

Geodesign in the Planning Practice: Lessons Learnt from Experience in Italy

Michele Campagna¹

¹University of Cagliari/Italy · campagna@unica.it

Abstract: In the last two decades or so, the geodesign approach has attracted a growing interest in the community of scholars and practitioners in spatial planning, landscape planning and related disciplines. Research on geodesign has since been flourishing accordingly, and dozens of case studies around the world have been undertaken. Early experimental studies were mostly carried-on in academic settings, occasionally with direct involvement of local stakeholders. More recently, however, the experiences gained in early years of research have offered a solid ground for launching a growing number of applications of geodesign methods to real world planning practice, most notably in strategic planning. This contribution presents the comparison of the results of two real-world case studies developed in Italy by the author, aiming at proposing an early assessment on if, and to what extent, the geodesign approach may be ready to offer an effective solution to most actual needs in the contemporary planning practice with regards to the current evolution of the Italian planning systems.

Keywords: Geodesign, strategic planning, planning practice

1 Introduction

The geodesign *movement*, defined as the application of the geodesign approach in landscape architecture and more generally in spatial planning studies by scholars and practitioners worldwide, has grown steadily since its early ignition at the National Center for Geographic Information and Analysis (NCGIA) meetings on landscape change and on spatial concepts on GIS and design, back in the early 2000s (WILSON 2015). In less than two decades, geodesign have become subject of academic curricula, theme of dedicated meetings (e. g., Esri's annual Geodesign Summit, Digital Landscape Architecture conferences, to name two) and a hot-topic in broader conferences in landscape architecture, spatial planning, geography and GIS. Likewise, geodesign was introduced into the realm of the planning and design practice, such in major infrastructure and engineering consulting firms as AECOM (MILLER 2012), O2 or Jacobs (WHEELER 2020). The promise, to be carefully assessed, is to empower more traditional environmental planning approaches with state-of-the-art technology tools, aiming at tackling current complex and unprecedented sustainability challenges.

While consensus may be found on a general geodesign definition as “a design and planning method which tightly couples the creation of design proposals with impact simulations informed by geographic contexts” (FLAXMAN 2010), this is only one of many features the approach can offer. Often, especially looking at the practice, one can observe a tendency to reduce the concept to its technology perspective, presenting geodesign as an application of CAD, BIM, GIS tools, from 2D mapping to 3D modelling. Accordingly, geodesign solutions often combine sketching and modelling tools with GIS and high-quality renderings to support planning and design. However, we assume here that while technology may indeed enable and greatly facilitate the application of techniques for planning built and natural environments in an integrated process thanks to the creation of multi-scale computational environments, methodology still stands at the very core of the practice of geodesign. As such, a meaningful

geodesign study should be grounded on sound methodology: the application of the Steinitz's framework (2012), in all its models and iterations, proved to effectively serve this purpose applying system thinking and supporting the fruitful collaboration among design professionals, geographic scientists, information technology experts, and last but not least, the people of the place. On the practical side, geodesign workshops supported preferably, but not strictly necessarily, by user-friendly interactive technologies can enable all that. In the last years, a widely applied geodesign workshop format which proved to be effective (RIVERO et al. 2015, NYERGES et al. 2016, CAMPAGNA et al. 2016, PETTIT et al. 2019) would include a knowledge building or assessment phase implementation (i. e. Steinitz' representation, process, and evaluation models) in a GIS environment, and an intervention phase (i. e. the change, impact, and decision models) implemented with the support of collaborative planning support system with a strong emphasis in supporting knowledge-based interactive collaboration and negotiation among many participants (the author has experience working with up to more than 60 simultaneously). Such format has been widely and successfully experimented in less than a decade, mostly in academic settings, and notably within the initiatives of the International Geodesign Collaboration (IGC; FISHER et al. 2020).

In this broad context, an interesting research question is then to what extent the application of geodesign in general, and of geodesign workshops in particular, may be effective in addressing real-world challenges and current needs in the institutional planning practice. This contribution aims at answering this question with regards to the Italian planning system (as described in section 2) analysing in comparison two recent planning processes which adopted the geodesign workshop, as introduced above, as main tool for supporting real-world strategic planning (section 4).

2 The Italian Planning System Between Tradition and Innovation

The Italian planning system is currently still framed by the National Planning Law (NPL) n°1150 adopted back in 1942. At that time, the most urgent need which informed its framing, adoption, and its application in the first decade of post-WWII reconstruction and following economic progress, was basically to control the growing settlements expansion. The NPL introduced a top down approach for regional and urban development planning organized in three main tiers, to be implemented by territorial coordination plans (later regional plans), local land-use plans at the municipal level, and implementation plans for specific land-uses such as for residential areas, historic centres, industrial areas, public housing, among others. Later in 1967, new urban development standards aiming at improving residential quality were introduced with the National Law n°765, affecting mainly the design of residential areas. In parallel, landscape protection regulations were introduced firstly in 1939 (with the laws n°1497 and n°1089), aiming at protecting individual natural and cultural heritage resources respectively. Later in 1985, Law n°431 introduced a more comprehensive and integrated concept of landscape as unique combinations of natural and cultural territorial features, to be protected through regional landscape plans. Most recently in 2004, the National Decree n°42, integrated the approach to landscape planning brought by the European Landscape Convention (2000).

In the above settings, little innovation was introduced in the Italian Planning Systems in terms of planning instruments since its early definition: while in some cases regional plans developed hybrid forms of regional development / landscape protection plans, and regional differences were introduced in local land-use plans, the main structure of the national framework remained substantially unchanged. Indeed, in the last four decades or so a long debate on the reform of the National Planning Law unfolded among academics and practitioners nationwide, nevertheless so far, no concrete results have been achieved.

In the last few decades, however, strategic planning started to be experimented in Italy. The making of strategic plans evolved mostly at the municipal level, and the local strategic plan was mostly considered a voluntary act until 2014, when it became a compulsory duty for metropolitan cities after the new Law n° 56, as a base for informing the making of (metropolitan) territorial plan thereafter. It should be noted, in addition, that beside regional and urban planning tools, several sector plans were introduced to regulate development with regards to several territorial systems such as hydrology, transport, environmental conservation, energy, tourism, waste management, to name some of those affecting substantial changes in territorial development. However, more often than not, all these new sector plans were developed without substantial coordination, creating in some cases complex overlapping and occasionally conflicting rules. Part of the latter issues was addressed after the European Directive 2001/42/EC introduced Strategic Environmental Assessment (SEA) regulations, according to which most if not all plans at all scales in Italy started to be subject to environmental impact assessment procedures before their adoption. While SEA practice usually includes a vertical and horizontal assessment of consistency of new plans with pre-existing ones, the first decades of the SEA application to spatial plans seldom achieved the substantial sustainability innovation introduced by the EU Directive principles, in terms of subsidiarity, participation, transparency.

Lastly, the recent European Green Deal is since recently providing a boost for the European green transition in the Member States. Unprecedented resources were provided to Member States to accelerate the transition to a green economy, with expectable major results in terms of territorial, economic and social transformation, to be achieved through actions in several territorial systems. This model is in line with the earlier application of structural funds, through which in the last decades the European Union fostered territorial development especially in lagging behind regions, where regional and local authorities could not mobilize otherwise financial measures for the purpose with routine governance resources.

In such a context as Italy however, where current spatial planning tools were conceived almost a century ago, innovation in the planning system at the national level, and in several cases at the regional level as well is indeed limited: development of new plans is often cumbersome, lengthy, and unsuited to fulfil current needs. Hence, the introduction of strategic plans informing at the small scale level (i. e. large areas or regions) the making of lower levels physical plans may help to make the territorial governance framework more consistent and suited to address current needs.

3 Geodesign: from Research to Practice

Since the publication of the STEINITZ book (2012), presenting a thorough formalization of the geodesign framework, research in the field has evolved fast. Thanks also to the introduc-

tion of new planning support system informed by the geodesign framework, such as most notably geodesignhub (BALLAL 2015), the number of studies has increased constantly. Furthermore, the birth of the International Geodesign Collaboration (IGC) in 2018 contributed dozen of comparable geodesign case studies around the world exploring the role of technology innovations in addressing locally current urgent local and global challenges (ORLAND & STEINITZ 2019, FISHER et al. 2020).

Geodesign, as an approach, may represent a key element to catch up with chronic delays, and eventually bring the necessary innovation to the (Italian) planning practice to enable regions and local communities to address current urgent challenges. Geodesign seems to be particularly suited for the purpose for: it applies system thinking (fostering the strategic coordination and synergies of sector plans); it provides multiscale computational environments (supporting impact assessment and subsidiarity); and it supports fast and effective collaborative design processes, enabling mutual-learning among participants and consensus building. To test this hypothesis however, we should assess to what extent existing geodesign methods and tools may be considered ready for fruitful application in the planning practice, as innovation may arguably take time to be fully taken on board.

While the recent growth of interest in geodesign and the completion of a big number of research studies may represent a major step forward in understanding how to address current sustainability challenges in a more effective way, when it comes to the planning practice geodesign application is affected by and have to face and comply with local cultural and political settings, needs and requirements, consolidated routines and power relationships: all these factors may often require to find a balance between the geodesign approach novelty and more traditional way of doing planning in order to achieve fruitful innovation. In other words, as much geodesign is usually appreciated by involved stakeholders in experimental geodesign scenario planning studies where the objective is testing new methods and tools and participants may be expectedly more open to learning, when it comes to the planning practice and deliberation is expected at the end of the process, involved real-world stakeholders may be more cautious, even suspicious, in adopting a new (unfamiliar) working settings, which may change the language, the media, and eventually affect established power relationships. Hence, understanding the dynamics of geodesign adoption in practice should be supported by careful reflections and assessment based on real-world experience. While the number of existing examples is still limited for comprehensive quantitative comparisons, an early critical review of the available examples may offer useful insights for providing tentative answers, and eventually possibly contributing elements for developing a more robust assessment framework in the future.

4 Two Real World Case Studies

The two case studies considered in this paper were both coordinated by the author as geodesign workshops supported by the geodesignhub planning support system within real-world strategic planning processes.

The first case study aimed at developing a strategic tourism development plan in the Oristano Gulf (Italy), and was held in the late 2019. The study involved five municipalities and several local stakeholders from NGOs and from the private sector, who collaborated in a workshop articulated in 3 sessions for a total of about 20 hours in presence (i. e. same time, same place)

along two working weeks, after a few months of workshop preparation by the coordination team in close partnership with the municipalities. While all the participants contributed their design part to the final agreed scenario based on consensus, the final responsibility regarding its formal adoption was owned by the municipalities only. The workshop, moreover, included a preliminary online session of design ideas crowdsourcing open to the whole community, which produced additional design data for the workshop, enabling wider community participation.

The second case study was developed in April 2021 during COVID19 pandemic. The geodesign workshop itself was, in this case, one individual step in the broader process of making of the Strategic Plan of the Metropolitan City of Cagliari (MCC), which included other participatory steps such as questionnaire surveys to citizens, and more traditional thematic workshops with stakeholders from NGOs and from the private sector among others. Focus of the workshop was to reach consensus among municipalities on a future spatial development scenario in line with an already approved preliminary strategic agenda. Table 1 synthesises the main features of the two workshops in comparison.

Table 1: Comparison of the main features of the two geodesign workshops

	Oristano Gulf	Metro-city Cagliari
Year	2019	2021
Goal	Sustainable tourism development scenario	Metropolitan strategic plan
Duration	20 hours in 3 days along 2 weeks	12 hours in 4 days along 2 weeks
Participants	5 municipalities (elected officials, decision-makers and technical staff); community stakeholders from NGOs and private sector	17 municipalities (elected officials, decision-makers and technical staff); 1 metro authority (decision-makers and technical staff)
Settings	Live (1 room)	Online (Zoom)
Technology	Geodesignhub	Geodesignhub
Systems	9 systems (+1 free) including green, blue and grey (2) infrastructures, agriculture, tourism (2), culture (2)	10 systems green, blue and grey infrastructures, agriculture, tourism, commerce and industry, housing, culture, smart-hubs
Deliverables	Future development scenario (map), technical report	Agreed scenario (map), priorities
Outcomes	Adopted	Included in the final plan

Due to existing pandemic social interaction and movement restrictions, the workshop was developed fully digital with the support of the Zoom online video communication platform, allowing for remote smart participation. The workshop schedules were articulated in 4 sessions, lasting three hours each along two weeks. The participants included all the 17 municipalities of the MCC, as well as the managerial and technical staff from the MCC. The results of the workshop consisted on a final agreed scenario based on consensus by the municipalities, including the definition of priorities for implementation. The atlas of the design results

can be found at tinyurl.com/metroca21. The design was included with all the other inputs gathered in the entire strategic plan making phases (e. g. questionnaire surveys, thematic workshops, etc.) in the final strategic plan documents, and eventually adopted (at a higher government level) by the Metropolitan Council in July 2021.

5 Results

In both cases, as normally experienced in geodesign workshops in research and teaching settings, most if not all the participants eventually appreciated the novelty of the geodesign approach for several reasons including the possibility to develop a fair and constructive dialogue among all the participants, including those who normally may have less space in the arena to have their voice heard. The fact that the workshop itself represented a learning experience for them was also much appreciated. The overall appreciation was demonstrated by post-workshop formal and informal feed-backs and questionnaire surveys (the detailed analysis of which is out of the scope of this paper). Nevertheless, in both of the case studies considered here, the final positive appreciation was not achieved without following initial criticism (and scepticism in some cases) by several participants especially at the early stages of their involvement in the process. In both cases, however this happened before involved stakeholders became familiar and confident with the approach and, eventually, mostly appreciated its results. Indeed, scepticism and criticism can be expected in such contexts when traditional practices are often disappointing to participants and still stakes are high and sensitive. Hence, the application of geodesign to practice in real-world processes when deliberation is to be achieved may require the ability of the coordinator to smoothly conduct the workshop developing participants trust and attitude to collaboration on the go. Not paying the proper attention to these issues might potentially undermine the success of the initiatives.

In both cases, the final scenarios were input for deliberations. Beside positive impacts in terms of learning and consensus building, in both cases the agreed final scenarios were fruitfully used to support the integration of territorial transformation actions which would have not been included in other traditional planning instrument otherwise. In this sense, both studies supported strategic planning with a fast, effective, and rewarding process: this can be considered an important element of innovation, especially with regards to the current Italian territorial governance context.

Both in the live and in the online experiences the participants were able to collaborate in groups proactively, and the emergence of trust relationships was observed in many stages along the processes. The combination of Zoom online collaboration platform and Geodesign-hub enabled, in this sense, as much an engaging experience for the participants as working in the same room. Tight schedules and online communication protocols in addition succeeded to keep the discussion on track, unlike often happens in traditional planning process where the discussion often follows unexpected, un-coordinated, and inconclusive strays.

6 Discussion and Conclusion

Based on this brief analysis of two geodesign application to real-world strategic planning examples, an early tentative answer about if geodesign research can likely be adopted and

bring innovation in the practice is substantially positive. In both cases geodesign innovation adoption was eventually well received by the stakeholders and effective in supporting collaboration and deliberation, and with substantial benefits in:

- Effectiveness (i. e. achieving positive results in terms of quality and consensus in much shorter time and in deeper than in traditional processes);
- Learning-experience (i. e. improving the understanding of actual issues, their relationships, and evolution of the perspectives by the participants);
- Inclusiveness (i. e. all the participants had the opportunity to have their voice heard).

While the use of user-friendly collaborative planning support system, system-thinking, and negotiation proved to be very effective in both cases, other forward looking long-term scenario planning and foresight approaches, such as those experimented by the IGC, may need more time to be directly applied to institutional deliberative processes. Possibly, they might potentially be better received once the community become familiar with the fundamentals of geodesign and the benefits of its application, as this might raise awareness on the opportunities of applying geodesign as routine. While the latter could potentially set the conditions for improving civic actions by fostering cooperation among social parties and eventually facilitate communities' societal changes, this may be considered a medium-long-term objective to achieve.

With reference to the Italian planning framework, the two case studies demonstrated the potential of geodesign adoption in strategic planning, in terms of effectiveness, quality, speed, learning-experience, transparency, and legitimacy, providing spatially explicit solutions, whereas traditionally the verbal language dominates when dealing with planning strategies. While in Italy strategic planning is already a normative requirement at the Metropolitan City government level, this is still a voluntary option at the local municipal level: the Oristano Gulf case study in particular showed the benefit of adopting such an approach.

In terms of participation, the two case studies represent two different settings: in the case of Oristano a broad variety of stakeholders were invited to participate and those most concerned eventually attended the whole process; in the case of Cagliari, only representatives of the municipal and metropolitan authorities participated, whereas the final deliberations, informed by the contribution of the municipalities, were made by the metropolitan level. The two case studies altogether show practical examples of horizontal and vertical collaboration, with more or less openness to wider participation respectively.

From this research perspective, further issues worth of investigation in the future include the possibility to a deeper involvement of stakeholders in the knowledge building, or assessment phase of the Steinitz' framework. This is a less explored facet in geodesign studies, especially in application to practice which would definitely need more experimentation.

This contribution, to conclude, critically reports early experiences of geodesign application in strategic planning practice, and calls for more research, possibly based on a consistent framework to be developed, including international case studies, in order to further investigate whether the results of the analysis of the Italian early experiences may be generalizable to different institutional, cultural and political settings in other countries, where the degree of openness of decision-makers and stakeholders to innovation, collaboration, transparency, inclusiveness may be very diverse.

Acknowledgement

The author wish to thank the anonymous reviewers for their useful comments to the early version of the paper, and to acknowledge the funding to the research by the *Fondazione di Sardegna* [project: “Investigating the relationships between knowledge-building and design and decision-making in spatial planning with geodesign], and by the *Autonomous Region of Sardinia, Regional Law n. 7/2007, Fund for Development and Cohesion* [Project: “Rural landscapes of Sardinia: planning green and blue infrastructures and spatial complex networks”].

References

- BALLAL, H. (2015), Collaborative Planning with Digital Design Synthesis. Ph. D. Thesis, UCL (University College London), London, UK.
- CAMPAGNA, M., STEINITZ, C., DI CESARE, E. A., COCCO, C., HRISHIKESH, B. & TESS, C. (2016), Collaboration in planning: The Geodesign approach. *Rozwój Regionalny i Polityka Regionalna*, 35, 55-72.
- FISHER, T., ORLAND, B. & STEINITZ, C. (2020), International Geodesign Collaboration: Changing Geography by Design. ESRI Press, Redlands, CA.
- FLAXMAN, M. (2010), Geodesign: Fundamental Principles and Routes Forward. Talk at GeoDesign Summit 2010.
- MILLER, W. (2012), Introducing Geodesign: the concept. ESRI Press, Redlands, CA.
- ORLAND, B. & STEINITZ, C. (2019), Improving our Global Infrastructure: The International Geodesign Collaboration. *Journal of Digital Landscape Architecture*, 4-2019, 213-219. <https://doi.org/10.14627/537663023>.
- NYERGES, T., BALLAL, H., STEINITZ, C., CANFIELD, T., RODERICK, M., RITZMAN, J. & THANATEMANEERAT, W. (2016), Geodesign dynamics for sustainable urban watershed development. *Sustainable Cities and Society*, 25, 13-24.
- PETTIT, C., HAWKEN, S., ZARPELON, S., TICZON, C., AFROOZ, A., STEINITZ, C., BALLAL, H., CANFIELD, T. & LIESKE, S. (2019), Breaking Down the Silos Through Geodesign – Envisioning Sydney’s Urban future. *Environ. Plan. B Urban Anal. City Sci.* 46 (8), 1387-1404.
- RIVERO, R., SMITH, A., BALLAL, H. & STEINITZ, C. (2015), Promoting Collaborative Geodesign in a Multidisciplinary and Multiscale Environment: Coastal Georgia 2050, USA. *Digital Landscape Architecture*, 1, 42-58.
- STEINITZ, C. (2012), A framework for geodesign: Changing geography by design. ESRI Press, Redlands, CA.
- WHEELER, C. (2020), Geodesign: making footprints for a better world, Arcwatch, May 2020. ESRI, Redlands, CA.
- WILSON, M. (2015), On the criticality of mapping practices: Geodesign as critical GIS? *Landscape and Urban Planning*, 142, 226-234.