eine konzeptuelle Weiterentwicklung erwiesen. Im Bestreben nach Schutz behindern wir uns selbst einerseits durch Vernachlässigung eines gesamthaften Zugangs zur akustischen Umwelt und andererseits durch eine mangelhafte Analyse der auralen physiologischen Bedürfnisse des Menschen abseits von Schutz vor und Vermeidung und Bekämpfung von Lärm.

[17] vgl. Leitner, Bernhard: P.U.L.S.E. RÄUME DER ZEIT / SPACES IN TIME. Ostfildern: Hatje Cantz 1999.
[18] vgl. Neil Postman: Wir amüsieren uns zu Tode. Frankfurt: Fischer Verlag. 1985

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