

TeMA

Journal of
Land Use, Mobility and Environment

This special issue collects a selection of peer-review papers presented at the 8th International Conference INPUT 2014 titled "Smart City: planning for energy, transportation and sustainability of urban systems", held on 4-6 June in Naples, Italy. The issue includes recent developments on the theme of relationship between innovation and city management and planning.

Tema is the Journal of Land use, Mobility and Environment and offers papers with a unified approach to planning and mobility. TeMA Journal has also received the Sparc Europe Seal of Open Access Journals released by Scholarly Publishing and Academic Resources Coalition (SPARC Europe) and the Directory of Open Access Journals (DOAJ).

INPUT 2014

papers selected

Smart City

planning for energy, transportation
and sustainability of the urban system

SMART CITY

PLANNING FOR ENERGY, TRANSPORTATION AND SUSTAINABILITY OF THE URBAN SYSTEM

Special Issue, June 2014

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TeMA. Journal of Land Use, Mobility and Environment offers researches, applications and contributions with a unified approach to planning and mobility and publishes original inter-disciplinary papers on the interaction of transport, land use and environment. Domains include engineering, planning, modeling, behavior, economics, geography, regional science, sociology, architecture and design, network science, and complex systems.

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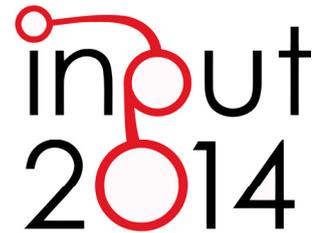
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This special issue of TeMA collects the papers presented at the 8th International Conference INPUT 2014 which will take place in Naples from 4th to 6th June. The Conference focuses on one of the central topics within the urban studies debate and combines, in a new perspective, researches concerning the relationship between innovation and management of city changing.



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EIGHTH INTERNATIONAL CONFERENCE INPUT 2014

SMART CITY. PLANNING FOR ENERGY, TRANSPORTATION AND SUSTAINABILITY OF THE URBAN SYSTEM

This special issue of TeMA collects the papers presented at the Eighth International Conference INPUT, 2014, titled "Smart City. Planning for energy, transportation and sustainability of the urban system" that takes place in Naples from 4 to 6 of June 2014.

INPUT (Innovation in Urban Planning and Territorial) consists of an informal group/network of academic researchers Italians and foreigners working in several areas related to urban and territorial planning. Starting from the first conference, held in Venice in 1999, INPUT has represented an opportunity to reflect on the use of Information and Communication Technologies (ICTs) as key planning support tools. The theme of the eighth conference focuses on one of the most topical debate of urban studies that combines , in a new perspective, researches concerning the relationship between innovation (technological, methodological, of process etc..) and the management of the changes of the city. The Smart City is also currently the most investigated subject by TeMA that with this number is intended to provide a broad overview of the research activities currently in place in Italy and a number of European countries. Naples, with its tradition of studies in this particular research field, represents the best place to review progress on what is being done and try to identify some structural elements of a planning approach.

Furthermore the conference has represented the ideal space of mind comparison and ideas exchanging about a number of topics like: planning support systems, models to geo-design, qualitative cognitive models and formal ontologies, smart mobility and urban transport, Visualization and spatial perception in urban planning innovative processes for urban regeneration, smart city and smart citizen, the Smart Energy Master project, urban entropy and evaluation in urban planning, etc..

The conference INPUT Naples 2014 were sent 84 papers, through a computerized procedure using the website www.input2014.it . The papers were subjected to a series of monitoring and control operations. The first fundamental phase saw the submission of the papers to reviewers. To enable a blind procedure the papers have been checked in advance, in order to eliminate any reference to the authors. The review was carried out on a form set up by the local scientific committee. The review forms received were sent to the authors who have adapted the papers, in a more or less extensive way, on the base of the received comments. At this point (third stage), the new version of the paper was subjected to control for to standardize the content to the layout required for the publication within TeMA. In parallel, the Local Scientific Committee, along with the Editorial Board of the magazine, has provided to the technical operation on the site TeMA (insertion of data for the indexing and insertion of pdf version of the papers). In the light of the time's shortness and of the high number of contributions the Local Scientific Committee decided to publish the papers by applying some simplifies compared with the normal procedures used by TeMA. Specifically:

- Each paper was equipped with cover, TeMA Editorial Advisory Board, INPUT Scientific Committee, introductory page of INPUT 2014 and summary;
- Summary and sorting of the papers are in alphabetical order, based on the surname of the first author;
- Each paper is indexed with own DOI codex which can be found in the electronic version on TeMA website (www.tema.unina.it). The codex is not present on the pdf version of the papers.

SMART CITY PLANNING FOR ENERGY, TRANSPORTATION AND SUSTAINABILITY OF THE URBAN SYSTEM Special Issue, June 2014

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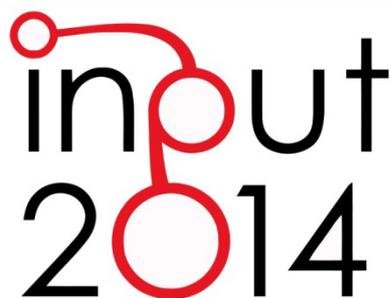
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SPECIAL ISSUE

Eighth International Conference INPUT
Smart City - Planning for Energy, Transportation and Sustainability
of the Urban System

Naples, 4-6 June 2014

The logo for the INPUT 2014 conference. The word 'input' is written in a lowercase, sans-serif font. The 'i' and 'n' are black, while the 'p' is red. The word '2014' is written below 'input' in a larger, bold, sans-serif font. The '0' is red, and the '1' and '4' are black. A red line connects the top of the 'i' to the top of the 'p', and another red line connects the top of the 'p' to the top of the '0'.

GEODESIGN FROM THEORY TO PRACTICE: FROM METAPLANNING TO 2ND GENERATION OF PLANNING SUPPORT SYSTEMS

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ABSTRACT

This paper deals with the concept of Geodesign, a new approach to spatial planning and design which is grounded on extensive use of Geographic Information Science methods and tools. As a method Geodesign is intended to inform projects since their conceptualization, to analysis and diagnosis, to design of alternatives and impact simulation, and eventually the final choice. This approach appears particularly urgent and actual to many scholars from academia and practitioners from the industry and the planning practice for advances in GIScience nowadays offer unprecedented data and tools to manage territorial knowledge for decision-making support. The author argues research in Geodesign may contribute to solve major actual pitfalls in sustainable spatial planning: namely it may offer methods to help planners to inform sustainable design alternatives with environmental considerations and contextually assess their impacts; secondly, it may help to ensure more transparent, responsible, and accountable democratic decision-making processes. The argumentation is supported by the author recent research results with regards to the evolution from 1st generation Planning Support Systems (PSS), to metaplaning and 2nd generation PSS.

KEYWORDS

Geodesign, Metaplaning, Planning Support Systems, Strategic Environmental Assessment, Urban and Regional Planning.

1 INTRODUCTION

The role of the technical rationality in planning changes according to spatial and temporal contexts with the different political, administrative and socio-cultural settings which may occur. These conditions affect the role all actors– including the planner itself – have in the planning arena, the way they participate (Arnstein, 1969) and the way they affect the final decisions. Hence in practice, the influence of those decisions on the future territorial development patterns -informed or not by the technical rationality (Flyvbjerg, 1998)- varies accordingly. It is not always straightforward for the community, as well as for the stake-holders involved in the planning process, to understand the “why” and the “how” decisions are made. This may be considered a major issue when dealing with the sustainability of the development processes, for it involves such important dimensions as responsibility, accountability, transparency, and eventually democracy of decision-making. In fact, the concept of sustainability of development is a complex one for it entails, as expressed by the principles of the Rio Declaration (UNGA, 1992), many dimensions to be considered along with the development processes, which in turn should be democratic, environmentally savvy and based on informed decision-making. In Agenda 21 (1992) two of its 40 chapters are specifically dedicated to the role of the scientific and technology community in sustainability, and to the role of information in decision-making. These objectives found transposition in the European policies on environmental impact assessment. Strategic Environmental Assessment was introduced in Europe in 2001 by the Directive 2001/42/EC with the aim of providing high levels of protection of the environment and contributing to the integration of environmental considerations in plan-making, according to sustainable development principles. After a decade of its adoption the implementation of the SEA Directive is widespread in Europe. SEA can be defined as a structured, rigorous, participative, open and transparent environmental impact assessment based process, applied to plans and programs (Fisher, 2007). Nevertheless, concern is often raised about its actual efficacy with regard to its real capacity to inform decision-making in the regional or local land-use planning process (Sheate, 2004; Fisher, 2010).

Hence, research in sustainable spatial planning should address two major issues, which are still poorly understood and not adequately tackled in the practice: more reliable methods are needed in order i) to inform the design of the territorial development by environmental considerations, and ii) to govern the development process so that it may be clear the how and the why decisions are made, by whom and on behalf of whom. Again, these appear such relevant issues that if not properly addressed may undermine any endeavour towards sustainability in a planning process.

In the light of the above assumptions, this paper reports current results of an ongoing research project on the impact of Strategic Environmental Assessment and Spatial Data Infrastructure policies in urban and regional planning. The project case study focuses on Sardinia (IT), where the actual planning system is nowadays characterized by a Regional Landscape Plan informing top-down the regional spatial governance, and by local land-use plans which should enact the RLP strategies in the Sardinian municipalities. The implementation of this scheme, which finds similar cases in other regions in Italy and Europe, is currently affected by the implementation of both the Directive 2001/42/EC on Strategic Environmental Assessment, which introduces impact assessment procedures for plans and programs- including regional, urban and sector planning-, and the Directive 2007/02/EC, which introduces the INfrastructure for SPatial InfoRmation in Europe (INSPIRE). While the first requires methodological innovation in the plan-making methods and processes in order to achieve more sustainable, informed and democratic decision-making, the second is starting to offer the Information Communication Technology (ICT) tools (i.e. interoperable digital spatial data and services) for easing knowledge building, collaboration among stakeholders, and decision-making

support in urban and regional planning. These two factors together are starting to affect the way plans are made, their contents, their format, generating the urgent need -as well as the unprecedented opportunity- for the development and the diffusion of integrated planning support systems (Harris, 1989; Brail and Klosterman, 2001; Campagna, 2004; Geertman and Stillwell, 2009).

Hence the relevance of the question on how to fill the gap between Planning Support System (PSS) research and real-life planning practices. The tentative answer given by the first research results presented in this contribution is twofold: on the one hand, much work is still needed to adapt existing software (i.e. 1st generation PSS) to local contexts easing their adoption by local planners, possibly serving customized functions by Regional SDI added-value services; on the other hand, innovative models for PSS should be conceived, implemented and tested in order to address some of the acknowledged pitfalls of 1st generation PSS, including among other their still existing limits of adaptability to different planning models and contexts. While in fact, 1st generation PSSs usually rely on off-the-shelf software or on custom software ad-hoc developed for given processes, the concept of 2nd generation PSS can be thought as an enabling platform which is intended to ease the governing or the management of the planning process including the orchestrated supply of the required (geo-) Information and Communication Technology (ICT) tools along the various steps of the planning process workflow. Thus, it should be noted, that while research on 1st generation PSS entails a more applied research approach in engineering, the formalization of the novel concept of metaplaning and 2nd generation PSS pivots around more theoretical social and management science issues in spatial planning.

With the above premises in Section 2, the concept of Geodesign is proposed as an innovative approach to urban and regional planning which, it is argued, may help to inform design by geography. The application of this approach is discussed in Section 2.1 with reference to the implementation of a pilot 1st generation Planning Support System for the Strategic Environmental Assessment (SEA) of Local Land Use Planning (LLUP) in Sardinia. In Section 3, the author proposes the concept of metaplaning as a method to manage the planning process aiming at ensuring its transparency, accountability, and traceability, and arguing that it may eventually support collaboration among the planning actors and inform the design of and the seamless implementation of 2nd generation Planning Support Systems. In the last section the author draws some conclusions on the opportunity offered by metaplaning to contribute to advancement in Geodesign research and sustainable planning practices.

2 THE EMERGING GEODESIGN PARADIGM AND 1ST GENERATION PSS

The term Geodesign has since recently become popular among spatial planning and Geographic Information Science scholars as an approach to planning and design, which is deeply rooted in geographic analysis to inform collaborative decision-making. This emerging trans-disciplinary debate concerns both the definition and the application of the concept of Geodesign (Steinitz, 2012). Geodesign can be defined as an integrated process informed by environmental sustainability appraisal which includes project conceptualization, analysis, projection and forecasting, diagnosis, alternative design, impact simulation and assessment, and which involves a number of technical, political and social actors in collaborative decision-making. The innovation in Geodesign, compared to older approaches in environmental planning and landscape architecture, falls rather on the extensive use of digital spatial data, processing, and communication resources.

As a matter of facts nowadays, the Information Society reached a mature age, and we face unprecedented wealth in terms of digital (spatial) data sources. The concept of Digital Earth (Craglia et Al., 2012) is slowly

shaping into reality, and both authoritative and volunteered geographic information resources are available to support analysis and decision-making. Nevertheless in spatial planning, professionals and decision-makers still lag-behind in the digital uptake in the practice, and in properly taking advantage of developing Spatial Data Infrastructures. Hence, making the Geodesign concept operational may be still considered a challenging task for many professionals and practitioners. Nevertheless, this should not be considered a minor issue for urban and regional planning legislation, as well as environmental assessment regulations and good practices, are making digital spatial data analysis and representation the mandatory working-space for spatial planners. In Italy, as a matter of facts, new regional spatial planning laws in Lombardy and Tuscany, as well as the Regional Landscape Plan in Sardinia, require to develop local land use plans relying on the respective regional Spatial Data Infrastructures data and services, and to represent the final plan in digital format. In these conditions while traditional plan-making method and tools are outdated and lack in competitiveness, the adoption of new media and tools without properly exploiting their potential would be a major missed opportunity for innovation with imponderable detriments to sustainability of development choices.

Geodesign on the other hand may constitute a promising approach in order to address current open issues in SEA, possibly bringing the invoked innovation in urban and regional planning. Steinitz (2012) recently proposed an integrated Geodesign framework (GDF) for the implementation of the approach in urban and regional planning and design. The GDF consists of six types of models the implementation of which is carried on iteratively. The representation models answer questions about how the environmental system, or the landscape, should be described. Then the process and the evaluation models explain how the system is evolving and what opportunities and threats can be devised. Once the base knowledge is created it may be used to inform the design of possible solutions or alternatives with the change models, whose outputs are then assessed through impact models and eventually chosen with the decision models. This methodological framework may be implemented in many ways. Among the possible interpretations, in the next paragraph ongoing research results are synthesised with regards to the implementation of a Geodesign approach in the pilot Planning Support System for the SEA of LLUP in Sardinia (further details of which are out of the scope of this paper, but are extensively documented in: Campagna and Matta, 2014).

2.1 THE SEA-LLUP 1ST GENERATION PLANNING SUPPORT SYSTEMS

The core of the contemporary regional planning system in Sardinia is characterized by a Regional Landscape Plan (RLP) adopted for the first time in 2006. The RLP defines protection rules for landscape safeguard and coordinates local development, and municipal land-use plans (LLUP), which in turn implement the RLP policies at the local level. Both the RLP and the LLUPs should undergo Strategic Environmental Assessment along their preparation. The RLP integrates the system of rules set by the regional planning regulations including well defined requirements with regards to the contents and formats of the planning information. Likewise, the guidelines issued by the Regional Government for the preparation of the SEA documents (i.e. the environmental report) also specify which information and indicators should be included, creating a framework for the knowledge base to be used for decision-making.

The spatial governance of the Sardinian planning system is supported since the early 2000s by the Regional Government Geographic Information System. From the data and technology perspectives, the regional GIS has recently evolved towards an advanced Regional SDI (Craglia and Campagna, 2009) for it nowadays provides all the main SDI components required by Directive 2007/02/EC concerning the creation of the Infrastructure for Spatial Information in Europe (INSPIRE). The Sardinian regional geoportal offers a catalogue service through which data can be searched and accessed via download or network services. The

Sardinian RSDI currently offers over 300 data layers, including vector, orthophotos and satellite images and high resolution Digital Elevation/Surface Models. Hence, the RSDI offers an unprecedented wealth of spatial information which can be used to support the application of Geodesign to address pitfalls in the SEA of the LLUPs.

In order to test the potential of the SRSDI as knowledge base for Geodesign, a Planning Support System prototype for SEA-LLUP has been implemented (Campagna and Matta, 2014). The main features of the PSS include a module which implements land-suitability analyses (Malczewski, 2004) to support the design of planning scenarios or alternatives. The design is also supported by a sketch planning (Harris, 1989) interface which thanks to a digital pen supports the planner real-time interaction with the design alternatives. Moreover, the system implements a spatial DPSIR model for real-time impact assessment. The indicator framework is calculated run-time and the results presented in a dynamic dash-board supporting collaboration. Once decisions are made the environmental report may be populated automatically by all the relevant information using predefined templates.

While the first functionalities are intended to support real-time planning collaboration and interaction among stakeholders, the latter one eases the creation of the output reducing the burden of editing the environmental report. The system has been implemented customizing commercial software to the Sardinian SEA-LLUP settings. However its use arguably can be generalized to other European regions. In fact the indicator framework implemented for Sardinia SEAS-LLUP relies on the use of the spatial data sources of the Sardinian RSDI, which in turn feature close relationships with the INSPIRE spatial data themes.

Current results include the real-time calculation of a number of indicators related to development options expressed in terms of land-use patterns changes and infrastructure network design. Further indicators are under study to enrich the spatial DPSIR model complexity towards the development of a spatial version of enhanced DPSIR (Niemeijer and de Groot, 2008).

This kind of approach to 1st generation PSS design evolves along a path which was paved along two decades of research work; it seems it may lead, as a reasonably achievable operational target, to contribute in the short-medium term to bridge the gaps among analysis, design, impact assessment, choice, and reporting, this way implementing Geodesign in the Strategic Environmental Assessment of urban and regional planning. However, as argued in the reminder of this paper, for the medium-long term, research in planning (support system) and Geodesign may offer less paved research alleys wherein theoretical and methodology challenges would be more related to the social and business management sciences perspective of the planning process rather than to more practice oriented land engineering.

3 METAPLANNING AND 2ND GENERATION PSS

The evolution of contemporary spatial governance makes urban and regional planning complex processes - involving actors, activities, resources, objectives, outputs- which are often difficult to manage in a logical, transparent and accountable manner. As a matter of facts a new figure of planner is emerging as a 'process manager' (Zanon, 2014) whose role is the coordination of interacting actors in complex workflows of activities.

In real-world spatial planning practices (i.e. Regional Planning or Local Land Use Planning) often metaplanning, as something which is usually not explicitly required by law, is disregarded. In such cases taming complex multi-actor planning processes and procedures may result confusing and the outcomes uncontrollable. While on the one hand lack of common understanding among the actors may easily arise, implying difficulties in collaboration, on the other hand understanding how, why, when, by whom planning

decisions are made may results blurred both to internal and external stakeholders and observers. The latter should be not considered a minor pitfall as both propositions from advances in planning theory (i.e. Innes' communicative planning, in Khakee, 1998, p. 370) as well as binding regulations on Strategic Environmental Assessment (SEA, Directive 2001/42/EC) –the environmental impact assessment of plans and programmes– require in plan-making not only the evaluation, explanation and documentation of the product (i.e. the final plan) but also of the process through which the plan was made. However, what SEA regulations and good practice guidelines usually suggest is an in-itinere or ex-post evaluation of some specific part of the SEA-planning process (i.e. degree of public participation in consultation or reliability of data sources), and an ex-ante metaplanning approach is often ignored. To address this issue in the next section the concept of metaplanning is proposed by the author.

3.1 METAPLANNING PRINCIPLES

Metaplanning can be defined as the design of the planning process. Metaplanning consists of the activities of specifying actors, activities, methods, tools, inputs and outputs, workflows or in other words the ex-ante and in-itinere adaptive design of planning the process. The objectives of metaplanning are both the improvement of the process and of its outcomes as well as its management and implementation. Moreover, as argued by the author in the reminder of this paper, metaplanning eases the design and implementation of the integrated planning supporting (digital) technologies.

It should be noted that close relationships with the metaplanning concept can be found as central to the Steinitz's Geodesign framework (GDF; Steinitz, ibidem) where the planner (or the Geodesign team) chooses and clearly defines the methods for the study according to a decision-driven approach (i.e. the second iteration in the GDF), before the resulting workflow is actually implemented (i.e. the third iteration).

The operational implementation of the concept of metaplanning should be achieved through the detailed description of the planning process. Several attempts have been proposed by scholars to formalise the description of the planning processes for a variety of purposes, however these results appears to have affected neither current planning practices nor the Planning Support System design (Geertman and Stillwell, 2009). As a matter of facts, limitations in Planning Support Systems diffusion may be addressed to lack of flexibility, thus of adaptability to contextual settings of the planning processes.

To address this issue a possible approach is to rely on recent advances in Business Process Management (BPM) (Weske, 2012). Process-orientation has gained big momentum in the last decade, and BPM reliable techniques and tools have been developed aiming at two main objectives: improving process management and easing information system development. BPM found extensive application in manufacture and service industries where goods and services production processes are cyclically run and improved. Introducing BPM in the production life-cycle requires effort, but it is usually acknowledged that the costs then pay off in the long run as the number of process instances grows.

The author argues in this paper that PSS design should also be process-driven, rather than technology-driven, and since metaplanning concerns the design and formalisation of the actual planning process, metaplanning should also inform the design of the information systems for planning support. To address this challenge, Business Process Management methods and tools have been applied by the author to implement the metaplanning concept in the urban and regional planning, and Strategic Environmental Assessment domain, claiming that metaplanning may both improve the process and ease customised PSS development accordingly. The latter results entail the concept of 2nd generation PSS, which can be thus defined as an enabling platform for process-oriented PSS design and implementation. The proof-of-concept of 2nd generation PSS, with the technical implementation details – whose discussion is out of scope in this paper–

were recently documented elsewhere by Campagna et Al. (2014). Rather, in the next section, issues concerning the BPM application to metapanning are discussed outlining a future research agenda.

3.2 METAPLANNING IN PRACTICE: A BPM APPROACH

BPM includes concepts, methods and techniques to support the design and analysis as well as the administration, the configuration, the enactment of business processes (Weske, ibidem). Hence, two are the main objectives of BPM: on the one hand BPM should support the improvement of a process (i.e. business perspective: design and analysis), while on the other hand it should ease the implementation of the supporting information system (i.e. IT perspective: configuration and enactment).

The last decade faced the diffusion of a growing number of Business Process Management Systems (BPMS) which enact a business process on the base of an explicit process model representation. A Business Process Model (BPM) is a set of activity models and execution constraints among them. From this perspective, urban and regional planning processes can be considered as business processes and Planning Process Models (PPM) can be drawn for a descriptive (i.e. as-is) or prescriptive (i.e. to-be) purposes in metapanning. In planning theory and practice several languages have been used to describe planning processes (Campagna, 2013) ranging from verbal description, such as articles in planning regulations, to graphical notations, such as workflow diagrams in planning handbook. However, most of the latter lacks semantic richness so that planning process models cannot be used to administrate or enact process instances.

In the last decade, Business Process Model and Notation (BPMN) has been developed and maintained by the Object Management Group as a standard graphical notation for representing business processes in form of diagrams. The rich semantic of this language allows representing actors (i.e. pool and lanes) and activities (i.e. tasks or sub-process) and a variety of executions constraints. Tasks can be manual, automatic or mixed, representing diverse situations of real world processes: automatic mixed tasks are those which are supported by the execution of distributed data (e.g. standard Web Feature Services, or WFS) or processing services (e.g. standard Web Processing Services, or WPS). As an example the PPMs in Figure 1-3 show how BPMN can be used to design a planning process with iterative shifts from high level general models to low level detailed description of each sub-part. For the sake of the example, the GDF (Steinitz, ibidem) was considered as reference process.

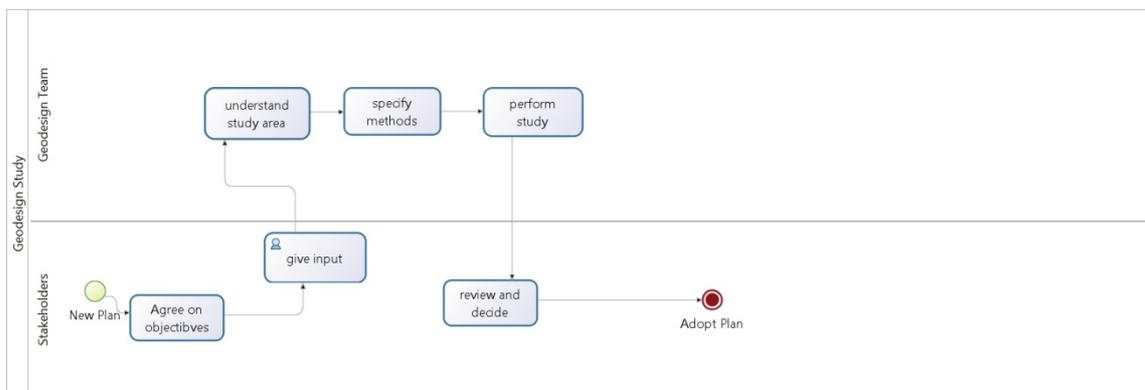


Fig. 1 High level BPMN Planning Process Model of the GDF

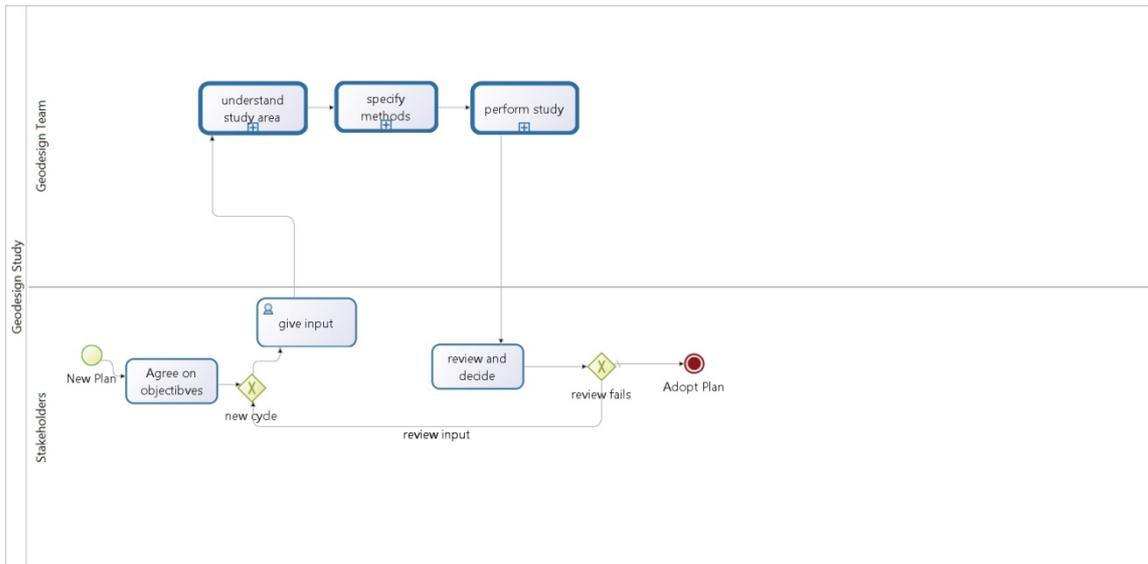


Fig. 2 High level BPMN Planning Process Model of the GDF with cycles

In Figure 1 a high level model of the Steinitz’s Geodesign Framework (Steinitz, 2012, p.28) is given. However the simple model in Figure 1 shows a linear process, while in reality the process may develop along several cycles. Thus, the PPM in Figure 2 relying on the BPMN rich semantics shows that after the specialists of the Geodesign Team (represented in the horizontal upper lane of the diagram pool) complete their work and send the outcomes to the stakeholders, the latter may accept or not; in the latter case a new cycle is activated and the loop continues until the consensus is reached on the design products. Moreover, the three (macro) activities (i.e. the three GDF Iterations) performed by the Geodesign Team are in facts complex processes themselves. The three GDF Iterations may be interpreted respectively as planning process scoping, metaplaning, and implementation. BPMN support the modelling of sub-process of complex activities: in Figure 3 the main steps of the third GDF Iteration are represented, each of which in turn may be expressed as nested sub-process.

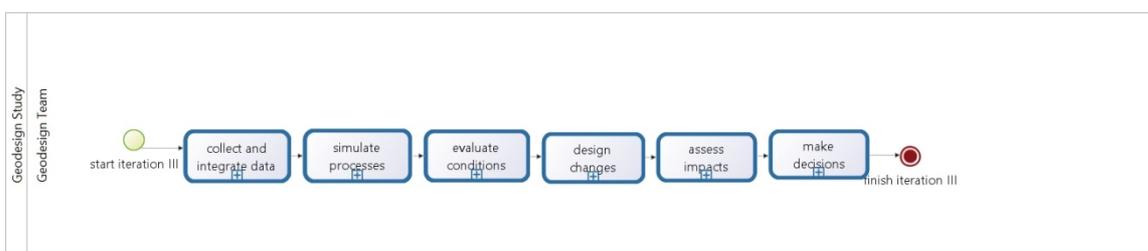


Fig. 3 High Level BPMN Planning Process Model of the III Iteration of the GDF

According to the Planning Process Modelling approach presented in the previous examples, models representing SEA and LLLUP process, as defined by local regulations and guidelines in Sardinia were developed in this project for simulation in order to analyse the process robustness and impacts, the discussion of which is out of scope in this paper. The next step in the research project will be to model case studies from the real practice in order to better analyse the implications of the use of as-is and to-be PPMs before testing BPM as metaplaning tool in real world settings.

Thanks to BPMN it is possible to model all the complexity of the processes down to the details of single tasks carried on by specific actors. BPMN diagrams can be understood from both humans and machines, becoming

the core of business process life-cycle. In facts, many off-the-shelf BPMS feature a BPMN diagram editor for design and analysis, a repository where models are collected, and a process engine which orchestrates the integrated execution of services supporting a variety of tasks including high level applications (e.g. GIS) and/or (spatial) web services as recently demonstrated by Campagna et Al. (2014). Thus, after the modelling exercise is completed, the configuration phase in the BPMS enables to select and set-up all the necessary digital tools which will be then server to the relevant process actors run-time to implement Geodesign methods.

4 CONCLUSIONS

Nowadays, current advances in Spatial Data Infrastructures and other Volunteered sources of Geographic Information and sensor webs offer unprecedented wealth of knowledge which if properly treated may offer challenging opportunities for planners to represent and understand ongoing territorial processes, to inform design of possible changes, to assess their impacts and eventually support informed and responsible decision-making. In order to tackle the challenges put forward by the big data avalanche new methods and tools should be developed for a more effective achievement of environmentally, economically, and socially sound sustainable and democratic development processes. At the local level these objectives would be translated in more sustainable, effective and democratic decision-making in SEA of LLUP.

This paper proposes two research lanes to be carried on in parallel in order to achieve results in the short-medium and in the medium-long term, concerning respectively 1st and 2nd generation PSS .

In a nutshell, metaplanning may contribute to govern the complexity of the planning processes in the face of their diversity, eventually achieving more transparent, responsible and accountable plan-making processes. In fact, the accurate documentation of the planning process can help not only to document and communicate why and how choices are made, but also how environmental sustainability and strategic objectives were mediated in the change models. At the same time, metaplanning may support collaboration among the involved actors in the planning process thanks to a better shared understanding of roles, activities, and workflows. Last but not least, metaplanning would support the lean implementation of 2nd generation PSS.

Metaplanning and 2nd generation PSS research is still in its infancy, and several issues should be addressed in order to formalize an operational metaplanning body of knowledge to support its industrial deployment in the planning practice. Among other issues the research should concern cataloguing methods and tools to share Planning Process (or sub-process) Models to make common value of the modelling efforts. To this end, findings in 1st generation PSS research can contribute to populate repository of standard models of good practices to be shared among scholars and practitioners. Such a knowledge base would be of value not only to facilitate the sharing and promoting of innovative approaches and methods, but also to apply process models simulation and assessment tools to find and solve possible bottlenecks or lovelocks in current practices. Last, but not least, further research effort should be devoted to understand the more appropriate granularity in PPM: up to what scale processes should be decomposed in the modelling exercise in order to define possible architectural shifts from high level 1st PSS generation paradigm, towards service-oriented architecture. Still a long way to go, but definitely challenging.

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