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Communication-Oriented and Process-Sensitive Planning Support

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ABSTRACT

The complexity of the planning context has raised criticism against public participation for being a rigid top-down endeavour which does not recognize the different communicative needs and necessary working modes in the engagement of broad publics and collaborative small groups. Consequently, the problem is how to improve public participation so that it becomes more sensitive to the variety of communicative activities and knowledge needs involved in the design of urban planning processes. The aim of the article is to present and discuss, on the basis of two small case studies in the Finnish context, a revised model for a process-sensitive planning support system (PSS), with examples of several digital tools. The authors argue that besides broad public participation, more collaboration is needed to converge the diverse knowledge of planning in two-way communication and co-working settings which enable the analysis and design of living environments.

KEYWORDS

Collaboration, Communicative Action, E-Planning, Participation, Planning Support Systems (PSS), Public Participation, Types of Knowledge

INTRODUCTION

Urban planning is part of Western democratic systems in which public participation is widely accepted as one of the cornerstones. Public participation is embedded in several European planning legislations in order to strengthen equality and justice in the production of our living environments. Currently, but especially in the future, urban planning will take place in a sequence of digitally assisted collaborative situations, where the need to work together with people from diverse backgrounds and with heterogeneous knowledgebases grows dramatically. Concurrently with the rise of the information society and the availability of digital tools, new arenas of participation have emerged. Also, the increasing number and diversity of stakeholders have made visible the varying ways of working and

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types of knowledge related to planning issues. Consequently, public participation has turned out to be a challenging endeavour especially when it has been organised as a rigid top-down endeavour in which important decisions have been taken before the participation begins. Despite the application of many digital and non-digital enabling tools, the participants rarely have a real impact on the final outcomes (Staffans et al., in press). In addition, public participation does not sufficiently recognize the self-organization of citizens and the everyday practice which are parts of civic engagement transforming the urban environment (Boonstra & Boelens, 2011; Wallin, 2019).

Our research problem is, how to improve public participation so that it becomes more sensitive to the variety of communicative and contextual activities involved in the design processes (Eräranta, 2019).

We regard participatory planning as a matter of both professionals and laypeople who are involved as stakeholders in the specific case. Contrary to the modernist era, when planning professionals were considered the prime holders of knowledge within the planning domain (Sandercock, 1995), the emphasis has slowly moved to knowledge producers outside the planning organization, to groups who are not professionally trained planners (Rydin, 2007). Consequently, it is important to understand the kind of knowledge that can be co-produced in the different phases of planning, as well as how the stakeholders are able to work together.

The careful design of the planning process and collaboration in groups have become central to the comprehension and managing of communicative planning (Innes, 2013; Newig et al., 2012; Vente et al., 2016; Eräranta, 2019). One of the challenges is, how to combine the participation of a broad public that produces several types of knowledge, with the collaboration of a selected group of actors that enables the convergence of knowledge in the systematic gathering, managing and processing of information throughout the planning process. As Rydin claims (2007, pp. 55-56): "It is much more difficult than often acknowledged to generate agreement between actors whose knowledge of an issue is rooted in different experiences." Consequently, there is a need to better understand, how and with whom we are working with, when striving to co-create good living environments.

As we have been working for a long time with the above descried questions, the aim of our article is to present and discuss, based on two small case studies in the Finnish context, a revised model for process-sensitive planning support (Staffans et al., in press), which will enhance the flow of various communicative actions during the planning process.

The research questions are:

1. Does the model enhance the design process in terms of integrating the broad public with the specific small groups or in terms of diverging and converging knowledge?
2. What kind of digital and non-digital tools or a planning support system (PSS) does the revised model provide to improve communication-oriented and process-sensitive participatory planning?

We argue that besides broad public participation more collaboration is needed to synthesize the diverse knowledge of planning in two-way communication and collaborative settings, which will enable the analysis and design of living environments.

Next, we will describe the theoretical framework including the original model after which the methodology for the empirical cases, their analysis and comparison will be presented with consequences for the revision of the model. The authors conclude by discussing the answers to the research questions.

THE THEORETICAL FRAMEWORK

The framework of the article comprises the epistemological background and a description of the planning support system necessary for the model.

Knowledge Creation and Communication in Planning

In planning theory, as in the practice of planning the concepts of participation and collaboration are widely used to describe the form of actions taking place between multiple actors. What connects these two concepts are communication and interpersonal interaction as the foundation. Due to the different planning systems and theories a variety of urban planning definitions co-exists, ranging from pragmatic arrangements of available physical space to the "organizing of hope" in the design of human settlements (Almendinger, 2009). According to Patsy Healey (1997, p. 55), planning can be conceptualized as processes of intersubjective communication in the public sphere, through which dynamic mutual learning takes place. Therefore, it is important to recognize, how different communicative actions, participatory as well as collaborative, vary in the support of knowledge creation in planning. The use of various types of knowledge – spatial, socio-cultural, economic - is also a central element in achieving change through planning, because several authors see planning as "knowledge in communicative action" (see Forester, 1989; Flyvbjerg, 1998; Plöger, 2016). Knowledge is embedded in social relations and generated in knowledge networks, which make communicative actions substantive in the planning processes.

The recognition of different types and modes of knowledge emerged in planning theory in the 1970's, when John Friedmann introduced the theory of transactive planning. According to Friedmann, dialogue in transactive planning is organized in working groups that are task-oriented, temporary in composition, small in scale, based on interpersonal relationships, inclusive and cross-related in their membership, self-guiding in their actions, and responsible to assemblies (legitimate bodies) (Friedmann, 1973, p. 247).

However, Rydin (2007) criticizes mainstream communicative planning theory as inadequate to handle multiple types of knowledge. She suggests that the planning system should be conceptualized as a series of arenas in which various types of knowledge interact with one another, and in which planners are not just responsible for the procedural aspects but for the active co-generation of knowledge by testing and recognizing knowledge claims. Rydin calls for claims-testing spaces and emphasizes the importance of finding relevant fora as a challenging activity. According to Rydin (2007), the claim-testing process needs space for giving voice to the various claims (opening-up, but also closing-down), by recognizing and negotiating the value of the different knowledge claims. However, knowledge creation in planning is loaded with dichotomies, even contradictions. Besides the importance of factual knowledge, planning needs creative inputs, emotions, perceptions and human experiences to become locally sensitive. Rydin´s opening-up and closing-down are relevant concepts but too restricted, as they are mostly based on the creation of expert knowledge and causal relationships, while innovation, creative thoughts and ideas are in a minor position. Therefore, we define knowledge as referring to various types and modes of knowing, expert, experiential and creative ones (see Siemens, 2006) that nurture planning.

In the design science (Saad-Sulonen, 2014), opening-up means divergence in stimulating new innovative thinking by diversifying and exploring. Closing down refers to convergence, i.e. refining and choosing the best possibilities (Vreede & Briggs, 2005). Divergence can be assessed as the number of generated ideas (see Champlin et al., 2018). However, in addition to the quantitative measurement of divergence, it is important to qualitatively gather and analyse innovative ideas broadly from both lay people and professionals in terms of content. Hence, the production of ideas is seminal in urban planning and knowledge creation as it is a wider concept than claim-testing.

Human interaction is fundamental to communication, when striving towards mutual learning and understanding, which benefit from a smaller number of participants and face-to-face presence. This contradicts the idea of participatory planning as an open procedure that inclusively reaches wide and diverse publics. The contradiction between broad participation and collaborative working in smaller groups is also evident in Innes and Booher´s (2004) critical reflection on participatory methods in the U.S.

Currently, broad public participation is enhanced by cell phones (text messages) and social media, which many governments have chosen to apply. The new technology tends to multiply voices in planning but complicates the examination of different types of knowledge. To arrange participatory fora and platforms for a large number of people is relatively simple compared to the challenge of organising, analysing and interpreting the information produced in these arenas. Consequently, claim testing in the sense of converging planning knowledge still rests on the planner's interpretations of the best solutions. Therefore, we assert that there is a need for more collaborative working and interpersonal communication to close down the knowledge creation process of planning. Although collaboration and working in task-oriented groups are widely acknowledged in planning theory, collaborative group work is hard to apply in broad public participation.

Technological Support to Planning

Planning support systems (PSS) for managing urban planning and development processes are one of the major ICT-based tools in e-planning (Silva, 2010). PSS have always been closely tied to existing urban planning practices (Brail & Klosterman, 2001; Geertman & Stillwell, 2003; Geertman et al., 2015; Klosterman, 1997). PSS are not highly structured but rather loosely coupled assemblages of mainly computer-based techniques that aim to facilitate the different phases of the planning process. They comprise a rich variety of computer-aided techniques designed to support decision-making and efficient planning practices (Batty, 2007). PSS can also be described as an infrastructure that systematically introduces relevant and new spatial information to the planning process (Klosterman, 1997). In PSS, both the substance (content and context of the planning object) and the process aspects (for example communication) are usually present (Pelzer, 2015).

Although neither participation, nor collaboration has been central in the PSS studies, the development of PSS assumes that increased access to relevant information leads to a greater number of alternative scenarios, leading to a better public debate (Geertman, 2002; Geertman et al., 2015). To perform these tasks, a classification of the functional roles of PSS has been proposed, which distinguishes between three broad categories (Vonk et al., 2005; Geertman, 2015): informing, communicating, and analysing and designing. Informing refers to the PSS-support of one-sided communication, for instance in the case of a planners' website or surveys; communicating refers to the PSS-support of two-sided communication processes in which the roles of the sender and the recipient change over time, for example in the case of making use of a map-based touch table; analysing & designing refer to the PSS-support of analysis and the creation of information, ideas and knowledge, such as land-use modelling or scenario-building. The functional roles of PSS enable planners and policy-makers to inform, communicate, as well as analyse & design on the basis of various types of knowledge innovative solutions.

Modelling a Communication-Oriented and Process-Sensitive PSS

The Research on participatory e-planning and PSS have disclosed two observations that have served as the starting point to the model for enhancing a communication-oriented and process-sensitive PSS (Staffans & Horelli, 2014; Kahila, 2015; Staffans et al., in press):

- Participation usually touches a broad public and produces a great deal of information, but the data remains scattered and difficult to access by different stakeholders;
- Collaboration in groups belongs to planning routines, but it does not easily bring the diverse interest groups and professions, nor politicians, to the same table.

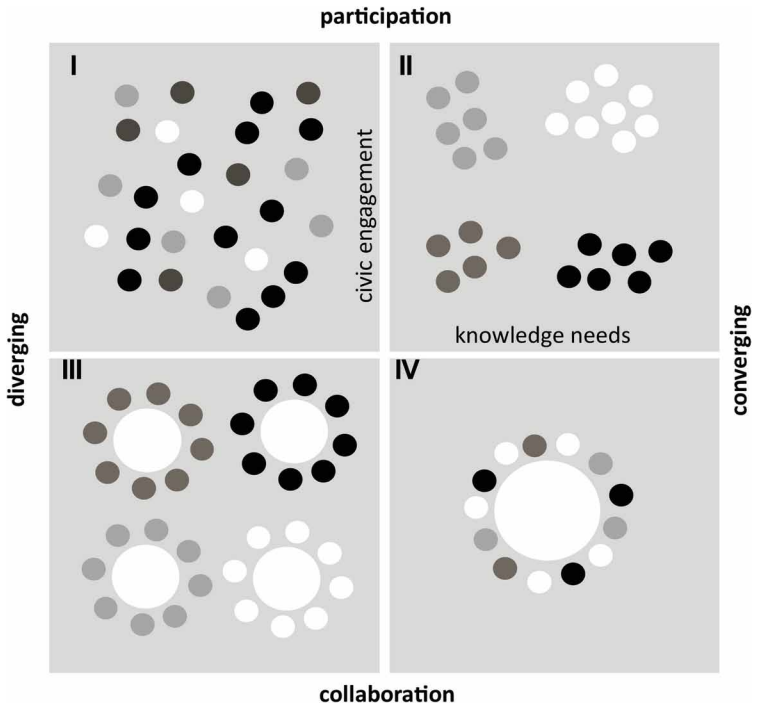
To solve the above described dilemmas, we have drafted a communication-oriented model comprising at this stage 1. a conceptual schema on knowledge creation and civic engagement, and 2. a process schema.

The two dimensions - knowledge needs, ranging from divergence to convergence, and civic engagement[1] extending from participation to collaboration - bring forth four types of communication needs and ways of engaging in urban planning (Figure 1). Thus, the schema acknowledges both Rydin's (2007) idea of opening up planning to multiple voices and closing down, when testing the knowledge claims and the notions on divergence and convergence in the generation of new ideas (Champlin et al., 2018).

Civic engagement is differentiated here by the number of participants. This distinction is made, since the opportunities to communicate with and within the broad public are fundamentally different from those in a small group. Participation refers here to working and communicating with a broad public and collaboration means working in small, selected groups:

1. Communication in the upper left corner addresses the broad public to produce diverse information or ideas for planning. The goal is to have the knowledge input of many individuals to the process. The output comprises a large variety of data, information, ideas and knowledge as the foundation for further phases;
2. Communication in the upper right corner converges (structures, organises) knowledge with the broad public. The goal is to recognise what kind of support different ideas or knowledge claims get from people. The output includes valued knowledge claims or selected ideas (one or more) for further elaboration;
3. Communication in the lower left corner takes place in smaller groups in order to make an input to the process. The goal is to get knowledge and ideas from diverse groups which can be later on elaborated in the process. The output contains a variety of different approaches and ideas as the foundation for further phases;

Figure 1. The theoretical schema is based on two dimensions in urban planning: Knowledge needs ranging from divergence to convergence, and civic engagement extending from participation to collaboration



4. Communication in the lower right corner organizes knowledge in a smaller group. The goal is to integrate different approaches and further develop planning knowledge and ideas in a collaborative manner. The output is a shared understanding of the direction and contents of the planning process.

The planning process is here understood as varying flows of communicative actions where the knowledge needs and the type of civic engagement go hand in hand with the ways of working, sometimes opening up the processes and sometimes closing them down. There are several ways to communicate both with the broad public and smaller groups, when diverging is needed to produce and construct knowledge and ideas. Similarly, a variety of digital and non-digital tools have been developed to converge, which are available for the broader public and group working (see Table 2).

The process schema, illustrated in Figure 2, comprises the flow of different communicative actions along the planning process. The process flow recognises three different imaginary phases: the goal, vision and plan. Each of the phases converge into some outcome, which defines and shapes the knowledge needs and contents of planning towards shared understanding. This process model of diverging and converging owes to the so called double diamond model, known from design science (https://www.designcouncil.org.uk/), but it is applied here in the context of participatory urban planning.

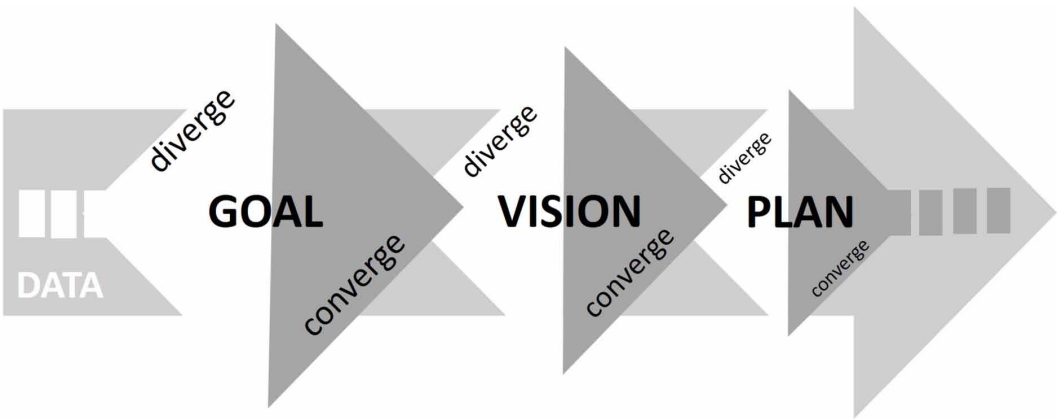
Goal setting refers to the phase, when the planning project becomes public. This phase comprises the early steps of the planning process in which large groups of participants are approached to produce information, such as comments, ideas, experiences for desired directions and priorities for further development. The planning system needs to be open for initiatives that are politically delivered, steered by the city officials or generated by the public either via individuals, citizen groups or self-organising communities.

The starting point for goal setting is the data of the area, its modelling as well analyses of the factual and expected as a variety of voices is crucial. To converge the goal setting phase both participatory and collaborative actions can be applied to define the shared goals or principles.

In the vision phase, the creation of a number of drafts should be supported. This takes place via innovation in various actor groups. Both lay and professional groups or a mixture of them are encouraged to bring forth ideas for the planning project at hand. At the end of the vision phase, the generated ideas are evaluated to produce one or two main visions that can be further processed.

In the plan phase the vision is first further developed with the broad public. Different mechanisms can be used to enable the broad public to explore the proposals and to comment them. The comments and ideas are then used to define and close down the proposal to a plan.

Figure 2. The flow of knowledge needs and civic engagement in which the opening up and closing down of the different phases of planning depends on the political and cultural context and purpose of planning



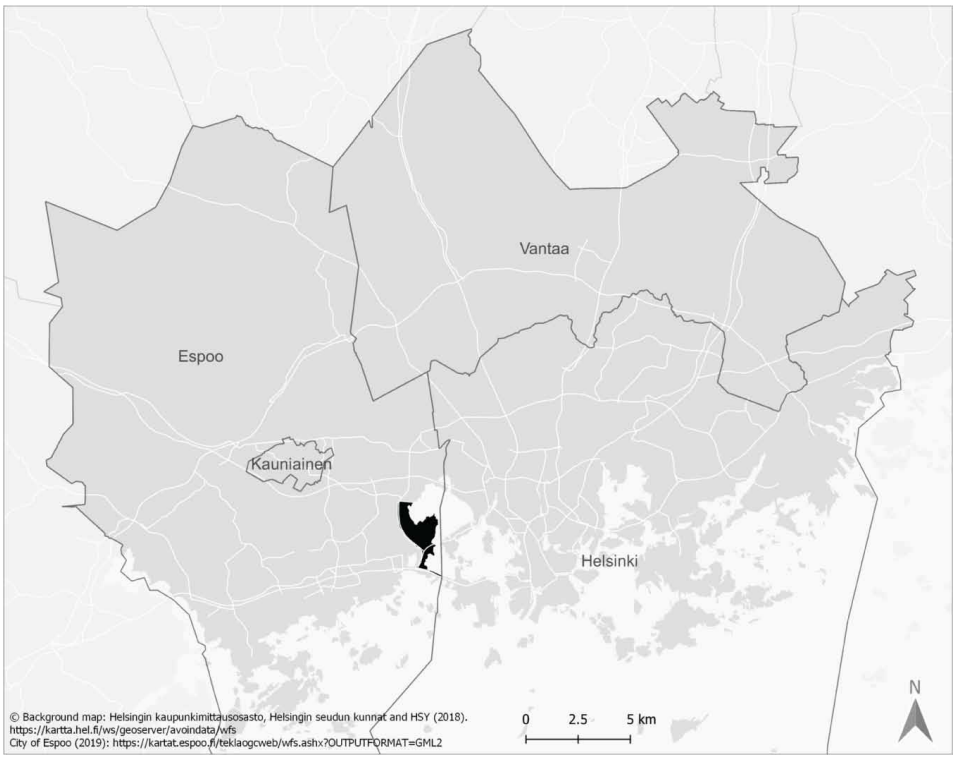
Thus, we have drafted a conceptual and procedural model the purpose of which is to combine the ways to reach the broad public and a selected group of participants, as well as various ways to support the collaboration in groups. The model enables a way to intertwine different communicative forms of action, actors, knowledge as well as digital and non-digital tools in the various phases of the planning process.

METHODOLOGY

The methodology of the empirical study for the article was based on a comparative qualitative analysis of two small empirical case studies in the Helsinki metropolitan area of Finland (1,5 million population; see Figure 3). Both cases applied a variety of data gathering techniques (contextual analyses, observation, surveys, interviews and analyses of documents and websites; see the details in the case-studies), as well as methods of data analysis and interpretation. The content analysis of the data was based on grounded theory and the constant comparative method (Strauss & Corbin, 1990).

In one of the cases, a new collaborative method, the ´Big Room-working`, was applied, which has been developed in the construction business. The Big Room-working provides an arena for various experts and it is supported by an advanced use of information technology. Although the Big Room-working is so far conceptually vaguely defined (Alhava et al., 2015), it usually refers to a physical space and a working method in which the chosen stakeholders gather to co-design and co-produce in a well-organized manner. This method has not yet been widely adopted in urban planning, but an increasing interest can be seen. Big Room-working has the potential to support the functional roles of PSS: informing, communicating, analysing & designing. However, transdisciplinary working

Figure 3. The Helsinki metropolitan area in which Otaniemi-neighbourhood can be seen as part of the City of Espoo



is demanding, and the Big Room-working faces multiple challenges concerning communication, collaboration and interpretation (Eräranta & Kauppi, 2017).

The comparative qualitative analysis of the cases has partly borrowed its methodology from the meta-analysis of qualitative studies (Timulak, 2009) the purpose of which is to provide a more comprehensive description of a phenomenon researched by a group of studies (focusing here on knowledge creation and civic engagement in urban planning) and to provide an assessment of the applied method (the development of the model). The steps in the comparative analysis have been: 1) the choice of the studies relevant to the research question that leads the comparative study (the aim of the original studies do not have to be the same as in the meta-analysis; Timulak, 2009); 2) a definition of what is considered as data in context (the publications on and behaviour in the cases that are relevant to the research questions); 3) an analysis of data by assorting it into domains representing the conceptual framework (see Figures 1 and 2); 4) delineating the data in domains into meaning units which allow the categorization and comparison of different meaning units according to similarities in their meanings (cf. open coding or constant comparative method by Strauss & Corbin, 1990). This process enables the final synthesis, which focuses on the whole body of research with implications for theory and practice; 5) interpretation of the results and the drawing of conclusions, which are supported by the so called Quasi-Judicial (QJ) case-method (Bromley & Powell, 2012). The latter is based on the network of empirical facts, relations and relevant concepts, such as the theoretical framework in this article.

EXAMINATION OF THE MODEL IN THE LIGHT OF TWO CASE STUDIES

The choice of the case studies was influenced by the fact that the Otaniemi area (3,500 residents), located in the City of Espoo (280000 population), close to the capital of Finland, is a very dynamic neighbourhood which enables to apply a suitable research design for testing our model. The current land use in Otaniemi is dominated by Aalto University, various research institutions, a traditional student village and a vivid network of start-up companies. As part of the rapidly growing Helsinki metropolitan area, Otaniemi is under a huge structural change due to three major investments: the new West Metro line, the Jokeri Light Railroad and the Aalto University campus development. However, the world-famous campus architecture and the valuable natural environment mean that the land-use planning of the area does not only have to cater for the housing needs of the growing City of Espoo, but also to reckon the protection of the cultural and ecological values. The strong development pressure and the contradictory expectations make the land-use planning of Otaniemi highly critical, demanding a great deal of communicative efforts.

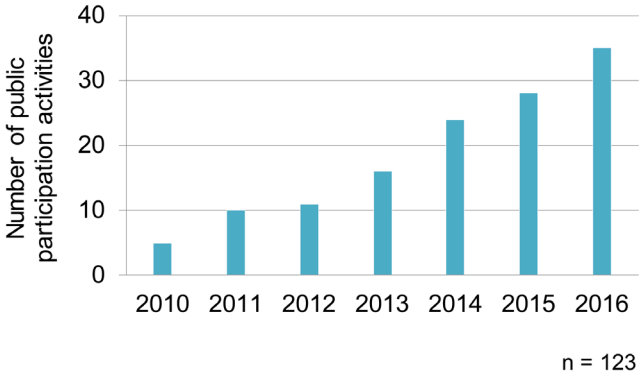
We will first describe the case study on public participation during the past seven years in the Otaniemi area after we will narrate the second case on small group collaboration in a project called Otaniemi OK that took place during 2014-2015.

Reaching a Broad Public Through Participation in Otaniemi

The empirical study on public participation in Otaniemi was based on surveys, public reviews, events and workshops, as well as interviews with major public and private, as well as third sector stakeholders. The outcomes disclosed that during 2010- 2017 in the Otaniemi area, 147 public participatory activities, such as service development, planning of parks etc. had been organised (see Figure 4). During the peak years many new planning projects were started in the neighbourhood, mainly organised by the city authorities, which affected directly the amount of communication needs. Activities in Figure 4 included all actions targeted at local people either by the public authority, a private company (a real estate developer) or a resident association. The data does not include participation and collaboration activities arranged through the social media.

During this period, nearly half of the activities were organized by the City of Espoo (Figure 5). The impact of large regional investments in the transportation infrastructure can be seen both

Figure 4. The number of public participation activities annually organised in Otaniemi



in Figures 5 and 6. Over a quarter of the participatory activities were governed by associations of municipalities as the Helsinki Regional Transport Authority (HSL) and the Jokeri Light Rail project. Also the frequency distributions of various topics were calculated (Figure 6), showing that 43% of all participatory activities focused on transport planning and mobility projects.

All participatory activities were analysed according to the types of action (Figure 7) and the functional categories of PSS (Geertman, 2015). One-way communication (informing) dominated the activities. The public was mostly approached through surveys, as 47% of the activities were either regular online or map-based surveys. In addition, statutory public hearings (public reviews) were organised in which the public had the opportunity to familiarise with and comment the planning material either in a physical place or in the Internet. However, only 3% of the participatory activities contained collaborative face-to-face working and interpersonal two-way communication (communicating), such as workshops.

Collaboration Supported by Big Room-Working in Otaniemi OK

The Energizing Urban Ecosystems research program (2012-2016), which included a project, called Otaniemi OK, provided us the opportunity to organise a collaboration process for the Otaniemi stakeholders to meet and discuss the future of the area in the Big Room-working

Figure 5. Organisers of the public participation activities in Otaniemi

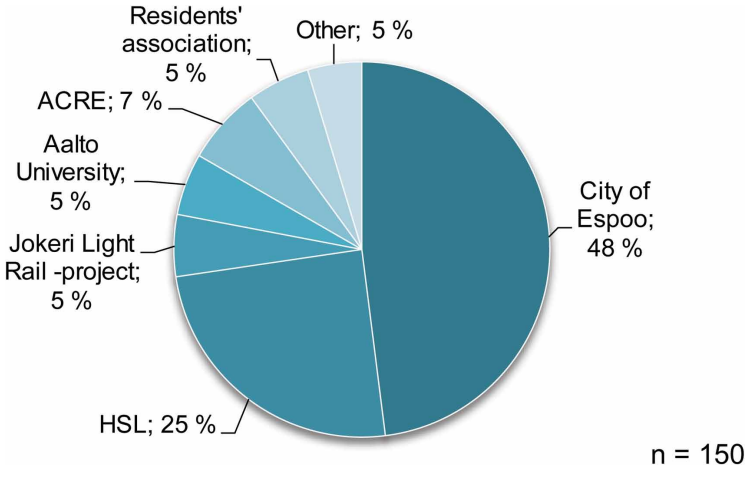


Figure 6. The themes of the public participation activities in Otaniemi

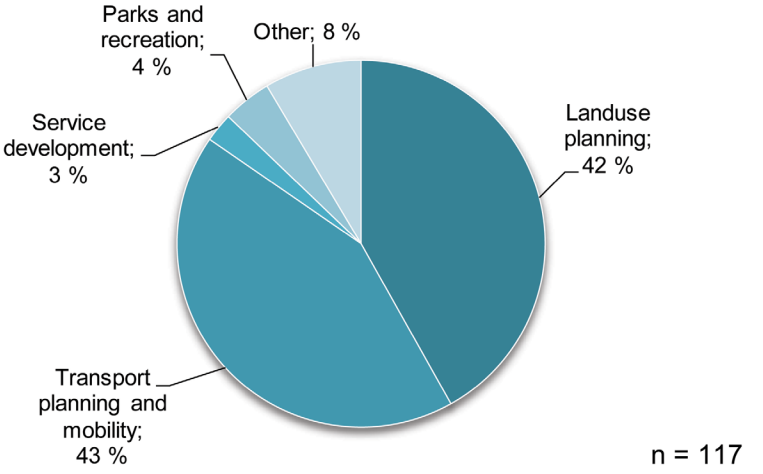
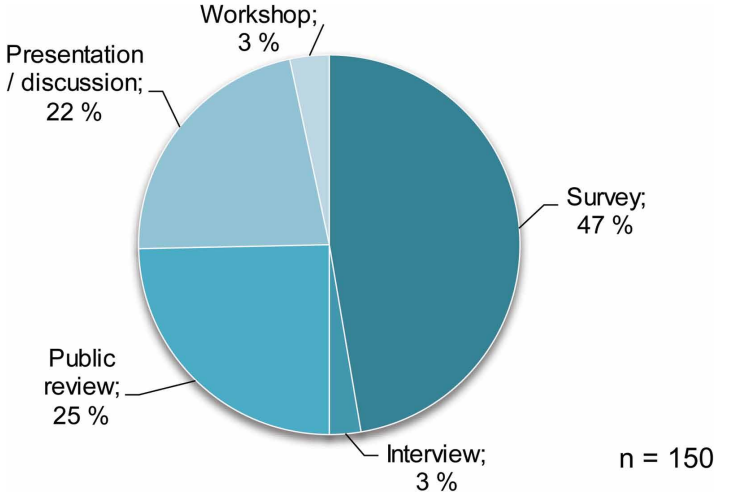


Figure 7. Types of participatory activities arranged in Otaniemi



setting. Our earlier studies had identified some concrete suggestions about the ways to facilitate different actors to improve their use of information and situation awareness in urban planning (Eräranta, 2013). This led us to develop the Aalto Built Environment Laboratory ABE (Figure 8). It is a space that supports co-creation and co-planning processes by integrating digitally assisted tools with face-to-face interaction (Eräranta & Kauppi, 2017; Eräranta & Staffans, 2015). The hardware of ABE consists of a seamless array of three large projection displays, which can show both 2D and stereoscopic 3D data. The set of main displays is complemented by support equipment, such as cameras, microphones and secondary displays. Depending on the case, ABE can serve as a platform for all the functional roles of PSS identified in the framework of this article.

The Otaniemi OK-process included three stakeholder meetings organised by the researchers at ABE (see Table 1). The 35 invited participants represented key interest groups in Otaniemi:

Figure 8. Big room-working at the Aalto Built Environment Lab (ABE), Aalto University (https://www.aalto.fi/en/locations/aalto-living-hub)

Table 1. The meetings, aims, participants and the role of researchers in the Otaniemi OK- process

Otaniemi OK Meetings	Aim	Participants	The Researchers' Roles
1st meeting (5.12.2014)	To invite the key stakeholders around one table To present each actors' Otaniemi vision To discuss the politically set goals versus the visions	Politicians 2 Officials 4 Residents 2 Students 6 Landowners 6 Consultants 3 Researchers 8 Total 31	Before the meeting: provision of a unified presentation template for the visions (ABE template); support to the residents Before the meeting: information gathering & analysis (all available Otaniemi planning material from the City of Espoo) During the meeting: facilitation of the discussion and data visualisations, enabled by the ABE hardware
2nd meeting (8.4.2015)	To discuss the similarities (agreed) and differences/conflicts (not agreed) of the visions To define the next steps	Politicians 3 Officials 4 Residents 3 Students 4 Landowners 6 Consultants 3 Researchers 8 Total 31	Before the meeting: analysis of the visions presented in the first meeting (agreed/not agreed) During the meeting: facilitation of the discussion and data visualisations enabled by the ABE hardware ("a shared vision heat map", see Eräranta & Kauppi, 2017).
3rd meeting (27.11.2015)	To discuss, reflect and elaborate the planning frame for the Otaniemi area	Politicians 2 Officials 3 Residents 3 Students 3 Landowners 5 Consultants 2 Researchers 8 Total 26	Before the meeting: preparation of the planning frame for the Otaniemi area (a concept of fixed networks and design codes) During the meeting: facilitation of the discussion and data visualisations enabled by the ABE hardware

officials (city planners), politicians (three biggest political groups), residents (through their association), students (Finnish speaking and Swedish speaking associations), landowners (the state and the university). Additionally, one consultant company attended the meetings as an expert of Otaniemi planning.

The meetings were recorded and transcribed for subsequent analysis and evaluation. Additionally, seven semi-structured group interviews were organised (recorded and transcribed) with 11 key persons, who were involved in the workshops.

COMPARISON OF THE PARTICIPATORY AND COLLABORATIVE PRACTICES IN OTANIEMI

The results from the cases on public participation in Otaniemi and collaborative activities in the Otaniemi OK- project, enabled us to compare the cases concerning knowledge needs and civic engagement in the different phases of urban planning, as well as the consequences for a viable PSS.

Separate Communicative Processes, Scattered Knowledge Creation

The 147 participatory activities in Otaniemi took place at a specific stage of a certain planning process. Stakeholders were widely invited to participate and to produce information about the needs for land use, transportation and service in Otaniemi. However, these participatory arrangements were mostly characterised by one-way communication. Either the planner informed the public of the coming changes in the environment or s/he gathered information as broadly as possible from the residents. These activities opened the planning processes and served the divergence of knowledge production.

However, there are remarkable challenges in the use of diverse types of knowledge. Even inside one neighbourhood, such as Otaniemi, numerous data sets have been collected in various projects or in the different phases of one project, by varying organisations or by administrative silos within one organisation. Public participation within one neighbourhood overlaps a great deal and the gathered data is not linked but scattered in several organisations. This generally complicates the use of residential data in planning and decision making. It is also challenging for the residents to understand and decide, when and where it is the correct time and place to participate. These thoughts are visible in one of the comments given by a resident:

From the resident's perspective, it looks like a piece of plan appears suddenly from somewhere and you cannot know what kind of plans exist next to that spot and nobody has been interested in informing about these plans. Therefore, a comprehensive illustration of the area would be needed. … It doesn't make sense that now the area is built in small pieces. (a resident of Otaniemi)

The collaborative Otaniemi OK-process was an attempt to converge the diverse group interests and knowledge towards a shared vision of Otaniemi. The city "expected a process where all participants can equally present their visions" and promised "to take advantage of the outcomes in the future planning" (Chief planning official, City of Espoo).

The researchers asked the key stakeholders in the first meeting of the Otanimei OK to present their own visions of Otaniemi by using the ABE presentation format. The researchers also gathered all available Otaniemi related planning material and political decisions, analysed and prepared visualised presentations to be discussed together. Based on the interviews, researchers supported the preparation of the residents´ presentation for the first meeting, which empowered the resident representatives and balanced the communication in the meeting. However, the researchers' role in the first meeting was not to advocate the residents´ vision, but to give equal space to the participants and to facilitate the overall discussion. Five different visions were presented and discussed in the first meeting by the residents, the students, the university and the landowners. One of the city officials acknowledged the need for the meeting in the following:

Usually these matters are discussed in small groups. This kind of an event, where everyone is able to hear others' thoughts simultaneously, increases the understanding of the goals between different

actors. I believe that in the decision-making phase we are able to proceed things quicker because of these events. Although we cannot make here any decisions, we can bring forth different views equally. (a city official, City of Espoo)

For the second meeting, the researchers worked on the presented visions, analysed the similarities and dissimilarities and made visualisations. For the third meeting, the final integration of the Otaniemi planning frame was prepared by the researchers.

In the meetings, the participants intensively discussed the visions and the planning of Otaniemi and agreed with the next steps. The Big Room served the process mostly as a platform for two-way communication but not really for working together. The analyses of the process and design took place between the meetings by researchers.

Based on the interviews, the participants considered the produced knowledge in the meetings valuable and suggested that it should be used as background material in the formal Otaniemi planning process. However, the interviewees were also aware of the vague status of the process. The Otaniemi OK-process was supported by the city officials of Espoo, but it was separate from the formal planning process. The vague status of the process became evident, as one of the politicians expressed his view about the process:

We have to remember what kind of decision-making process we have. In planning we have a board that takes the decisions. City officials, landowners, residents etc. can talk what they want but at the end we have a very systematic decision-making process. We need to understand different viewpoints because this is a huge process but at the end, when we need to proceed, the decisions are made in clear steps. (City councilor, City of Espoo)

In spite of this statement, after three years of the last meeting Otaniemi is still lacking the master plan and many projects are waiting. The city seems to be unable or reluctant to openly communicate and work with the different viewpoints, the "clear steps" of decision-making are after all not so clear and the challenge of how to converge the "huge process" is enormous.

The findings from the communicative actions in Otaniemi indicated that improvement in the handling of data and processing of information in planning are needed. More collaborative settings are required, where knowledge from various professional groups can intertwine with the lay knowledge and produce shared understanding as well as joint proposals. Moreover, when communicative actions take the form of working together instead of just informing, the events can also be used as claim testing occurrences in which different actors use the available information to create new knowledge. To make the planning process more communication-oriented and more efficient the different ways of communication should be better linked to one another.

The Weak Role of New ICTs

Up till now, new methods or tools have seldom been used in public participation and collaboration practices. One exception are the map-based surveys that, on the one hand, have partly replaced the former online non-map-based survey tools and, on the other hand, have provided a channel to reach new kind of knowledge in a format that was not possible before (Ministry of Environment, 2018). The possibility to gather localised data that is based on the map markings respondents have made, enables planners to collect data in a format that is easier to analyse and transfer to the existing information systems (Kahila-Tani, 2015). In Otaniemi, the use of map-based surveys has grown during the seven years being now a more permanent part of the toolbox of participatory methods.

The applied digital tools mainly focused on the delivery of information and on the collection of information instead of using tools that can support collaboration among different actors. The Big Room-working in ABE that was used in the Otaniemi OK-meetings was an exception. Based on the interviews, the participants of the Otaniemi OK-process were generally pleased with the analysed

material, such as maps, charts and graphs, as well as with the visualisation possibilities that the space and presentation technology enabled. Simultaneously, the participants found the use of the unified presentation format laborious to compile in the first meeting. In addition to technical assistance, the participants highlighted the importance of the expert facilitator, who took care of the discussion and working together. Also, the power of the visualisations that guided the discussion, was appreciated. Finally, the tools together with the high-quality visualisation-techniques and the physical setting of ABE were experienced as innovative. Even though ABE is a university project, without a formal position in the institutional urban planning system, it has shown potential to become a semi-formal meeting place for a wide network of stakeholders in urban development and in the new forms of hybrid governance (Horelli et al., 2015).

Despite the hype around the digitalisation of urban planning, the situation seems different for public participation and collaboration in small groups. Research data collected from the Otaniemi area indicate that the use of ICTs has grown, as data is often digitally collected. Informing people takes place via the Internet and the planning related materials are available online. However, digitalisation mainly supports one-way communication and the divergence of the knowledge base in planning. In collaborative working (two-way communication, analysis & design) that results in converging knowledge in terms of producing shared visions and proposals, the role of digital tools has so far been limited.

Revision of the Model and Tools for the Future

The framework of this article comprised a model consisting of a conceptual and procedural schema (Figures 1 and 2). Its purpose was to enhance the analysis of how to combine the ways of reaching the broad public and a selected group of participants, as well as the various ways to support collaboration in groups. The case studies illustrated that the model helped to analyse the knowledge needs and civic engagement in terms of divergence and convergence as well as participation and collaboration. Thus, the first research question could be answered. However, the second research question, concerning the provision of relevant PSS by the model, which would improve communication-oriented and process-sensitive participatory planning, remained unanswered, as the application of digital tools in the different situations remained inadequate.

Therefore, we have drafted a third, methodological part to the model, comprising a table of potential tools for the future endeavours (Table 2), based on our former studies and a literature review on PSS. The tools can be applied in the different phases of planning – goal, vision and plan – (Figure 2), depending on the communication needs and ways of working.

During the goal phase, when the planning becomes public and a wide variety of voices is crucial, tools to support the discovering of information, such as on-line map-based surveys and PPGIS, are useful and effective (see Figure 9; Kahila, 2015). During the early steps of the process, not only information should be gathered broadly but also the public should be extensively and clearly informed. PPS, such as web-based tools, idea creation workshops, the social media and big data-tools are worth considering during this phase.

The creation of several drafts should be supported in the vision phase. For example, the Geodesign hub (geodesignhub.com) can then be useful. In the Geodesign hub parallel groups can work together to produce alternative visions from which a couple of versions can be chosen to be elaborated at the end and then opened up for the public (Figure 10).

The broad public should be able to comment the elaboration of the vision transformed into a plan, in the plan phase, such as an on-line commenting site in Leppävaara, Finland (Figure 11). The comments and ideas are then used to define and close down the proposal to a plan.

In addition to various tools and working methods, an online and real-time data bank is needed to collect and store all the data produced in participation and collaboration activities. This databank is needed for ‘pooling’ the data and for analytic purposes. The databank should also be capable of bringing forth the earlier phases of the process and to work as a re-visioning tool. The databank also

Table 2. The methodological part of the revised model with examples of potential tools to be applied in the different phases of planning

	Divergence/ Participation	Divergence/ Collaboration	Convergence/ Participation	Convergence/ Collaboration	Outcomes
GOAL	• map-based surveys (PPGIS) • social media • big data • analytical and predictive tools	• workshops	• crowdsourcing • online voting • panels • map-based surveys (PPGIS)	• Big Room-working • visualisations (GIS etc.) • information models • analytic and predictive tools	• shared goals for development • map-based presentations and visualisations • criteria and indicators for monitoring and evaluation
VISION	• map-based surveys (PPGIS) • online idea competitions	• workshops • easy- use modelling tools • games • geo-design	• virtual reality • augmented reality and commenting • on-line voting	• Big Room-working • decision support tools (analytic) • geo-design	• shared vision and a selected draft for the plan presented in city model and visualised in 3D
PLAN	• social media • map-based surveys	• city information models	• virtual reality • augmented reality	• city information models • Big Room-working • decision support tools	• a shared plan for the future development, presented in a city model and visualised in 3D

Figure 9. A map highlighting the results of a map-based survey created for the master planning process in the City of Helsinki, Finland (Staffans et al., in press)

Figure 10. The Geodesign hub can be used for visioning in-fill options in urban development. An example from Otaniemi, Espoo, Finland.

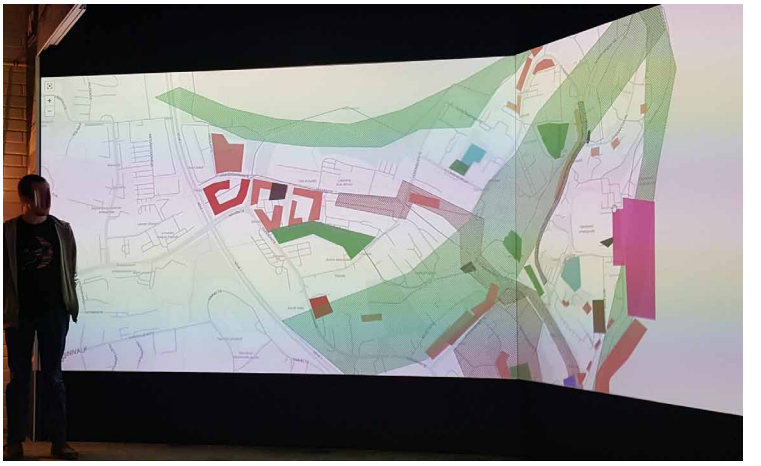
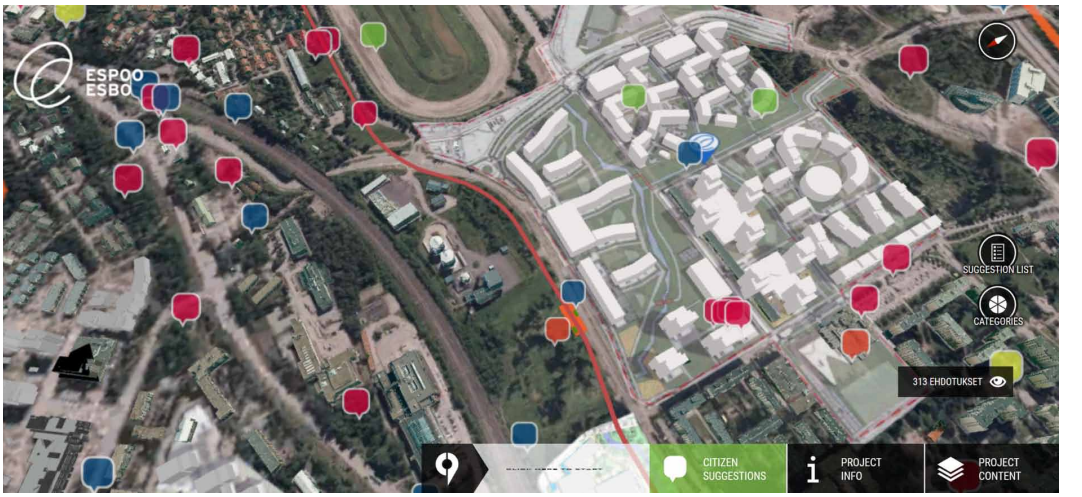


Figure 11. An on-line commenting site for a new urban centre. An example from Leppävaara, Espoo, Finland (http://legacy.cityplanneronline.com/cityplanner/project/webgl/index.do?uid=mZtuKSm3&lang=fi).



needs to be at least partly open for the public supporting the divergence phases of the process so that the different actors can study how information has been accumulated. This will ease the convergence sessions, when the same databank can be used to stimulate and support the face-to-face dialogue. As urban planning will increasingly be based on the so-called city information model, the databank with various 3D visualisations will grow into such a model (Biljecki et al., 2015; cf. the links to the data trust discussion in the EU, Australia and USA).

CONCLUSION

Public participation and collaboration in urban planning provide situations, where different actors are entitled to influence decisions that affect them. In spite of the similar purposes of these two forms of

engaging people in planning, the empirical data shows that there are several practical challenges due to mixing these two forms of engagement. To overcome ineffective participatory and collaboration processes, more awareness of the purpose and goals of communication is needed, as well as solutions to support the process-sensitivity of urban planning.

The aim of the article was to present and discuss, on the basis of two case studies in the Finnish context, the revision of a model for process-sensitive planning support (Staffans et al., in press), which will enhance the flow of various communicative actions and ways of engagement during the planning process.

The research questions dealt with the ability of the model to enhance the analysis of the design process in terms of integrating the broad public with the specific small groups to diverge or converge knowledge. We also asked, what kind of public support system (PSS) does the model provide to improve communication-oriented and process-sensitive participatory planning?

The model originally comprised two parts 1) a conceptual and 2) a procedural one (Figures 1 and 2). The results of the two case studies, as well as that of Staffans et al. (in press), corroborated that the model enhances the process-sensitivity in terms of observing the communicative needs and ways of working during the different phases of the planning process.

However, it was evident that the digital infrastructure or PSS was not sufficiently innovative and up to date in the case studies. More effective use of ICTs and PSS are needed. The tools should be tested more often, and the use of the tools should be systematically evaluated at the end of the projects. Therefore, the methodological part—Table 2—was added to the model. Thus, the revised model comprises a set of potential tools for the different phases and purposes of urban planning. However, it is not just the abundance of tools that are important, but their integration in an ecology of tools (Wallin et al., 2010) or in a comprehensive planning support system, which is linked to the social and ecological needs of the project and context. Testing the PSS in context might additionally increase the process-sensitivity of urban planning. It is also clear that in the future testing and negotiations involving the application of city information models, will need special spaces, such as the Big Room or equivalent.

Therefore, success in future arrangements calls for asking how, when, why, with whom and with what kind of PSS public participation and collaboration should be organised in a specific project and in a specific phase. This is in line with what several other studies have concluded, namely that the challenges stakeholders have during participatory projects narrow down to having a more effective process design in which the outcomes of the endeavour are carefully defined (Vente et al., 2016; Newig et al., 2012).

Nevertheless, there are still two serious gaps in the model. It does not yet sufficiently take into consideration the final role of the political decision-makers in urban planning. How to engage politicians in the planning process in a way that they will be loyal to the collectively deliberated solutions? In addition, how to expand the model to include the self-organisation of community groups and everyday practice, which are not part of, but linked to public participation, as they are important agents in the hybrid governance (Wallin, 2019; Mäenpää & Faehnle, 2017). These are crucial questions for future research.

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ENDNOTES

[1] Civic engagement is used here as a generic term covering different kinds of urban activities from public participation via self-organisation to practices of everyday life (see Wallin, in press).

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