reviewed paper

The Parametric Design to Foster Cross-Border Governance

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1 ABSTRACT

Ongoing research intends to develop a new planning tool to foster cross-border governance. It is a conceptual model that employs parametric design and new forms of communication. Its application can go beyond administrative boundaries.

Today in the world, there are increasingly complex problems that need to be addressed in a multiscalar and interdisciplinary way, as the pandemic and the environmental crisis are demonstrating.

Territorial planning is called to face challenges that require new tools integrated into territorial governance and without administrative limits. We must also help make decisions in a tight time frame and comply with the financial resources used.

The research intends to create a tool to involve local actors in the future design of the area. The method consists of using 3D images, in addition to traditional forms of representation. The parametric design permits to evaluate design alternatives better as it is more realistic. The tool must be integrated with communication forms capable of stimulating bottom-up processes and creating cross-border networks with medium to long term effects.

The problem is addressed in Chiasso, in the cross-border region between Canton Ticino (Switzerland) and the Lombardy Region (Italy). It is a relevant hub of north-south flows and has recently been affected by two projects: a new highway layout and the commercial custom's adaptation. These will have repercussions in the area and involve the social, economic, and environmental challenges for the future. There is no lingusitic barrier long this border, but no strategic planning is shared between the countries, and in the same area, there are four different planning tools.

The desired result is the recognition of a new tool for territorial planning. The first test carried out with students of the Master's Degree at SUPSI in Mendrisio (CH) underlined a greater interest by participants when using this parametric design alternatives.

Keywords: parametric design, informal planning, cross-border governance, communication, bottom-up

2 INTRODUCTION

The doctoral research, still in progress, focuses on conceptual models that can help the actors involved in participatory processes to formulate problems in the cross-border region. Therefore it is necessary to rethink the vision of the cross-border context, the way of dealing with problems, and the tools to be adopted.

First, the boundaries must be rethought. They must no longer be understood as static limits of national sovereignty. A new perspective is needed in the narration of these places. As Brambilla describes, the border should be considered a paradoxical structure that became an expression of culture and territory multipolarity, generating a transnational flow of narrations and images. Adopting this perspective, borders are created and creative space. [1]

As for the problems, in a world where there are increasingly complex problems to face, as pandemic and environmental crisis, the methods for elaborating shared solutions must necessarily be more structured than in the past. Therefore, the procedures consolidated over time must be revised to cope with the new challenges. Complex problems include different disciplines that consider various approaches. They also have modifiable and external elements whose variation is beyond those who deal with them. All these things mean that a planning problem must be tackled both at the large scale where the problem arises and at the local level where the solution proposed will be located. "(...) In planning practice, there are numerous understandings of the term "planning approach", planning can, for example, be understood as urban design, land-use management, social practice, landscape ecology, traffic management, etc. what is common to all these is that planning is never neutral or an activity that can be taken for granted."[2] The current problems

[1] "Borders: paradoxical structures between essenzialization and creativity", pp.582, 2009.
[2] "Planning Approaches or Nothing Comes from Nothing", pp.161, 2018.

ISBN 978-3-9504945-0-1. Editors: M. SCHRENK, V. V: POPOVICH, P. ZEILE, P. ELISEI, C.BEYER, J. RYSER, G. STÖGLEHNER

need to be addressed in a multiscale and interdisciplinary way and with the involvement and awareness of local actors and citizens. Territorial planning is called upon to make its contribution. It is necessary to equip it with new tools capable of being effective in a tight time frame thanks also to the integration with new technologies, and comply with the financial resources used.

Therefore, the goal is to adopt tools that use creativity. In particular, the research refers to informal planning. Bern Scholl argues that the set of instruments and procedures do not underlie the fixed procedures of planning law so that they can be designed flexibly and matched to the conditions according to the occasion, the topic, or the constellation stakeholders. Informal planning is not regulated (in its accuracy) as much formal planning. Informal planning is indispensable for the preparation of formal planning as well as for many others.[3] Creativity must necessarily be included in a broader planning process, also composed of the rules of formal planning. This approach makes it possible to act in compliance with cross-border governance. It makes it possible to maintain relations with national governments and incorporate visions on an international scale (top-down). Furthermore, informal planning allows bottom-up involvement thanks to the collaboration with stakeholders (bottom-up).

One of the advantages of this approach is to be able to adapt to changes in the context. The recent pandemic crisis, for example, has highlighted the relationship between the complexity and the shorter time to respond and intervene. Therefore, it is necessary to have tools to return an integrated vision of the problem that one wants to face in the shortest possible time.

Informal planning also has limits. As Papamichail and Peric argue, informal planning cannot be taken for granted - it is strongly interwoven with the planning culture influenced by the historical and political background, and the current socio-economic conditions.[4]

3 THE CONCEPTUAL MODEL

The aim of the research is the creation of a conceptual model to foster cross-border governance. The research focuses on a conceptual model that introduces the parametric design and communications forms that enable an honest discussion and shared solutions.

A conceptual model is "Result of the processes leading from the task to the specification of the conceptualisation of the ontological structure of the problem domain, comprising assumptions and constraints on all relevant modeling decisions."[5]

The conceptual model is not a phase of the process but the set of procedures necessary to coordinate a participatory planning process. In accordance with Tolk's interpretation, conceptual modeling is not a limited activity in the initialisation phase of a simulation system, but a perpetually reoccurring process that drives the design of experimentation, the providing of necessary data, the evaluation and presentation of results, and many more activities conducted within the life cycle of the system.[6]

According to Wagner, the purpose of a conceptual model is capture a sufficiently large, and sufficiently complete, part of the real world problem domain, for which a simulation study is to be performed, in such a way that all kinds of research questions concerning this domain can be investigated.[7]. Furthermore, in agreement with Arbex and Birta, the conceptual model should enable all stakeholders to discuss (...) and it must be sufficiently comprehensive to serve as a specification for a computer program.[8]

During the participatory process, there must be respect for the ideas and opinions of others. Only in this way is it possible to create a climate of trust between planners, designers, and stakeholders. Grams argues that planning also means building an atmosphere of trust. (…) Through a carefully designed planning process, all actors are encouraged to accept and play their role. An ambiance of trust among decision makers allows fast decision-making when a window of opportunity opens.[9]

[3] "Formal and informal instruments and procedures", pp.2, 2016.
[4] "Informal planning: a tool towards adaptive urban governance", pp.2089, 2019.
[5] "Conceptual Modeling: Definition, Purpose, and Benefits", pp.2823, 2015.
[6] "Conceptual Modeling: Definition, Purpose, and Benefits", pp.2821, 2015.
[7] "Conceptual Modeling: Definition, Purpose, and Benefits", pp.2823, 2015.
[8] "Conceptual Modeling: Definition, Purpose, and Benefits", pp.2823, 2015.
[9] "Attisholz: From Switzerland's Largest Industrial Brownfield to a Reserve of Euroean Relevance by Planning", pp.127, 2018.

The benefits of the conceptual model, according to Tolk are: building trust by unambiguously documenting the model – which is the foundation of the resulting simulation – which is pivotal in case of reuse or composition. [10] Finally, Arbez and Birta add that the conceptual model ensures that key SUI features (e.g. behavior, granularity) evolve from discussion with all stakeholders rather than from a programming bias. [11]

The conceptual model focuses on increasing the level of engagement of the stakeholders and creating territorial processes in the immediate and medium to long term.

3.1 Parametric design and communication

The combination of parametric design and communication allows to design and focus on inclusion and creativity. It is a tool that make possible to translate different plans and projects into the same language and helps to understand problems and make shared decisions. This approach lets have the governance of the territory but go beyond the existing administrative limits.

3.1.1 Parametric design

The research intends to introduce parametric design in the conceptual model because it allows evaluating design alternatives and their effects on the area. Fusero and other argue that the use of parametric software in urban design, it is not only for the three-dimensional representation of projects at the urban scale but precisely in the process of forming urban planning tools, as a tool to help the planner to evaluate diversified scenarios and make motivating decisions. [12]

Moreover, its introduction help the planner coordinate the territorial transformations and coordinate them in a short time. Garagni and Bravo say that parametric technologies make possible to embed information into urban digital models, intended as sort of data collectors browsable in real-time. [13]

Galli defines parametric design like an innovative approach based on the use of computational tools to optimize the performance of the system in relation to the goals of the project. [14]

It can systematise rules (based on different parameters) and a large amount of data from different disciplines. Lee argues that each algorithm in this process has two components, parameter and rule. (…) In mathematics a parameter describes a range of variation, whereas in design, it defines the scope of design possibilities. (…) In contrast, a rule describes the resultant algorithmic functions as well as the relationships between components. [15]

The application of parametric design in urban planning can be various. In accordance with the research goal, the use of parametric design is to aid participatory planning. Lee asserts that decision-making in design is a cognitive process where in alternatives are generated and evaluated, potentially enabling a more creative design process. In recent years parametric design's heightened capacity for automatically generating and evaluating options has been celebrated by researchers and designers, but it has also placed an increased emphasis on decision-making activities. [16]

Furthermore, Rollandi argues that the parametric representation captures the attention more than other forms of visual model. The tools available to planners are the same as in the gaming world with which highly realistic settings are created. Good results can be obtained quickly, which significantly affects the entire participatory planning process's overall costs. [17] The parametric drawing involves the viewer with all the senses and, therefore, increases his curiosity and participation. Bosselmann said that the experience of watching a film involves visual, kinesthetic, spatial, temporal, and aural senses. As the scene starts, the motion captures the eye, and viewers cannot help becoming part of it. Objects pass by, allowing viewers to get their bearings. Once they have watched a few frames, they can sense the space, understand its boundaries, and gauge the distance to other objects within it. [18] Furthermore, the administrative limits are not

[10] "Conceptual Modeling: Definition, Purpose, and Benefits", pp.2823, 2015.
[11] "Conceptual Modeling: Definition, Purpose, and Benefits", pp.2823, 2015.
[12] "Urbanistica parametrica: una nuova frontiera delle Smart Cities", pp.4, 2013.
[13] "The parametric representation of the city", pp.125, 2010.
[14] "Urbanistica parametrica. Open data, strumenti e tecniche per la progettazione della città di domani", pp.26, 2013.
[15] "Creative Decision-Making Processes in Parametric Design", pp.2, 2020.
[16] "Creative Decision-Making Processes in Parametric Design", pp.2, 2020.
[17] "A conceptual model to promote engagement in participatory planning in the cross-border region between Switzerland and Italy", pp.6, 2021.
[18] "Representation of Places. Reality and Realism in City Design", pp.92, 1987.

ISBN 978-3-9504945-0-1. Editors: M. SCHRENK, V. V: POPOVICH, P. ZEILE, P. ELISEI, C.BEYER, J. RYSER, G. STÖGLEHNER

constraints but are an area under consideration. The representations also make it possible to "translate" different plans and projects into the same language. In this regard, in 1976, Lynch argued: a unified language appropriate to the sensory form of cities will be a long time developing if indeed a unified language is possible. Meanwhile, we must deal with the many different aspects of this issue in diverse and sometimes not entirely compatible ways. Language in some form, whether graphic, verbal, gestural, mathematical, or whatever, is indispensable to thought. [19] It is clear that there is a greater engagement level with effects that last over time by adopting a representation. Oxman and Gu assert "Instant visualisation in 3D brings ideas to life and fuels creativity, both in professional designers/planners and untrained participant citizens, particularly so when designs can be interactively changed during the co-design sessions. The activity of visualisation helps participants to assess and reflect deeper on the spatial properties and qualities of their ideas. It facilitates comparisons of alternative designs and places these, literally, into the larger urban context. Being able to immediately review design alternatives in 3D contributed positively to the engagement of the workgroup." [20]

In the following figure there is an example of using parametric design in partecipatory planning. City of Zurich presented these building candidates in a competition for a new public school in the Allmend neighbourhood.

Fig. 1: The application of parametric design. Source: Esri web site.

Parametric design has many advantages, it is a support of addressing current challenges and changes. Its use should not replace planners and stakeholders because they have the necessary knowledge, an exhaustive vision, and the necessary sensitivity to tackle complex problems. Still Oxman and Gu write “However, there should also be an informed balance between pure parametric tool manipulation and the utilisation of a broad understanding of architectural knowledge in the parametric design process.” [21] Therefore, it is necessary to find a good balance able to relate all the conceptual model elements.

3.1.2 Communication

We live in a world where people are willing to define new rules, a world where new communication forms bring research and society closer. The analyses conducted over the last decade show that people are closer to disciplines they are not specialists in: this is due to the desire for new content and the fact that we immediately have an unlimited amount of information and insights thanks to technologies. The use of new tools and the method to communicate content appears essential to creating a topic's involvement. The physicist and humanist John Ziman wrote about the close relationship between science, society, and communication: the fundamental social institution of science is therefore its communication system. [22]

As has already been written, the research aims to create an environment of trust and respect. To do this, inclusive communication will be used “Inclusive Communication is an approach that seeks to 'create a supportive and effective communication environment, using every available means of communication to understand and be understood.” [23] It relates to all modes of communication: words and sounds, written

[19] “Managing the Sense of a Region”, pp.120, 1976.
[20] “Effectiveness of Virtual Reality in Participatory Urban Planning”, pp.5, 2018.
[21] “Theories and Models of Parametric Design Thinking”, pp.478, 2015.
[22] “An Introduction to Science Studies”, pp.58, 1984.
[23] https://www.rcslt.org/

information, online information. “Inclusive communication makes services more accessible for everyone. It will help to achieve successful outcomes for individuals and the wider community. It enables people to live more independently and to participate in public life.” [24]

The conceptual model intends to improve the use of new technologies for communication in the planning field. They are an essential instrument for each of us. The company We Are Social conducted the annual report for 2020: it shows that 60% of the world population is online and 90% of the time spent online is on apps where we spend an average of 2 hours and 24 minutes a day. Cowley and Hollander argue that the popularity of Facebook, Twitter, Google, Instagram, Youtube, Blogspot and other social media has spurred a demand for new forms of participatory planning and self-organising governance by citizens. Unlike with many conventional methods, citizens are keen on using social media tools to engage with planners. [25] More and more users use social platforms all over the world. They are a tool that connects and involves people of all age and different social groups. On social networks, there are no barriers; they allow us always to feel connected with the world. It is for this reason that the conceptual model intends to make use of them. Clark writes that mobile participation is expected to attract a much wider interest group than conventional participation tools, in particular youths and young adults who are difficult to engage in public affairs or participation schemes. [26]

Also, about the effects, Leeuwen asserts that the device used influences the engagement level or that smartphones users are more likely to engage with local policy. [27]

It will also be essential to know how to create new networks and strengthen existing ones affect in the territory even in the short and medium time.

4 CROSS BORDER REGION BETWEEN SWITZERLAND AND ITALY

The context for applying the conceptual model is the cross-border region between Switzerland and Italy with particular attention to the cross-border axis composed by Lugano (CH), Chiasso (CH), Como (IT), and Varese (IT).

"A cross-border region is a territorial entity that is made up of several local or regional authorities that are co-located yet belong to different nation-states. Cross-border regions exist to take advantage of geographical conditions to strengthen their competitiveness." [28]

This area is important on an international scale as it is at the centre of relations between northern and southern Europe. Indeed it is involved by the CODE24 strategy approved under the INTERREG IVB NWE European programme (2010-2015). Ticino is in the middle of the connection Zurich-Milan. On the one hand, recent projects in mobility and innovation make it possible to strengthen synergies in Zurich. On the other hand, Ticino has always had a strong relationship with Milan. According to Torricelli and Stephani, Canton Ticino today is an urban agglomeration that wedges into the valley floor up to the shores of the lakes, open in Mendrisiotto on relations with Como and Varese, the neighboring cities, but above all with Milan, which it exercises the attraction of a global city or rather of a Global City Region. [29]

The relations between Switzerland and Italy have a long tradition. Torricelli and Stephani argue that in southern Ticino, the border has always been permeable to traffic and markets, political ideas, fashions to costumes, and then, already in the post-war period, to the industrialisation process from the South. [30] The absence of a language barrier favours all this, as it also claims Economic Research Institute of University of Lugano “frontier labour markets will be “permeable,” given the common language, to frontier workers.” [31]

Despite this, the analyses conducted during the PhD highlighted some problems in the field of spatial planning.

[24] https://inclusivecommunication.scot/
[25] “The new generation of public participation: Internet-based participation tools, Planning Practice and Research”, pp.1, 2010.
[26] “Coproduction of government services and the new information technology: Investigating the distributional biases”, pp.2, 2013.
[27] “Effectiveness of Virtual Reality in Participatory Urban Planning”, pp.3, 2018.
[28] “Encyclopedia of the City”, pp.155, 2004.
[29] “La cooperazione transfrontaliera in Svizzera”, pp.3, 2009.
[30] “La cooperazione transfrontaliera in Svizzera”, pp.3, 2009.
[31] “Approfondimento della situazione del mercato del lavoro ticinese negli anni successivi all’introduzione dell’Accordo sulla Libera Circolazione delle Persone”, pp.62, 2015.

ISBN 978-3-9504945-0-1. Editors: M. SCHRENK, V. V: POPOVICH, P. ZEILE, P. ELISEI, C.BEYER, J. RYSER, G. STÖGLEHNER

First of all, a problem concerns the tools because there is no strategic planning shared between Switzerland and Italy. Therefore on the same territory, there are four different tools, two structural and two operational. They are different in terms of definition, competence, and characteristics. Canton Ticino has a strategic plan on a cantonal scale and uses zoning on the local scale. Lombardy Region instead has a strategic tool at different scales, and it has the regional law about urban and territorial regeneration. These tools must be "converted" to the same language to understand the possible outcomes.

The second type of problem of the cross-border region regards projects. There are many sectoral projects, but there is no integrated vision of territorial development and insufficient stakeholder involvement. For example, there are many INTERREG projects develop along five different axes. They intend to improve relations with local actors "(…) to improve the participation processes of stakeholders - businesses and civil society of the territories involved." [32] This aspect is essential to understand citizens' needs to create bottom-up processes and obtain good results in the territory. Regarding the work in the cross-border region between Sweden and Norway "The Sweden–Norway INTERREG-A subprogramme has assisted in boosting the cross-border collaboration process between Värmland Province and the Norwegian side of the border area since the mid-1990s, which has produced a positive effect on the territory in most of its development domains. However, beyond the Interreg programmes, the main policy agenda regarding current cross-border collaboration strategies has mainly centred on promoting economic growth (Region Värmland). Instead, the implementation of a broader cross-border policy development vision, based on a CBPS (bottom-up cross-border planning strategy), takes into consideration all domains of territorial development and the participation of the border residents – a bottom- up CBPS. The need for a CBPS makes even more sense in cross-border areas with long and strong historical collaboration ties, such as the border area comprising Värmland, Hedmark, Akershus, and Østfold." [33]

An excellent example of a cross-border project was the Regional Trains Ticino Lombardia (TILO). It is the first collaboration project ensuring regional and cross-border traffic. The company's shareholders are 50% of the Swiss Federal Railways SBB, and 50% of Trenord. [34]

Concerning the settlement model, the analysis of the territory highlights the use of sprawl. This model is no longer sustainable and generates lifestyles that prefer cars for daily journeys. The investigations conducted on the settlement units (understood as the sum of the resident population and the number of employees) in the cross-border region have shown that just under 70% of people do not live and work near the railway stations. In Switzerland, the settlement units near the stations are 48%, while in Italy, they are 25%.

All this generates two other problems. The first one concerns mobility and it is represented both by internal movements due to the growing number of frontier workers. In the 4th quarter of 2019, there were 67,878 cross-border commuters in Canton of Ticino, which increased 9.7% compared to the same quarter of the previous year. [35] A portion of the workers use the TILO for their daily movements. The average number of people on weekdays in the Lugano station during 2018 was 26.000 people, which increased 8.3 compared to the previous year. [36] The second problem is environmental and acoustic pollution. Low-intensity settlement development models and congestion of the main roads increase that, although all this does not correspond to the criteria of recent global trends.

In this cross-border region, the railway does not reach even half of the settlement units compared to other contexts such as northern Switzerland. [37] Consequently, the possibility of applying a policy for modal share will not have the same results. In this sense, greater efforts are needed to solve the sustainability of the settlement in this area.

In general, there is a discrepancy between the settlement model, the infrastructure network, and the local scale environment. For this reason, a survey was conducted in the cross-border region to understand urban

[32] https://progetti.interreg-italiasvizzera.eu/it
[33] "The importance of Swedish–Norwegian border residents' perspectives for bottom-up cross-border planning strategies", pp.13, 2019.
[34] https://www.tilo.ch/
[35] https://www.bfs.admin.ch
[36] https://www.sbb.ch
[37] "Gesamtperspektive Basel", 2020.

design and territorial dynamics. Attention is paid to the transformation areas because they are an opportunity for the future of this cross-border region.

All these problems can be tackled with greater collaboration on different scales "(…) This context provides a framework for thinking about how cross-border processes can operate more efficiently between governance levels that mediate and interconnect urban, local, regional, and national territorial planning processes." [38] According with Fossa, governance means "direct interaction between public bodies of different levels and stakeholders, outside the institutional hierarchies, aimed at projects or policies" [39] There is nobody with cross-border expertise, it is necessary to consider an involvement that starts from the bottom and considers the stakeholders already present in the area. A fundamental role is played by an informal instrument that fosters cross-border governance.

Another fundamental point concerns the context. The use of the same language and cultural affinities will be a positive element. According to an analog project in the Danube Region "It is clear from the case studies that a shared ethnicity and / or linguistic homogeneity tend to strengthen the intensity of cooperation." [40] To better understand cross-border problems and dynamics, we should analyze the territory on an intermediate scale. The studies conducted in Central Asia underline that it is necessary to move from a supranational to a subnational vision. According to Breslin and Hook, this vision is called microregionalism and refers to numerous interconnected processes "below" the national level across borders. [41] An example is in the study for the Hong Kong - Zhuhai - Macau Bridge. Also in this case there are no linguistic and cultural barriers. The great expansion of the area makes sure that people work in one country but live in the others. This generates continuous congestion of roads, boats, and customs. It was necessary to start a cross-border governance process for the construction of a new bridge. The process took many years and also involved stakeholders. Unlike the cases in the European Union the situation was: absence of authority at the regional level, transfer of power from the central government to the local governments and stakeholders. Also, in the cross-border between Switzerland and Italy, it could be considered to analyze the territorial context on a micro-regional scale. For example, there are different relations in the cross-border axis composed by Lugano (CH), Chiasso (CH), Como (IT), and Varese (IT). Recent events, such as the pandemic and climate crisis, have highlighted the close relationship between Como and Mendrisio. It is a micro-region within the cross-border region. Thanks also to the conformation of the territory, there are close work, commercial and family ties that need to be better analyzed, especially to overcome some of the problems previously described.

The research aims to create a conceptual model for the cross-border region. An informal planning tool that creates involvement beyond administrative borders, but it recognises the governance of Switzerland and Italy. For this reason, the research introduces a bottom-up tool that favours long-term processes. "A bottom-up based CBPS (bottom-up cross-border planning strategy) rationale can serve as a mechanism to implement an effective multilevel governance process, while combating persistent nation-state mentalities and border barriers. In summary, the main advantages of a bottom-up CBPS are that it takes into consideration the position of the residents in the border region." [42]

Ambus and Hoberg note the need to ''devolve more authority to communities to create the space for meaningful participation and to encourage more novel and adaptive approaches'' [43] Furthermore, Bixler said that in a world of uncertainty and complex social–ecological interactions, understanding cross-scale dynamics that affect decision making, adaptive capacity, and resilience across institutional levels is a critical endeavor and polycentric governance provides this framework. [44] The European Commission promotes that since 1997 "Such a bottom-up approach to spatial planning requires the recognition of the intersection between people and place, while embracing measures to co-ordinate municipal, regional, and national

[38] "The importance of Swedish–Norwegian border residents' perspectives for bottom-up cross-border planning strategies", pp.6, 2019.
[39] "Real estate registry", 2019
[40] "Crossing the Borders. Studies on cross-border cooperation within the Danub Region", pp.4, 2016.
[41] "Microregionalism and World Order", pp.8, 2002.
[42] "The importance of Swedish–Norwegian border residents' perspectives for bottom-up cross-border planning strategies", pp.13, 2019.
[43] "The evolution of devolution: A critical analysis of the community forest agreement in British Columbia", pp.945, 2011.
[44] "From Community Forest Management to Polycentric Governance: Assessing Evidence from the Bottom Up", pp.159, 2013.

ISBN 978-3-9504945-0-1. Editors: M. SCHRENK, V. V: POPOVICH, P. ZEILE, P. ELISEI, C.BEYER, J. RYSER, G. STÖGLEHNER

territorial development visions and interests, in a common decision-making process based on joint efforts in which common policies and guidelines are adopted." [45]

4.1 Chiasso

In recent times, a good opportunity for cross-border planning is in Chiasso. Together with Mendrisio, in recent years, he has been interested in various cultural projects with a cross-border character.

Fig. 2: Chiasso. Source: Municipality of Chiasso

Fontana argue that it is a highly competitive region, thanks also to its well-established geographical position, at the centre of an entire mobility network for Europe, the axis that connects the Mediterranean with the North Sea, the axis with the highest population density of the continent. EU-supported new track and tunnel projects favor strengthening links between major European cities within a high-speed network, where the topography is no longer a limit. Travel times have halved: Milan, Zurich, Malpensa, and the interconnected Alpine passes. [46]

Chiasso is the southern terminus of the Gotthard railway and is the northern end of the Milan-Chiasso line. The station is one of the customs posts and constitutes the border point of Swiss and Italian railway networks. The other customs offices are near Ponte Chiasso (Italy) and the biggest one is Brogeda crossing on the highway.

Currently, there are two important projects under discussion. The first proposes moving part of the Chiasso-Como highway route into the tunnel. This new layout also involves moving the customs grounds and digitising them. In addition, the Swiss Federal Railways is preparing the new layout of the railway yards of Chiasso. It involves the decommissioning of part of those and frees up an area to be redeveloped. As regards the areas currently occupied, these are an excellent possibility of conversion through a cross-border project. Together with the transformation areas present in the Chiasso Town Plan, they could change its layout. Furthermore, given the Chiasso railway station's importance, a project could be implemented with a centripetal concept. It consists of the concentration of qualitative development in a limited space, preserving free spaces, and increasing the quality of existing centres. Moving the route would also enhance the green areas present along the Faloppa river in Chiasso and the Breggia river banks as far as Lake Como.

These visions must be managed beyond administrative boundaries. Furthermore, only with local actors' involvement will it be possible to make a paradigm shift in the territory's choices and define a new concept of quality.

[45] "The EU Compendium of Spatial Planning Systems and Policies", pp.75, 1997.
[46] "Pianificazione transfrontaliera per lo spazio funzionale di Chiasso", pp.10, 2019.

In recent months, the first application of the conceptual model is being carried out with a class of students at SUPSI (University of Applied Sciences and Arts of Southern Switzerland). The students were divided into five groups, and each represents a different actor who intervenes in their ways and times. As for the characteristics, both the multiscalar and the interdisciplinary approach are taken into consideration. In addition to the difference in the scales of intervention, different methods have been envisaged to represent the design solutions: freehand, software as desired by the designers, and CityEngine, a software application developed by Esri R&D Center Zurich. In this way, it will be possible to evaluate the effects of the students' different representations.

The project proposal's development will have to consider the aspects of settlements, mobility, and the environment. A reflection was made on the complexity of emergencies (climatic, pandemic) that this historical moment requires. Finally, particular attention must be given to the communication of design solutions: the method and tools used to illustrate the project were evaluated as an integral part of the project.

At the end of the course, a debate was organised to evaluate the effects of the representations. Compared to the traditional representations used in the first part of the test, parametric design, thanks to CityEngine, has changed the ongoing discussion. It contributed to creating a climate of dialogue and comparison on the various project solutions proposed.

Then, the second ongoing test of the research involves stakeholders' participation to obtain a shared vision for the area.

Fig. 3: The first result of the test with the students, by A.Rollandi

5 CONCLUSION

At the end of this examination, three aspects appear evident. The first aspect concerns the problems: they must be faced in an interdisciplinary and multiscalar way. The second concerns borders: they must not be a limit. In compliance with cross-border governance, different scales of intervention and informal tools: using constantly evolving techniques adapt more quickly to citizens' needs than traditional planning tools. Finally, tools must favor bottom-up approaches. With the help of parametric design and appropriate communication tools, the conceptual model will also be possible to have higher engagement levels in the cross-border project.

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ISBN 978-3-9504945-0-1. Editors: M. SCHRENK, V. V: POPOVICH, P. ZEILE, P. ELISEI, C.BEYER, J. RYSER, G. STÖGLEHNER

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