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ROOSE A. and KULL A. Empowering spatial information in the evolution of planning systems: lessons of ad-hoc plans in Estonia, *Regional Studies*. The paper analyses the emergence, use and quality of spatial information in the case of extensive and vibrant spatial developments conditioned by the introduction and maturation of a decentralized spatial planning system in Estonia. Spatial information is assessed to characterize the legacy and evolution of planning systems and practices in Estonia. The paper discusses the content, representation, and visual quality of planning maps and tools in the dynamics of spatial development. Physical plans focus exclusively on ‘siting and speed’, which means that ad-hoc practices supporting flexibility and promoting innovativeness often neglect strategic planning.

Information géographique Aménagement du territoire Cités-régions Visualisation Estonie


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Räumliche Informationen Raumplanung Stadtregionen Visuelle Darstellung Estland

ROOSE A. y KULL A. Capacitar la información espacial en la evolución de los sistemas de planificación: lecciones de planes provisionales en Estonia, *Regional Studies*. En este artículo analizamos la aparición, el uso y la calidad de información espacial a partir de
desarrollos espaciales amplios y dinámicos condicionados por la introducción y maduración de un sistema de planificación espacial descentralizado en Estonia. Evaluamos la información espacial para caracterizar el legado y la evolución de los sistemas y las prácticas de planificación en Estonia. En este artículo abordamos el contenido, la representación y la calidad visual de los mapas y las herramientas de planificación en las dinámicas del desarrollo espacial. Los planes físicos se centran exclusivamente en la ‘ubicación y la velocidad’, lo que significa que las prácticas provisionales que apoyan la flexibilidad y fomentan la innovación muchas veces se olvidan de la planificación estratégica.

Información espacial  Planificación espacial  Regiones metropolitanas  Visualización  Estonia

JEL classification: D83, O21, P21, Q15

INTRODUCTION

The use of spatial information and analysis in planning and environmental assessment has been a fairly under-researched area in spatial planning (LANGERDORF, 2001; APPLETON and LOVETT, 2003; DÜHR, 2007). Rapidly changing planning contexts and new stakeholder demands in civil society together with a dramatic increase in interested parties and intensified planning conflicts have resulted in the adequacy of traditional spatial planning methods and tools being questioned. There has been much academic discussion recently about hard and soft planning and hard and soft spaces (DE ROO and PORTER, 2007; HAUGHTON et al., 2010). MARCH (2010) distinguishes scientific–positivist and ‘critical–social’ theories in planning research as an old-fashioned modernist positivist–empiricism. A postmodern verification of reality and a neo-pragmatist concern with environments are often mixed in planning instances as postmodern scepticism may lead to the conclusion that progress and change simply cannot be properly planned (ALBRECHTS, 2006).

Owing to increased interactivity and communication, evidence-based planning has been developing since 2000 (FALUDI and WATERHOUT, 2006). In addition to the lack of an evidence base, spatial planning has been harshly criticized for lack of imagination and poor creativity. It was seen as a mere regeneration of bureaucratic routines. Dynamism in planning has an internal and external dimension (DE ROO and PORTER, 2007). Evidence-based policies have contributed to changes in the wider political context. The institutional context remains the most ignored aspect in planning, particularly in terms of specific local circumstances (VIGAR et al., 2000). Planning and especially the establishment of democratic planning traditions must always remain in the domain of governance. The new east–west dimension that resulted in the eastwards expansion of the European Union has increased the diversity of planning cultures and approaches. This creates challenges but also opportunities for mutual learning and development of the planning profession. In Central and Eastern Europe spatial planning has undergone a dramatic transformation (ADAMS, 2006, 2008; NEDOVIC-BUDIC, 2001). The new democracies in the region indicate the direction in which economies formerly under central planning have to proceed. After the initial transition, mismanagement, failures and the declining role of the planning profession, planning has grown in maturity. The simplistic approaches and reasoning based on, for example, the cost of land and investment interests alone no longer dominate planning practices.

Estonia exemplifies the ‘new’ European countries that phased out centralized spatial planning systems and have been steadily introducing new decentralized systems with high degrees of complexity and public participation, mimicking societal dynamics and the change of legal and economic systems and governance as summarized regionally by ADAMS et al. (2010) and explored in Poland, Hungary and Serbia (BÁNSKI, 2010; RADVÁNSZKI, 2009; NEDOVIC-BUDIC et al., 2011). As both a small country and a small state, Estonia’s public administration and governance exhibits a set of characteristics such as limited activities, multitasking, informality, limited steering and personalism of roles (ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD), 2011).

During neoliberal growth, Estonia like other Baltic states faced increasing social, economic and territorial disparities between metropolitan areas and the rest (ADAMS, 2008). In order to guide often chaotic development, the aim of enhancing spatial planning is not to control development but rather to facilitate and guide it. The emergence of strategic planning has caused tension between statutory and non-statutory plans. In many cases, the legal status of strategic plans is problematic (EVERS, 2008). The preparation of a strategic plan with the aim of optimizing spatial structure and improving the environment becomes a process of political and social mobilization. In essence, there is an opposition in planning between public participation and stakeholders’ involvement. The interrupted history of planning systems and the stakeholders’ role combined with the rapid economic growth of the 1990s and 2000s with increasing territorial disparities were the main challenges in the context of strategic planning in Estonia. Since 2008, the economic recession has affected land and property developers, substantially decreasing the pace and volume of land-use planning.
Planning as a design science or a form of social technology implies a model of theory–practice interaction linking the physical sciences and their respective technologies and applications (Alexander, 2010). At times, technology can overrun the knowledge of when to apply it and, in the context of multiple possible interpretations, maps might be used inappropriately or irresponsibly (Monmonier, 1996; Orland et al., 2001). A social constructivist understanding of the production and use of planning maps employing the power of being on the map and depending on the context, values and interests of those involved in the cartographic process has become more widespread over recent years (Dühr, 2007). In the postmodern world, values in a society strongly influence the interaction between the members of the society and the stakeholders. The cultural approach acknowledges the existence of different ‘truths’ and ‘interpretations’ of planning policies and maps (Knieling and Othengrafen, 2009). There is a clear need for a careful evaluation of the quality of spatial information, the communication of spatial trends, the current mapping and visualization techniques and the normative function of mapping in order for them to be used appropriately and objectively in spatial planning and strategic territorial decision-making.

Not only scientific knowledge alone, but also experiences, common knowledge, tacit knowledge, practical common sense reasoning and intuitive notions are essential parts of planning knowledge input (Harris, 2002). Haughton et al. (2010) refer to the need to develop discourses of a number of spatial planning disciplines rather than just the one mainstream discipline. This reflects the diversity of planning practices in the enlarged European Union and in the world in general, which, in turn, means that the application of knowledge becomes increasingly vital. In practice, spatial cohesion during the transitional period in Estonia was interfered with by the largely accidental development of planning levels, ties and institutions as well as by the strong impact of sector planning and restructuring. Within this paradigm, territorial cohesion means a balanced development, that is, seeking policy measures and strengthening spatial planning in order to alleviate territorial socioeconomic disparities (Dühr et al., 2010). As pointed above, this was accompanied with a digital mapping explosion, fast application of information and communication technology (ICT) and increased public access to spatial information. The present article examines the introduction of planning legislation and systems, their implications in a suburban housing boom and in the development of the infrastructure, and the impact of visualization in plans and in communicating the strategies. The assessment of Estonia as a country and a planning system in transition and convergence expresses the concepts, models and techniques, ideologies, policy-making processes and practices of the evolution of a spatial planning system in the context of contemporary planning traditions and European territorial policy. Estonia experienced a great change in spatial planning, in the communication of spatial information and in overall physical development. The usage of spatial information was assessed over time in order to characterize the interrupted legacy and the evolution of a national planning system and practice in Estonia. The aim was to assess the role of spatial information in spatial planning and policy implementation mainly on the suburban and county levels in a dynamic and socio-economically transitional society. Ad-hoc planning practices which focus on siting and speed tackling specific growth issues are debated in the light of cohesive planning at the city-region level. The goal is to analyse the relations between different planning tiers, meanings and planning quality, specific spatial planning methods and visualization rules and values, on the one hand, and city-region planning practices, on the other hand. Cartographic practices and plans are assessed in terms of presenting evidence, policy-directing ‘paper’ maps and other media. The analysis shows how the challenges of spatial information usage in planning lead to the question of governance and setting a national spatial planning framework related to Estonian territorial dynamics and the objectives of European territorial cohesion. The authors suggest a shift in emphasis in contemporary planning practices from a search for ideal planning settings and techniques to a greater concern with flexibility and fuzzy solutions due to institutional and political constraints in the condition of high socio-economic dynamism.

**CONTEXT OF THE STUDY**

Re-treating evidence-based and regulatory planning

Evidence-based planning is part of European planning history (Faludi and Waterhout, 2006), although the emerging communicative approaches in the 2000s challenged puritan, technically rational planning. Inter-subjective communication has become as important as the neo-positivist empirical object-oriented approach to constructing reality (De Roo, 2010). The political interest in the territorial dimension of development and the aim of territorial cohesion makes the quality of communication more and more vital (ESPON, 2010). At the same time, technological developments in computing provide new tools to take a further step in innovative visualization and cartography. The mobilizing force behind evidence-based planning is a linear and utilitarian view of research. Within such a framework, evidence is fit into the planning process, not vice versa. According to a classical postulate, the interpretation of data is always subject to scientific argument (Popper, 1959). Knowledge cannot be treated as supreme and primary in the planning process. Rydin (2007) points to a debate between a modernist planning
theory and a contemporary postmodern planning theory, viewing knowledge as socially constructed, multiple and constituted in the form of claims. As KOOMAN (2003) stresses, the production and utilization of governing knowledge is a social process. The postmodern model of social construction in planning does not recognize claims to absolute truth. Contemporary planning theory has an emphasis on values and on how to generate social agreement from a multitude of values. Knowledge claims can be distinguished from, for example, ethical, pragmatic, efficiency and aesthetic claims (RYDIN, 2007). In such instances, planners need to recognize the position of different actors, their values and experiences. The question rises whether one can distinguish knowledge and evidence from other bases for intervention. The reality of scientific progress is interplay between inductive and deductive knowledge development where tentative, provisional and accidental observations are negotiated (DOLBY, 1996). Handling different types of knowledge and applying these in decision-making is a growing concern. A greater reliance on deliberative and collaborative approaches has been proposed as a solution (RYDIN, 2007). Consensus has to be reached through the communication and negotiation of interests and by involving and empowering communities within the decision-making process (INNES, 2004). The influence of the planning paradigm based on communication has grown, eroding ‘rational’ planning methods and substituting them with communicative approaches and skills, such as mediation and conflict resolution (ALEXANDER, 2010). In addition, collective action requires a greater investment of time and resources from the participants (NEWMAN, 2008).

What happens if evidence for planning is not readily available? The scarcity of relevant information is related to the conflicting dynamics and speed of policy-making and the research process (FAULDI and WATERHOUT, 2006). Even providing additional verified scientific information may lead to further confusion and more evidence can result in discrepancies if it is incomplete, contradictory or inconclusive (DAVoudi, 2006). In the process of delivering planning policies, politicians and policy-makers fairly deliberately determine what counts as knowledge and valid interpretations. According to COLLINS and EVANS (2002), stakeholder rights are conceptually different from rights based on expertise. The physical and environmental domains have demonstrated the benefits of engaging with local people who have developed knowledge of the environment through their everyday experience. Still, experience is not in itself sufficient to count as knowledge.

Multilevel, fuzzy governance contexts, controversial knowledge and missing data led to the development of alternative planning approaches such as participatory planning and the post-1980s’ communicative, interpretative and institutional planning (FORESTER, 1989; HEALEY, 1997; SAGER, 1994). The actor-consulting model tackles uncertainties in planning that are not always recognized as such (DE ROO and PORTER, 2007). Social sciences tend to put emphasis on keeping knowledge outside the planning organization. This should be done in groups other than professionally trained planners. RYDIN (2007) stresses the need to assert the value of knowledge in planning alongside taking into consideration the opinions of different stakeholders, expert, interest and practice groups whose knowledge, approaches, policy focuses and communication channels are only partly overlapping. In a situation where there is great uncertainty in terms of the knowledge content and mixed policy arenas, external experts can play a key role in shaping policy discussions (ADAMS et al., 2010). The soft solution fuzzy planning approach is based on the idea that life is full of uncertainties that planners, policy-makers and stakeholders are simply unable to control (DE ROO and PORTER, 2007; HAUGHTON et al., 2010). DAVoudi (2006) explores the enlightenment model, that is, how policy informed by evidence contributes to decision-making. MORONI (2010) proposes to adapt planning to the realities of the twenty-first century, criticizing the theories and concepts that have become institutionalized in the planning profession and in planning as a knowledge-based discipline. Hence, it remains difficult to understand the actual influence of planning theory upon planning practice due to the multiple actors, circumstances and influences involved. ALEXANDER (2010) questions whether knowledge from planning theory and research affect practice at all. One has to admit that there are fundamental dilemmas between science and policy, knowledge and action. It is a challenge for all researchers and practitioners to bring research and practice closer together and to improve the applicability of theory and research in the areas of economic, legal and political realities to achieve favourable influence over spatial arrangements (MARCH, 2010).

The role of spatial planning practices is changing due to the emergence of information communications technology (ICT). Planning maps are usually analytical, although policy maps require a different cartographic language to deal with fuzzineses and present the intended developments (FAULDI and WATERHOUT, 2006). It remains difficult to see how cartographic interpretations of planning can be made adequately transparent to untrained policy-makers, users and the sceptical public (KITCHIN et al., 2009).

The concept of ad-hoc planning

Mainstream planning theory has increasingly focused on the procedural aspect of planning. External developments on the substantive side are increasingly pushing the profession in new directions and demanding responses (ALLMENDINGER, 2002; HAUGHTON et al.,
Developers, investors and decision-makers are increasingly under pressure to operate in short-term frameworks (Thrift, 2000). As the realization of planning projects becomes imperative, a ‘permanent state of emergency’ appears. The plan-led regulatory system creates hierarchic guidance frameworks from the national level via the regional level to the local level. Aiming to increase the efficiency of planning, spatial planning attempts to streamline project-by-project decisions and to introduce the coherent development according to strategic agenda.

Strategic plans reflect the process of development planning and are characterized by intersectoral coordination and financial feasibility. The output is not just a plan for land use but a set of interrelated strategies for land, infrastructure, financial and institutional development. The emergence of strategic spatial planning in Europe is associated with the development and promotion of the idea of spatial planning under the European Spatial Development Perspective (ESDP) and European Union regional policy (Albrechts et al., 2003). The European trend is about shifting attention to the strategic level of spatial planning and the need for sector integration (Healey, 2007). Strategic plans combine fragmented interests into collective action and create the spatial imagination to get things done at the heart of the argument (Newman, 2008). At the same time, there are signs that strategic forms of spatial planning move towards very pragmatic and action-oriented approaches (for example, the recent European Union Strategy for the Baltic Sea Region).

Master plans have played a central role in the urban planning process. Master planning has been changed and improved in some countries, but it has been much less effective than could be expected (Albrechts, 2006). It has been severely criticized as being too complex, bureaucratic, time consuming, static and even elitist. There is a new emphasis on decentralization, transparency, and accountability in replacing and upgrading conventional master planning. It is a question of adaptive role-setting for authorities as well as for planning expertise with a stronger emphasis on community and business needs. More flexible, indicative, and proactive planning is needed in both strategic and master planning.

In general, the majority of urban initiatives have been developed in a random ad-hoc manner with few resources, little time and little attention paid to strategic thinking (Atkinson and Moon, 1994; Shaw and Robinson, 1998). This has been caused by the domination of technocratic and economistic visions of local development and a relatively weak civil society. As planning theory and practice shift away from the positivist paradigm of knowledge, discussion moves to revising scientific ‘objectiveness’ or legitimate knowledge (Alexander, 2010). Planning setting intends to incorporate more informal operations of planning into the statutory planning framework to manage the ad-hoc planning controls (Cullingworth and Nadin, 2006). Integration between planning tiers occurs largely on an occasional ad-hoc basis. Much development takes place without any hindrance from the planning system. In assessing different planning contexts, it should be stressed that not all local spatial perspectives born from soft planning are anti-regional or anti-county in principle (Morgan, 2002). Making planning decisions on the lowest level compatible with achieving the desired objectives can help maximize participation in and the effectiveness of the planning process.

Within the neo-liberal approach, ad-hoc planning practice aims primarily at siting and speed, focusing on urgencies in planning (Table 1). According to Molotch (1977), the core rule of ad-hoc (for this in Latin) planning is: planning and decision-making for a particular purpose only. The approach presents a profit-driven supply-side entrepreneurial intervention. Looking for a different type of planning, planning systems are keen on moving away from regulatory policy and instruments to a more development-led approach that aims to intervene more directly, more coherently, and more selectively in social reality and development (Albrechts, 2004).

The debate includes the central question of how to provide a sense of certainty while allowing flexibility to cope with sudden challenges and opportunities, changing circumstances and conditions. As stated in the previous section, the scientific aspect of plan-

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<tr>
<th>Advantages</th>
<th>Disadvantages</th>
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<tr>
<td>Decision-rich and solution oriented</td>
<td>Rushing in nature</td>
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<tr>
<td>Quick</td>
<td>Incoherent and uncoordinated with other plans</td>
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<tr>
<td>Flexible and adaptive</td>
<td>Less control, less planning</td>
</tr>
<tr>
<td>Less bureaucratic, less formalized, across administrative units and institutional barriers</td>
<td>Ignores prescriptive norms and standards</td>
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<tr>
<td>Targeted communication</td>
<td>Missing long-term perspective</td>
</tr>
<tr>
<td>Direct stakeholder involvement</td>
<td>Selective use of information</td>
</tr>
<tr>
<td>Stimulates innovation and creativity</td>
<td>Can be too experimental</td>
</tr>
<tr>
<td>Helps scenario-building, insightful</td>
<td>Limited public participation</td>
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Making is based on the assumption that it is impossible to account for all the factors involved. The plan-making process becomes more complex due to the massive amount of information in various knowledge clusters and increasing participation of different interest groups and epistemic communities in addition to rapidly evolving spatial, institutional and economic contexts (Duhr et al., 2010). The ad-hoc approach could result in a selective use of spatial information as consistency and innovation become more important in plan-making and plan-issuing. The knowledge resources available are cross-fertilized and legitimized in the socio-political process. On this basis, ad-hoc planning practices have various advantages such as pragmatism, adaptive processing and innovation, which allow for context sensitivity. Apparently, the ad-hoc scheme also has disadvantages such as rushing the process, loose, and incoherent action within and between planning tiers and the experimental nature. The ad-hoc planning process is adaptive and involves high degrees of trial and error. On the other hand, it allows spatial and governance visions to influence traditional planning and conservative governance cultures.

The emerging national spatial planning system and practice in Estonia

With its 45,227 km² and 1.34 million inhabitants, Estonia is the smallest country in the Baltic; while more than 40% of the population lives in the Tallinn metropolitan area. The metropolitan growth rate was fed on a loss of small-size town and rural populations. The uneven distribution of the population illustrates the sharp regional disparities that have been reinforced by loose regional policy and unsettled strategic planning.

What does it mean to plan without traditions? Dramatic changes in the Estonian planning system have taken place after independence was regained in 1991. The former centrally coordinated authoritarian system has gradually been replaced with a post-modern democratic participatory system. This transformation has been strongly influenced by three main factors:

- The process of land restitution which ran parallel to various legislative acts being drafted and continuously amended; there is a focus on land-use and ‘hard core’ physical planning.
- Remarkable economic growth with expansive development in the property (real estate) sector which put intensive pressure on planning authorities and local councils to proceed with planning documents at a fast pace.
- The availability of state-of-the-art (digital) spatial information and the ability to analyse spatial information in the context of strategic planning.

Following the central planning of the absolute top-down control of the Soviet period, the Estonian national planning system is rooted in rational thinking and technocratic management promoting straightforward, command-and-control, solution-oriented plans. According to Newman and Thornley’s (1996) five-class European planning system, the Estonian system was classified as a member of the Eastern European family. However, decentralization is the main trend and direction of planning in Estonia; while Scandinavian planning family has gone furthest in decentralization. Rather than drifting towards the Scandinavian family, the Estonian spatial planning system represents a comprehensive hierarchical system including mandatory, legally binding top-down delegation from the national level via the county level to municipalities. Following the weakening of county administrations, the responsibility for the planning process lies greatly with municipalities. The Planning Act ensures that planning synthesizes the interests of the society with respect to land use and contributes to the protection of the environment. At the national level, the tasks of the spatial development policy lie generally with the Ministry of the Interior, which is assisted by the Ministry of the Environment which strengthens the connections between planning and environmental issues.

National planning (üldplaneering) and county planning could be treated as strategic planning introducing spatial concepts and visions, while comprehensive and detailed planning pertain to land use, functional zoning, and environmental and infrastructure planning. At the regional level, county governments ensure the implementation of the national and the regional objectives of spatial development, perform quality control, and address planning appeals. County and comprehensive plans may be prepared as thematic plans with specific objectives. County planning (maakonna planeering) formulates the strategy and concepts for the general physical and economic development of the county, balances national and local interests, and forms the basis of long-term sustainable development. Comprehensive planning (üldplaneering) provides guidelines and a land-use overview of development aiming to outline the main objectives of long-term sustainable development, establish general conditions for land use and functional zoning, and determine the location of principal technical network routes and engineering constructions. Detailed planning (detailplaneering) is the basis for land use, buildings and infrastructure in plots. A
detailed plan is prepared for part of the territory of a rural municipality or city and it serves as the basis for building activities and land use in the short term. All major plans are subject to environmental appraisal.

The Europeanization and internationalization of the planning marketplace in Estonia during the re-independence 1990s and 2000s deserves special attention and reflection. Among other convergence factors and domestic arrangements, Europeanization stands for the complex facets of European integration impacting the strategic planning practice (WATERHOUT et al., 2009). Domestic institutional reform and governance patterns were conditioned by the European Union. In the vertical top-down approach, European Union regulations and directives have stimulated and influenced Estonian planning discourse; transnational cross-border cooperation stimulated organizational learning and the ‘softer’ horizontal Europeanization. The restructuring process has led to a reorganization of the settlement hierarchy and increased territorial polarization that should be tackled by using the European Social Fund (ESF) and European Regional Development Fund (ERDF)-funded programmes facilitated adaptively by the European Social Fund hierarchy and increased territorial polarization that has led to a reorganization of the settlement planning discourse; transnational cross-border cooperation stimulated organizational learning and the ‘softer’ horizontal Europeanization.

In the launching period of the new planning system, 1992–1997, the legacy of the Soviet system played a role in implementing the planning tasks (Table 2). Until the end of 1990s, the drafting of the National Plan and sectoral strategic planning documents was started, and the adoption of county plans was followed by the green network thematic plan. In the second development phase of the spatial planning system in Estonia (1998–2002), the mode of operation in spatial planning was influenced by economic development and European Union accession. The national plan for Estonia was adopted in 2000, which was the first modern national-level planning document with clearly expressed spatial concepts and vision. This was followed by county plans representing a normative and descriptive approach.

The situation in spatial planning changed between 2003 and 2006 when the focus stayed on land use and physical planning confronting weak regional planning. During the peak time of issuing detailed plans, the period between the drafting and the adoption of a detailed plan increased significantly and there were up to ten times more detailed plans issued than in the previous period. Decisions were made in a rather ad-hoc and pragmatic manner. Ad-hoc practices intensified spatial imbalances at the local and national levels. During the years of extensive economic growth, the majority of planners were involved in land-use planning and parcelling. The planning delivery has stabilized since 2007 because a hierarchical planning system has developed and the extensive submission of new detailed plans has ceased. The aspect of programming and public–private partnerships has added a new dimension during economic downturn.

The Estonian planning community consists of professionals with different backgrounds ranging from architecture, landscape architecture and geomatics to geography and engineering. However, the multitasking duties that public sector planners–administrators have can reduce their focus on and commitment to planning.

The Estonian spatial planning system illustrates the strong Europeanization at the national and sector levels, on the one hand, and pragmatic land-use planning with effective planning delivery as the task of the local authority, on the other hand. Evidence-based planning was promoted in the conditions of the increasing volume of plans, rising value-conflicts and consensus-seeking among interest groups.

THE ROLE OF SPATIAL INFORMATION IN SPATIAL PLANNING

Model case plans and evaluation methods

By applying geographical information system (GIS) spatial explicit analysis, content analysis and expert panels, the use, quality and coherence of spatial information across national, county and comprehensive plans, detailed plans, thematic plans and other strategic planning documents in the context of city-region development was assessed. The analysis focused on the use of spatial information and the contributions and efficiency of spatial analysis and visualization. Visualization was analysed according to the way in which data had been organized and structured and how this information was used to communicate ideas and meaning.

Tartu County as a city–region was selected as a model case for spatial explicit analysis across county planning levels: the county plan, thematic plan, comprehensive plan and detailed plan. The content of the spatial information of the plans relative to location was studied with the help of map algebra. The presence of concurrent spatial features, their shape and semantics through the hierarchy of map planning were identified in the context of map scale and generalization levels. Focusing on Tartu as a knowledge-based regional centre allows different planning methods and tools to be analysed in a systematic manner in order to determine how spatial information has been incorporated in planning. Most plans contain thematic and analytical maps, the policy aims and strategies of which are complemented by and discussed in textual annexes. The content of planning permits, annexes and documentation across planning levels is analysed. Content and data coverage analysis is based on the generalized classifications of INSPIRE (2009), covering seventeen spatial data themes grouped according to common characteristics in data content and needed for environmental applications. Spatial data themes, the representation of which in plans are assessed, include geographical location, administrative units, properties, elevation, geophysical environment, land surface, transport, utilities, society,
<table>
<thead>
<tr>
<th>Period</th>
<th>Development of a national planning framework</th>
<th>Planning practice</th>
<th>Use of spatial information and technology</th>
<th>Key areas of development in the built environment</th>
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<tr>
<td>1992–1997: Legacy of central planning, new legislation. 'The wind of change'</td>
<td>Planning and Building Act (1995); drafting county plans</td>
<td>No detailed plans; shortage of contemporary planning know-how</td>
<td>Software, introduction of digital spatial information, launching computer-aided design (CAD), hardcopies, low data precision, poor readability</td>
<td>Vacant plots in the core city; single plots in the fringe</td>
</tr>
<tr>
<td>1998–2002: National strategic planning</td>
<td>Decentralization to municipalities; issuing county plans and national plan (2000); drafting thematic plans of green network; 'Europeanization of planning'</td>
<td>No or few detailed plans; comprehensive city planning; elaborating methodology for thematic plans</td>
<td>Software instruments, mainstream CAD, launching geographical information system (GIS) (at county level), moderate precision, massive updating, readability poor</td>
<td>Small settlements in the fringe; 'landmarks' in the city, a few larger infrastructure projects</td>
</tr>
<tr>
<td>2003–2006: Booming ad-hoc planning on the local level</td>
<td>Introducing Strategic Environmental Assessment (SEA); issuing thematic plans of the green network</td>
<td>Speeding planning delivery, massive issuing of detailed plans; delayed comprehensive plan</td>
<td>Spatial data infrastructure, CAD, advanced GIS, spatial data infrastructure, improved precision and readability</td>
<td>Mid-size settlements in the fringe; active development infrastructure and public spaces</td>
</tr>
<tr>
<td>2007–Present: Quality concern, value conflict, search for integrated strategic planning</td>
<td>Deadline for issuing comprehensive plans (2007); public involvement, not in my back yard (NIMBY)</td>
<td>Quality control; issuing comprehensive plans</td>
<td>Information and communication technology (ICT) tools, professional know-how, institutional setting, advanced GIS, multilayered structure, web-maps, advanced map design</td>
<td>Infill in the city; slowdown of small settlements; increasing the share of an integrated infrastructure project</td>
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Empowering Spatial Information in the Evolution of Planning Systems in Estonia

area regulation, air and climate, hydrography, seas, biodiversity, natural resources, natural risks, and anthropogenic stress. Data specifications will provide a detailed definition of data content by means of the application schema and feature catalogue. Furthermore, data specifications will specify the requirements of data quality, data consistency, reference systems and metadata.

The comparison of textual and graphic representation of spatial data themes and the assessment of the content, representation and visual quality of spatial planning maps demonstrates the progress in the field. The panel assessment according to the relevant criteria set by the authors and using formalized scoring systems reviewed the planning maps and drafted conclusive summary tables. The experts were chosen to represent all points of view, in a balanced and impartial manner (WITKIN and ALTSCHELL, 1995). The panel team included professionals and experts from the Geography Department, county government and municipalities covering each specific expert arena; professional groups and various communities of practice were asked to examine all the data and all the analyses made during the evaluation.

Content of plans

A planning support system incorporates components such as theories, data, information, knowledge, methods and tools that collectively support all or some parts of a unique professional planning task (GEERTMAN and STILLWELL, 2003). Using spatial information in strategic planning has focused on:

- how to integrate thematic/topical layers across agencies and sectors with shared city-region and peri-urban issues;
- how to enhance the public’s spatial thinking and awareness; and
- how to build consensus around a strategy in spatial frictions and confrontations.

Planners with the necessary knowledge disseminate symbolic and non-verbal evidence and stakeholders learn to read it (SANDERCOCK, 1998). Plan-making and decision-making occur in different arenas and involve different actors (HILLIER, 2002; ALBRECHTS, 2006). Cadastral and land-use planning has determined the development of the spatial planning framework and practice over the last decades in Estonia. As comprehensive and detailed plans focus exclusively on siting and speed, ad-hoc practices opt for the scientific-rational approach neglecting strategic and cohesive planning on the upper city-region level. The visual medium with its rational, tangible and content-based features gains importance. Having identified and formulated the planning content, the primary task typically involves obtaining the data for spatial analysis and mapping. Tangible outcomes of planning such as spatial plans and explanatory texts are assessed below.

The research reveals that encoding geographic information differs in graphic maps and in text. At the cadastral and municipal levels, the majority of traditional static features (land use, functional zones, infrastructure) is presented on a map as factual proof. Strategic plans still require that some sections be accompanied by background data and explanatory texts, for example, the development of the education system, social infrastructure, local heritage and identity in county plans. Much spatial uncertainty is incorporated in the text and the corresponding maps are only partially generated. When comparing textual and graphic representations of spatial data themes, it was found that physical objects, nature, environment and technical infrastructure are well covered in major plans. Graphic and textual data are quite complementary, although segregated in the case of elevation, geophysical environment and socio-economic features. Poor coverage characterizes neighbourhood units, social aspects and risk assessment. The features of built environments such as transportation, infrastructure, settlement networks and environmental features such as bodies of water, land cover, vegetation and landscape diversity are transferred or translated quite smoothly to upper or lower planning tiers.

Terrestrial elevation, air conditions and natural risk are covered vaguely. Some basic spatial data such as census districts or postal codes have not been introduced in Estonia and therefore are completely absent from planning. Functional linkages are not well presented in plans, if at all. Several plans are undermined by ‘overloading’ due to an undefined or overly loose approach to map synthesis. If the cartographic language is not kept short and simple, the spatial information overload damages and distorts the message of a plan. The power of being on the plan plays a vital role (DUHR, 2007). The same research reveals that the broader scope of plans has not caused much development in visualization, as visualization media are not deployed or are inefficiently used. Modest use of spatial information limits the implementation of spatial planning in the conditions of uncoordinated land-planning policies and mechanisms at various planning levels and in ad-hoc practice.

The detailed plan is the simplest in terms of cartographic merits, representing the layout of a parcel and its infrastructure. The map layers of transportation networks and infrastructure (energy transmission lines, water and gas pipelines) become outdated relatively quickly. Also, the buildings layer involves numerous errors due to incomplete construction cycles. By map elements and content, comprehensive plans, including the majority of basic map layers, plus infrastructure, environmental resources and impact as well as the social implications of development are the most complex in their content and scale. The county plan and thematic plan for settlements at the county level are comprehensive and complex in visualizing the
county-level spatial policies, even though, in a way, these maps sum up too many layers of different subjects, making them too complex and noisy. In thematic plans, the description of spatial policies elaborates and explains visual maps. Spatial policies are discussed extensively in the texts accompanying county, thematic and comprehensive plans, depending very much on the availability of digital map layers and supporting spatial data infrastructure. Telling stories and sustaining the storyline is a very efficient method of communication, especially in exceptional cases, in areas with confronting functions and with specific phenomena. The development of the regional airport in Tartu has had a great impact on regional development as a facilitator for research and business areas.

The importance of spatial information in policy implementation has been steadily increasing due to the booming economy and physical planning. Newly available and highly detailed spatial data open new approaches and methods for planning practices. At the same time, real-world representation in planning maps is naturally restricted as basic and topical layers quickly become outdated. It becomes clear that highly detailed topical data sets are a considerable challenge to planners.

Visualization of planning maps

The measure of a good map is how efficiently it communicates the information and intended message to its audience, the intended users of the map. New theoretical ways of understanding mapping often emphasized the discursive power of the medium, stressing deconstruction, and the outputs that cartography achieves (KITCHIN et al., 2009). PICKLES (2004) emphasizes the multiple, institutional and contextual nature of mapping. Shortly, the power of mapping becomes a very important consideration. There is a need for effective ways of communicating spatial information to non-experts as the spatial literacy of stakeholders on different expert communities and user levels is based on different backgrounds, institutions and interests. Nonetheless, it is difficult to weigh the role of map design and the artistic aspects of a map. In an emerging network society, all stakeholder groups who are informed and whose opinion counts could be involved in the map-making processes, at least in the final stages of plan drafting and consultations. In order to use visualization in a target-oriented way, the role of maps in political processes as possible awareness-raising instruments is more specifically explored and defined at the European level of strategic planning (ESPON, 2009).

In analysing the planning maps of the Tartu region, visualization provides complementary and far richer media for portraying plans and strategic agendas than singular texts. The clarity of well-designed maps enables discussion at expert and dissemination meetings to focus on how to tackle issues rather than on debating whether or where a problem exists. Visualization is critical in improving the efficiency of the usage of spatial information (SLOCUM et al., 2005). At the same time, map communication models received criticism, often leading to better-designed maps (MACHECHERN, 1995). The key to analysing planning maps is an appropriate balance of technique and representation (DUHR et al., 2010; SLOCUM et al., 2005). Technique-dominated cartography focuses on development, whereas a representation-focused approach stresses concepts and trends (KITCHIN et al., 2009). Beside aesthetic merits, the communication depends on a complete and effective layout. The text below addresses the cartographic ends and outputs of planning, assessing the support of visualization – the use, creation and manipulation of images, maps, diagrams and charts.

The majority of analysed maps suit their intended planning purposes. Simply put, the goal determines the technique and representation. Still, paper maps with traditional symbols dominate. Presumably, at the strategic level, simply designed, boldly symbolic and robust spatial information on maps is assimilated quickly. Innovations in visualization are restricted by

<table>
<thead>
<tr>
<th>Map theme</th>
<th>County plan</th>
<th>Thematic plan</th>
<th>Comprehensive plan</th>
<th>Detailed plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning level</td>
<td>Zoning</td>
<td>Restrictions</td>
<td>Green network</td>
<td>Basic</td>
</tr>
<tr>
<td>Planar organization</td>
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<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Visual hierarchy</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>–1</td>
</tr>
<tr>
<td>Contrast</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Figure–ground</td>
<td>–1</td>
<td>–1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Balance</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Typography</td>
<td>–1</td>
<td>0</td>
<td>1</td>
<td>–1</td>
</tr>
<tr>
<td>Legends, etc. explanatory</td>
<td>0</td>
<td>–1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Average rating</td>
<td>–0.14</td>
<td>–0.43</td>
<td>0.71</td>
<td>0.14</td>
</tr>
</tbody>
</table>

Note: –1 = Poor; 0 = average; 1 = good.
the policy-makers’ ability to absorb them. A key requirement, that is, good visual balance, is achieved in most cases according to the present survey (Table 3). In terms of visualization, detailed and comprehensive plans expose the current techniques, also increasing map effectiveness through good design, and satisfy the end-users’ needs. The county plans issued mainly in late 1990s illustrate the early standards and quality of visualization techniques. County maps have noisy map layering and poor contrast of the major features. Figure–ground quality is quite sound in all planning tiers. In most maps analysed, map contrast is a common problem in presenting major features. Visualization trade-offs detected in the survey comprise excess information, poor readability and applicability, especially in early county and municipal plans (Fig. 1). Comparing the mapping and visualization techniques in planning at the end of the 1990s and the 2000s, the general representation and layout becomes much better supported by the richness of techniques employed, though the lower-tier plans also on a normative basis become more consolidated. The visualization techniques are predetermined by mainstream GIS software and mass production and the default solutions prevail. Advanced visualization techniques are applied progressively at the local branches of Nordic companies (Ramboll, Pöyry Entec, Sweco, etc.). Additionally, graduates returning from abroad tend to transfer some innovative techniques and standardized layouts already deployed in the Nordic region.

Often impressive visuals, technical solutions, and art design are used in physical and master plans to highlight designated features in order to manipulate target groups and decision-makers. On the detailed plans, maps tend to please at the expense of fidelity to reality and meeting the goals of the land developers and private interests. In addition, at lower planning tiers maps are too rich in detail, lacking structured, purpose-based layering. Iconographic symbols in master plans are used to attract attention to policy and mobilize public support, for example, aeroplane for airport, runners for recreation, a swing for a kindergarten (Fig. 1). By using specific symbolic flows and features, such iconic attempts could be noticed in a few planning cases such

![Fig. 1. Extract of the comprehensive plan of Ülenurme municipality, near Tartu, Estonia (1:20 000, 2009). Functional zoning: yellow, residential; pink, business and industry; grey, agriculture; blue, airport; green, semi-natural and natural ecosystems](image-url)
as the national plan Estonia 2010 (for example, flow of investments, cross-boundary cooperation). Multiple visual means to express connectivity issues (conceptualized or simple graphical, colour or contrast delineated) are common at national, county and master-level planning tiers in contrast to detailed plans that rather stress the spatially disconnective or terminal level. At the European level, representations of trans-European infrastructure networks, the metaphoric ‘bananas’ and ‘grapes’, attempt to use iconography to articulate new spatial concepts such as polycentricity in the form of images (JENSEN and RICHARDSON, 2003). In many instances, the purpose of such metaphors is to attract attention and to generate debate for consensus-building. This is often in the service of disseminating new ideas or propagating political preferences (ESPON, 2009).

Moving towards an ‘evidence-informed society’ using more formal models and a ‘spatially aware society’ using better-designed maps will require more attention to be paid to the context of the information (KITCHIN et al., 2009; KRAAK and ORMELING, 2010). Map-makers should realize that maps can communicate unintended messages as well (WOOD and FELS, 1992) and users of map should be aware that a single planning map might depict just one representation of planned spatial phenomena in order to convey narrow, context-specific messages. The principle can be that of providing less geographically precise and more innovative solutions for fuzzy plans and spatial policies. Constraints of the paper medium, poor statutory status of computer animations, and other features and forms of time geographies are challenges for the visualization and communication of plans in the decision-making process. Choosing adequate ways and places of presenting innovative visualization and cartographic language has become an emerging field of research and policy support (ESPON, 2009).

Implications of ad-hoc planning in city-regions

In liberal settings, planning governance depends on the scope of control while most decisions are made by individuals. The emergent systems of governance are somehow ‘soft’, though ‘hard’ and ‘soft’ spaces of governance are mutually constitutive (HAUGHTON et al., 2010). Planning geography is only now starting to encounter the need to search for ways of integrating hard and soft spaces.

The ESDP reflects the shift to what has been dubbed the contemporary paradigm of regional development (BACHTLER and YUIL, 2001). The clash of two planning cultures (science and design) in the search for a comprehensive theory and practical added value is exemplified in Estonia. European Union enlargement has facilitated the clash of many planning ‘cultures’ in Europe, posing challenges but also creating opportunities for mutual learning within the planning system.

In Estonia, strategic planning should be developed in new functional regions to enable cohesive planning and a harmonized multilevel and cross-scalar approach as policy-making and conformity are still dominantly top-down and centralized, driven by European Union spatial rhetorics, Structural Funds and resources. Planning practice reflects the legal priorities of cadastral and land use, not a comprehensive integrated approach. City-region experiments are looking for new spatio-institutional solutions. Planning is influenced by the planning problem and its modes, methods and tools of analysis are not strictly predetermined. Instead, they emerge during the continuous planning process. A rapid and ruthless search for proposals comprises city-region powers and tests the relationships between counties, city-regions, local governments and neighbourhoods. Different types of relationships are constructed and developed across city-region geographies with numerous institutions and interests. Planners as officials and political decision-makers act in multiple networks and legal frameworks, employing multiple methods and techniques, simply, deploying bureaucratic powers.

As an expression of the shifting nature of planning, increasing bureaucratization and administrative certainty is caused by the growing maturity of public administration. The decreased volume of plans improves the quality, communication and resource allocation in terms of the delivered plans, expressing a compromise between the speed of decision-making and the comprehensiveness of the decision. Slower processing and delivery could improve public involvement. Another feature related to bureaucratization is ‘environmentalization’ when dealing with negative externalities that load the planning process with various extensive environmental restrictions, strategic and impact assessments. An ideal strategic planning, that is, inclusive spatial governance, could offer the opportunity to increase the efficiency and effectiveness of spatial planning to deal more productively with creating the conditions for producing well-designed and smoothly functioning neighbourhoods.

Several questions are posed here about why there is an apparent mismatch in ad-hoc planning practices between supply, demand and the application of planning-support instruments, information and knowledge at the city-region level. Naturally, ad-hoc practices and the weakness of strategic planning could be explained by the interrupted history and the emergence of brand new methods and culture of spatial planning. Except for land use and environmental layers, the domination of an aspatial content in planning practices is pronounced in the context of decentralized decision-making at the level of fragmented master planning in rather small municipalities, causing biased results. In giving interested parties the right to draft detailed plans, local authorities give away part of their planning monopoly and investors get a strong position within the planning process. Strategic planning in metropolitan
and urban areas has been disturbed by administrative borders, which is a common problem in spatial planning (Healey, 2007). It might call for the introduction of a radically different spatial framework. Fuzzy boundaries as new ways of thinking and planning were born in Northern England and Wales. ESDP stresses multi-scalar concepts of connectivity, polycentricity and settlement patterns, decoded in recent spatial planning initiatives as gateways, hubs and corridors reinventing new internal territorial geographies, for instance, the Enterprise Zones and Sustainable Communities action plan in England and the development of a strategic framework for six Welsh sub-regions that needed to take into consideration the housing market, job distribution, the Greenbelt and rural issues. The new framework established a consultation platform for integrated strategic planning and flexible decision-making at the sub-regional and sub-local levels instead of simply issuing a fixed statutory plan within administrative units (Haughton et al., 2010). As Herrschel and Newman (2002) state, the city-region has natural ad-hoc meanings, although within political and administrative devolution city-regions receive a meaning of administrative units or of spatial planning instruments. Characteristically to a small country, the unbalanced governance mechanism between a powerful, centralized state and a weak regional level is one of the most important issues for cohesive planning and development in Estonia.

Comprehensive and thematic plans could not be defined by administrative boundaries to enable neighbours to work together on meso-level spatial developments and issues in a flexible way. Due to the weakness of the national urban policy in Estonia and changing urban hierarchies urban focus will be strengthened in the new Estonia 2030+ national plan.

Rapid development in situ causes devaluation of cartographic information as decision planning becomes outdated and, thus, inaccurately represent reality. Less detailed spatial information in strategic planning documents is often overridden and poorly communicated to authorities, developers and citizens. As a county plan is outdated not only in spatial terms, but also in its methods, detailed plans are confronted with other plans in settlement patterns and transport infrastructures. Sector-induced cases are also exemplified in preserving green networks. As long as the complexity of the city-region is growing, with regard to many different superior sector authorities (social, economic, transport and environmental) among others, city-region planners often search for agreements, collaboration and propositions outside their own expertise, ‘off the map’, so to say, looking for legal and institutional solutions. In the light of recent developments and trends, it can be suggested that spatial planning is becoming more complex, searching for better mapping and a more integrated, institutionalized approach and involving more non-professional, value-based stakeholders (Strasser and Schnepf, 2005). As spatial planning frameworks and business flows are becoming more structured and bureaucratic, aspatial tools are drifting back towards textual representation. Textual features and geographic vocabularies dominate the Territorial Agenda, various transnational as well as national spatial visions (Dühr et al., 2010). Preferring textual and non- graphic output instead of maps, images, animations and other innovative visualization products for handling spatial issues is explained by the qualification and efficient deployment of textual spatial visions in the political arena. The coordination of plans for cross-sector implementation strategies in suburban areas is needed. Adoption processes related to the operationalization of integrated strategic planning in suburban zones verified that different planning levels within the hierarchy of the spatial planning system require different approaches.

CONCLUSION

The article demonstrates the introduction and use of spatial information and evidence in ad-hoc planning within the framework of developing a national planning system. The Estonian case has prompted considerable theoretical debate on liberating spatial planning, on the importance of spatial evidence, and on communicating knowledge in the field of spatial planning over the last two decades of societal transition. The conceptualization of spatial planning was placed within the context of an ad-hoc approach, adding new perspectives to thinking about evidence-based planning, governance and policies, handling uncertainties, rushing requests, and balancing a multitude of interests and values. In short, the ad-hoc planning concept emphasizes faster and leaner decision-making. The empirical evidence and planning practices presented in the paper by the Estonian Tartu region case study suggest that the scope, content and quality of spatial information has been extended in ad-hoc practices following local circumstances and business needs. Urban development, suburbanization and European policies, particularly in the areas of environment, transportation and infrastructures, have intervened directly in the progress of spatial planning methods and practices.

Both the potential and the limitations of ad-hoc planning should be emphasized. This approach can be used to identify pioneering innovative planning cases, empowering representation modes, evidence-based and visualization methods that do conform to the ‘power of maps’ to pursue the normative ideals of democratic governance in development cases. Primarily, ad-hoc cases are driven by the need to address specific and up-to-date growth management issues such as land development, housing, infrastructure planning or environmental conservation as it happened in Estonia. It should be stressed that the adoption of ad-hoc
solutions offers the benefits of land-use planning without imposing new planning regulations and administrative structures. Emerging spatial data infrastructures provide noticeable support on the comprehensive and detailed plan levels. Negative effects of ad-hoc plans can be limited more efficiently by integrating them with institutions acting in different planning tiers and interest groups in different policy areas, that is, through an organized proximity enabling one to solve conflicts and launch processes of cooperation, delivery-oriented partnerships and negotiation within ad-hoc mechanisms. Clearly, the planning system should be responsive to both the private sector and public administration making it easier for people to be involved in the planning process. Still, the weak and fragmented nature of the planning community in search of its identity and the scope of the profession as well as the continuously weak positioning of planning bodies and the lack of an effective system of public control and participation in the preparation of spatial plans often results in the domination of private interest.

In addition to having assessed spatial information in the planning process, the paper also addressed several issues related to integrated planning in Estonian city-regions. It is vital to set up conditions for general and cohesive planning schemes by fuzzy boundaries and functional areas across municipalities in the urban fringe. The analysis cools optimism about establishing comprehensive overarching systems of agendas and general plans for detailed plans which are still firmly rooted in land-use planning. The planning system is also becoming more institutionalized and involves more stakeholders, which leads to a tendency to use procedural solutions that are supplemented by bureaucratic, regulatory, textual planning tools instead of favouring evidence-based mapping and unbiased representation. The national spatial planning framework, using its legal basis, governance and information infrastructure, methods and tools for spatial analysis, has to provide a solid analytical base with regard to European, national and regional geography and territorial development.

The Estonian case, considering fast-track development and subsequent recession, leads to the conclusion that controlled ad-hoc plans could reshape the built environment as well as reshuffle the planning framework for a more efficient and robust use of spatial knowledge. The leaner communication model in spatial planning lends new power to communities becoming more influential within the planning process. The empowerment in situ generates greater control of the process, integrating ‘hard’ and ‘soft’ spaces instead of simplistic, the administrative power to say ‘no’ reactions to plans and projects which have been imposed by higher-level institutions. In turn, the broadening spectrum of interests and agencies involved allows the plan to be bolder and more resolute. A more favourable theoretical context for developing research questions about contemporary planning practices should focus on how actors react to the development solutions to achieve short-term objectives without administrative burden.

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