Memorize the Dance in the Shadows?

Unriddling the Networked Dynamics of Planning Processes through Social Network Analysis

Susa Eräranta
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A doctoral dissertation completed for the degree of Doctor of Science (Technology) to be defended, with the permission of the Aalto University School of Engineering, at a public examination held at the lecture hall K216 of the school on 1 March 2019 at 12.

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Abstract

The importance of cities is increasing due to the rapidly growing share of population living in urban areas. The accelerating urbanization processes together with the challenges set by climate change, globalization, and societal differentiation, are highlighting the importance of planning and governance in guiding sustainable urban futures. Sustainable urban development requires the synergy of multiple knowledges, as well as organizational capability of learning over time. Current planning theoretical views suggest that planning is constructed in social processes, increasing the importance of understanding their relational structures. As complex systems, the multi-actor planning processes are typically dynamic in nature and often unsystematically documented, challenging the organizational learning processes. Consequently, planning research has acknowledged that the procedural dynamics and their potential effects over time are not adequately understood, partly challenged by the frequently occurring gap between planning practice and research.

The aim of this research is to approach the complex interactions in planning processes by generating new understanding of their often invisible networked dynamics. Furthermore, a special focus for interpreting the dynamics is set on process memory development. The empirical study utilizes longitudinal time-series data from one four-year statutory strategic spatial planning process in one municipality in the Helsinki Capital Region, Finland. The data has been specifically collected and processed to be analyzed through social network analysis (SNA) for studying the dynamics of the actors’ connections through meetings. The SNA findings are validated through a series of individual interviews with participants of the specific process. In addition, focus group interviews with strategic spatial planning professionals are utilized for testing the applicability and relevance of the findings for process development purposes in planning practice.

The findings open up the multidimensionality of the actual social complexities, visualizing and quantifying the often invisible networked dynamics in a strategic spatial planning process. Based on the findings, SNA opens up new ways for conceptualizing planning through visual-analytical methods and actor-relational criteria, generating new understanding of the diverse groups of actors and knowledges involved in shaping urban futures. Moreover, the findings suggest that a combination of qualitative and visual-analytical SNA methods can improve the understanding the causes, consequences and implications of various networked process structures which were previously difficult to identify. In conclusion, unveiling the networked dynamics in planning research is a promising direction for further understanding of planning practice.

Keywords strategic spatial planning, planning process, planning process dynamics, social network analysis

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Tiivistelmä

Tämän tutkimuksen tavoitteena on tarkastella strategiseen maankäytön suunnitteluihin liittyvää asiantuntijavuorovaikutusta ja kehittää ymmärrystä suunnittelprosessien usein vaikeasti havaittavasta verkostodynamiaasta. Verkostodynamian vaikutuksiin paneudutaan suunnittelun prosessimuistin käsittämän avulla. Empiirisessä tutkimuksessa hyödynnetään aikasarjadarataa neliyvoitosta strategisen maankäytön suunnittelun prosessista Helsingin pääkaupunkiseudulta. Tutkimusaineisto on kerätty ja käsitetty analysoitavaksi sosiaalisen verkostoanalyysin (SNA) menetelmillä. SNA- analyysin tulokset validoidaan yksilöhastatteluilla analysoituen suunnittelprosessien osallistuneiden henkilöiden kanssa. Lisäksi tulosten merkitystä käytännön suunnittelutyön kannalta testataan ryhmähastatteluissa strategiseen maankäytön suunnittelun ammattilaisten kanssa.

Tutkimuksen tulokset avaaavat asiantuntijavuorovaikutuksen kompleksisuutta visualisoiden ja kvantitoiden suunnittelun usein vaikeasti havaittavasta verkostodynamiaasta. Tulosten perusteella voidaan todeta, että SNA tarjoo uusia mahdollisuuksia suunnittelprosessien ymmärtämiseen visualis- analyysityömenetelmien avulla. Tulokset auttavat ymmärtämään suunnittelprosesseihin liittyviä moninaisia toimijaryhmiä, jotka ovat mukana määrittelemässä kaupunkiseutujen tulevaisuutta. Tutkimustulosten perusteella laadullisten ja visualis-analyysitysten menetelmien yhdistelmällä voidaan avata uusia näkökulmia erilaisten verkostorakenteiden syihin, seurauksiin ja merkityksiin.

Avainsanat
strateginen maankäytön suunnittelu, suunnittelprosessi, suunnittelprosessin dynamiikka, sosiaalinen verkostoanalyysi

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This research turned out to be the most inspiring learning process, both as a researcher and as a practicing planner. By crossing over the invisible boundaries between research and practice, between disciplines, and between organizations, I discovered that the greatest potential for learning new comes from outside one’s own immediate context, offering a continuous source of new perspectives and unforgettable stories from a network of devoted people around me.

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Some have asked what the magic behind the process is. It is in the combination of inspiration, hard work, and endless support. It is in the courage of stepping beyond the boundaries, and follow the curiosity to the formerly unknown directions. Therein is the magic.

Otaniemi, December 2018

Susa Eräranta
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The author was solely responsible for writing the dissertation.
Prologue

“Land-use planning is a hopelessly complex human endeavor. It involves actions taken by some to affect the use of land controlled by others, following decisions taken by third parties based on values not shared by all concerned, regarding issues no one fully comprehends, in an attempt to guide events and processes that very likely will not unfold in the time, place, and manner anticipated.” (Couclelis 2005, 1355)

Years ago, when I first opened the doors of a municipal planning organization as a newly graduated practicing planner, I did not know much of what to expect. Stories of the reality of practice were not to be found in publications for preparing oneself for even a hint of the world, which was waiting behind the doors. No complete manuals to be read before entering the practice, explaining how to orientate oneself through the processes. Just general papers of a mysterious world, pointing out one word over all: complexity. In addition to process descriptions of few linearly placed boxes containing words like analysis, evaluation, elaboration, and action. Like stepping stones for hopping over the mighty stream for reaching the opposite shore. I had considerately been told that the practice is a mess of which nobody could speak logically about. And once I entered, behind every corner, lurking in the closets, hiding in the drawers, falling out from the books in the old shelves, watching one to pass by in the staircases, whispering from the walls, and appearing as faded memories out from the teapots, more and more complexities began to show up. Slightly convincing one of their existence, but still fading away once tried to be caught. And I realized. These were now the messy complexities, which were supposed to be taken into account in the planning processes. They were just waiting to be noticed, to be acknowledged, and to be invited into the processes.

On top of all these, there were the humans. Holding an unbelievable amount of undocumented knowledge to be learned. Knowledge nowhere to be found from the closets or drawers, not stored in the books, nor hiding in the shadows. Knowledge, which was stored in the humans, awaiting to be recognized and to be utilized in the processes. And even more knowledge, forgotten long ago, held by the ones who had left the organizations years before. Setting my hands on processes, and going through the available documentation, my mind was full of
questions I wanted to ask, reasonings I wanted to know, decisions chains I wanted to understand. Many times being told that the answers are to be found from the humans, who are no more working in the organizations. Nobody else knowing the answers anymore, memories forgotten long ago in the midst of all other processes. Despite of the organizations, the challenges remained the same. Scarce memories. Humans changing. Memories stored in humans, who were not to be easily reached anymore. Not one or two times did I find myself calling to another municipality, asking if they still memorize what were the thoughts behind. Learning that for reaching the memories, I ought to know the humans. The networks behind. To reach the diversity of the well-thought reasonings, the investigated alternatives, and the forgotten discussions. The knowledge, which was not to be found from databases or reports. The knowledge, which was stored in the interactions of the humans.

Little by little, trying to cope with my curious mind while experiencing the surprises of the practice, breathing in the complexities, I began to understand the processes more and more. The vividness and dynamics of the complexities were nowhere near to be captured into the words of publications, or to be learned in the classrooms. They had to be experienced. In the middle of all this, I was constantly reminding myself that when something seemed simple, I had just most probably missed most of the context. Listening carefully to the more experienced colleagues, opening up their thinking and understanding. Silently gazing at the amazing beauty of the procedural complexities unfolding in front of my eyes. Among these humans who were willing to share their knowledge and memories, but given the possibility of building on my own understandings, I gradually began to learn the Practice. To enjoy the complexities, to get inspired of identifying even more of them. With my mind continuously seeking for answers of what could be learned to better understand the processes.

And I learned that all of these humans in the processes were utilizing their expertise and imagination to cope with all of the complexities around them. Weekly, daily, hourly. Over months, years, sometimes even decades. Trying to find the right pieces that make the puzzle fit together for solving the mystery. For a while. Before someone opens up the box again, mixing up the pieces, and asking for another way of combining them. Thus, planning processes do not tend to be easy or boring. When one thinks that the pieces finally fit together, the wind blows in from the window, mixing the puzzle, and flying in a pile of new pieces to be fitted in. As I quickly understood, planning processes are not linear graphs consisting of few subsequent boxes with simplified words. They are continuously changing systems, nested within other continuously changing systems, including yet a larger variety of internal continuously changing systems, and bound together by a continuously changing network of human beings,
memories, knowledges, and learning. Continuously inspiring the participants to find new solutions, which would serve the recognized objectives, and typically at some point ending up into a vivid public discussion. Thus, describing planning processes through a linear set of simplified phases would miss the astonishing complexities and the value-laden nature of the processes. How many times have we heard that planning processes are unique? And yes, all processes do definitely have their own characteristics, partly defined by the participants. However, similar to all processes is their dependence on questions, which are understood and valued differently by all participants.

If I was asked to describe a planning process on a general level in the Nordic democracy context, I would point out the complexities that are based on the diversity of knowledges and opinions behind the processes. Explaining that to cope with all of the external complexities, a diversity of actors is invited to join the processes for sharing their expertise and opinions. Yet, if asked from anyone, never inviting diverse enough group of participants for serving the purpose. Never inviting the right actors for bringing in the needed information. And never inviting the right expertises for answering the questions. So, for understanding the unique contexts even better, a variety of background information is utilized in the processes, drowning the participants under information overflow. Yet, if asked from anyone, never utilizing the right background information for understanding the right issues. Never utilizing enough of background information for understanding the context even better. And always utilizing too much of background information for wasting the scarce resources and prolonging the processes. For coping with the differing views, alternatives are prepared during the processes for drafting some of the possible solutions. Yet, if asked from anyone, never drafting enough alternatives for understanding all solutions. Always drafting too many solutions for unnecessarily wasting time. At least never drafting the right alternatives for giving any value for the process.

To understand the prerequisites and consequences of the possible solutions, a variety of investigations are made. Yet, if asked from anyone, never making the right investigations for understanding the right consequences in a detailed enough way. Never making enough investigations for serving the purpose of the process. Still, always making too many investigations for wasting the scarce resources and prolonging the processes. All this is done to understand the genius loci of the places to develop them from their own characteristics onwards to a strategically sound direction in order to serve the shifting needs in a continuously changing world. Yet, if asked from anyone, the solution is never on a strategic enough scale to give enough flexibility. Never detailed enough to steer the subsequent processes as needed. And always picking up the wrong characteristics of the context. And the plans are at least always based on the wrong opinions
of the wrong participants. So, the processes are carried out by trying to consider all possible things that may matter, simultaneously trying not to spend too much time on anything, not to prolong the processes or waste the scarce resources. Yet, if asked from anyone, never considering enough issues during the processes. Never considering them in a thoroughly enough way. And never even considering the right issues. Still, always considering too many issues for spending too much resources over time.

Finally, as we already know, the participants are dealing with the dynamic complexities of the world in the processes. Complexities, which are doomed to be incomprehensible to everyone. Yet, always expected to solve the complexities in no time with no resources, ending up with a perfect solution, which is optimal for everyone participating in the process, and much beyond. To cope with these complexities, the memories, the humans, and the learning capabilities matter - setting the frame for the objectives of this research. Of this research, which is aiming at learning from the practice to the research, and from the research to the practice. Finding new understanding of the social complexities, and their effect on memory development in planning processes. To find out how to support the research in identifying ways of understanding the practice-related complexities, and to support the practice in identifying ways for understanding the impacts of some of the process-related complexities. To support the organizations, which are coping with the complexities in a changing world. In a reality where the humans and everything around them continuously changes. And the memories fade into the shadows, being gradually forgotten. Until some day when the pieces of the puzzle are moved again, and the long-forgotten and unnecessary memories become valuable again. When the walls do not anymore whisper their secrets, and when the bookshelves and drawers do not anymore hold on to the forgotten. Then, the network of the humans participating in the processes may show its strength, holding on to some of the memories. One just has to know the humans, and find them.
1. Introduction

1.1 The complexity and dynamics of planning are increasing

The importance of cities is increasing due to the rapidly growing share of population living in urban areas. Two thirds of the world’s population are expected to live in cities by 2030. Simultaneously, climate change, globalization, and societal differentiation are challenging the future of the cities as robust and livable environments. Cities are functioning as complex adaptive systems like living organisms (Holling 2004), “far from equilibrium and qualitatively different from” their subsystems (Baynes 2009). The growing complexity has been acknowledged by planning theory (e.g., Byrne 2003; Chettiparamb 2006; de Roo & Silva 2010; Sengupta et al. 2016), as planners are facing a variety of external inputs, which are out of their own control (Brooks 2002). Healey (2007, p. 1, p. 3) describes urban areas as “a complex mixture of nodes and networks, places and flows, in which multiple relations, activities and values co-exist, interact, combine, conflict, oppress, and generate creative synergy”, and consequently, planning has to deal with multi-actor dilemmas of “co-existence in shared spaces”. Therefore, planning questions have been identified already for long as intrinsically wicked (Rittel & Webber 1973) and ill-defined (Faludi 1973a). There are no definitive formulations to wicked planning problems, as they are essentially unique, and can be considered symptoms of other systemic problems. The definition of a wicked planning problem is difficult to specify, as it is already wicked in itself. Wicked problems are intrinsically uncertain, rapidly changing, nonlinear, complex and do not have an ultimate solution (Sengupta et al. 2016). Consequently, planning needs creativity in answering to the dynamic and complex uncertainties of the future (Albrechts 2005), working through the complex conflicts and confrontations (Healey 2007) with highly unpredictable consequences. According to Hillier (2003), planning still quite often fails in attaining its promises.

Planning processes are nested in a complex multi-scale system, ranging from the societal to the organizational levels. All levels affect each other, setting a framework for planning processes. Thus, planning requires holistic understanding of the invisible interconnections both within and between the planning or-
ganization and the human scale, and with the surrounding environment. Si-
loedness may negatively influence an organization’s awareness of the
knowledge it possesses for dealing with the complexity. Lack of awareness of the
ongoing processes is typical in complex and knowledge-intensive settings (Al-
vesson 2004). Consequently, planning cannot be done in silos, but asks for more
systemic and aware practices and frameworks of understanding. By definition,
a system is a functioning entity that cannot be divided into independent parts
without losing some of the emergent properties (e.g., Boulding 1956; Ackoff 1971;
Ackoff & Gharajedaghi 1996; Gharajedaghi 2011). Systems thinking is a framework
for considering issues as systemic wholes, built up from essential parts func-
tioning interconnectedly. The general systems theory was initially developed as
a framework for various disciplines to discuss and understand each other
(Boulding 1956). There was a need for this as the specialization of disciplines had
led to a siloed professional culture with no boundary-crossing activities to allow
the generation of new knowledge over the disciplinary boundaries. If one fol-
lows the reasoning of systems theory, boundaries set the limit for an analyzed
system and its environment. However, the system is not understood inde-
pendently from its environment, but as an integral part of it. Another central
premise of systems thinking is that a system cannot be understood by decou-
pling it into individual parts. A system is adaptive when it can respond to varia-
tions for improving its potential of achieving goals (Holland 1962), and open
when it is in a continuous interaction with its environment (Emery 2000).

The task of planning is not an easy one, and there are no true or false answers.
Instead, planning considers weighing and valuing various options and opinions
against each other in the interactive processes. As de Roo et al. (2012, p. 2) have
suggested, "Experienced planning practitioners therefore take a humble posi-
tion while playing the game called spatial development. Thus, 'game' is by no
means an academic fun park, where everything goes as planned, where moves
can be explained well and always have a happy ending. On the contrary, it is a
very serious 'game' full of pitfalls and with rules that are still barely understood".
Consequently, de Roo et al. (2012) suggest a frame of relationalism to discuss
the understanding in which the situations, values, ideas, and so on, depend on
their relations. Thus, instead of black and white, there are "infinite shades of
grey, produced on the basis of relationships. These infinite shades of grey can
be seen as a metaphor for the endless number of situations with which spatial
planners, for example, are confronted" (de Roo et al. 2012, p. 9).

The recognition of cities as complex adaptive systems is based on complexity
sciences, which can be applied to planning as well. Complexity sciences and gen-
eral systems theory belong to general sciences, as they offer universal under-
standing, which can be applied in multiple disciplines (de Roo et al. 2012; Gates
2016), including planning. Consequently, complexity theory involves a variety of contributions ranging from the natural to the social sciences. Complexity theory bases itself on the recognition that the complex interconnections and behavior of various subsystems generates non-linear dynamics over time. Complexity science has utilized various methods for depicting patterns in the seemingly complex systems, ranging from applications of nonlinear mathematics in revealing dissipative structures of living systems to analyzing the co-evolution of societal structures (e.g., Nicolis & Prigogine 1977; Giddens 1984; Innes & Booher 2010). Because of the diverse applications, complexity has been described in a plethora of ways, none of which has been totally able to describe its essence in full detail.

Recognizing the challenge, Hillier (2012, p. 39) has suggested, "Complexity is complex!"

Plans have been traditionally acknowledged as a central instrument for guiding sustainable urban development processes for decades further. Practicing planners are challenged with the dynamics and the unpredictable changes of urban systems, evolving from the interdependencies between the human and the non-human components (Sengupta et al. 2016). Planning occurs within a complex context and a long time-scale, combining multiple non-linear and seldom easily structured processes (Innes & Booher 2010). The complex dynamics are contesting planning processes from outside as well as from within, requiring increased awareness of the processes and of their possible consequences. The task of planning is not easy, as the processes need to manage with the external complexities of their environment, but also cope with their own internal complexities. Despite of their societal importance, the discussion of the quality of the planning processes guiding the development of cities has remained scarce.

Planning processes are initiated for a certain purpose and affected by a number of factors from outside and within, responding to the changes over time. Complexity is not anymore only a feature of the society which planning is dealing with. Complexity is integral to planning practice itself, and new understanding is needed to deal with the internal complexity (Chettiparamb 2007). The processes are working as open adaptive systems, affecting and being affected by their complex environments while dealing with the ill-defined problems within the complex internal systems of their own. The complexity of the processes exceeds the understanding of any individual (Innes & Booher 2010). Consequently, more actors are entering into the processes, increasing their internal complexities. Complexity exists already within the networked dynamics of the planning processes themselves due to the diversity and interdependence of the various involving actors (Dempwolf & Lyles 2012) on a variety of levels. Some have even argued that there is a need of using complexity theory for improving the understanding of the processes (e.g., Stacey 1995). Accordingly, from this perspective,
planning processes cannot be understood only through analyzing their components (e.g., actors), but require the analysis of their interactions (Innes & Booher 2010, p. 32). Every individual component of the planning process, be it on the actor-relational or organizational level, is already complex in itself. Thus, planning processes integrate complex and adaptive socio-political and institutional systems, as well as cultural factors (Othengrafen 2010), operating on the grounds of distributed intelligence and dialogue (Innes 2005, p. 59).

Complexity is not only about the amount of things happening simultaneously, but about their interactions and interdependencies over time, as well, going beyond complications (Koppenjan & Klijn 2016). The systems perception of complexity science is far from the traditional rational idea of breaking a problem down into comprehensible pieces and solving one problem at a time without a holistic understanding of their systemic interrelations. Rational planning process designs have been claimed to mismatch the “actual disordered, uncertain and essentially political realities” (Davoudi 2015, p. 317), which planning is working with. Simultaneously, there is not enough awareness of the possible effects of the processes. As has been suggested, “Today’s solutions become tomorrow’s problems” (Sterman 2002, p. 504). Benign objectives may have undesired outcomes, if the systemic conditions are not understood well enough. A system as a whole behaves in an unpredictable way, and the consequences of planning decisions cannot be accurately understood without systems thinking. For understanding the systemic complexity, path dependencies and feedback loops between the parts of the system have to be acknowledged.

De Roo (2012; 2016) has applied the systems thinking framework for classifying the evolution of planning process discussion. The first phase of procedural thinking, the rational-comprehensive view of processes (e.g., Banfield 1959) belongs to the first class of closed systems. The second class of semi-open systems involves the iterative scenario planning processes, which are formed around feedback loops (e.g., Lindblom 1959; Mitchell 1961). The third class of systems focuses on the communicative turn in planning (e.g., Forster 1982; Healey 1999), whereas the fourth class includes the view of processes as complex adaptive systems acknowledging their nonlinear and uncertain nature over time (e.g., Innes & Booher 2010). By suggesting for a classification of the possibilities for approaching complexity through planning research, Hillier (2012) describes romantic and baroque complexity, based on the work of Kwa (2002) and Law (2004). Whereas the formalist romantic view of complexity attempts to integrate all relevant fragments into a single system, such as a city to be modelled and predicted through a defined set of indicators, the baroque view analyzes individual unstable fragments and their interrelations, which are impossible to describe fully due to their turbulent nature (Hillier 2012, pp. 57–58).
1.2 Networked planning processes

The ability to deal with complexity is challenged mostly by human limitations. "Knowledge is hard to obtain; the mind of a man is small and simple while the world is large and complex" (Wildavsky 1973, pp. 141–142). Consequently, more and more actors are entering into planning processes for being able to utilize a larger pool of knowledge in order to cope with the complexities. For this reason, also the internal complexity of planning processes increases, originating from the interactive and socially constructed nature of planning. Othengrafen (2010, p. 83) has described planning as “a multifaceted and highly complex activity, embedded in specific cultural contexts composed of interactive processes among involved actors, their cultural cognitive frames and their particular social contexts”, pointing out the complex and interactive nature of planning processes. In his description, the complexities of planning exceed the individual and organizational levels, being partly framed also in various cultural structures. Thus, planning processes are dealing with multi-level complexities, ranging from the micro and meso levels to the macro level structures (Lubell et al. 2012; Moliterno & Mahony 2011). The requirements for multi-level understanding are not new, and have been pointed out already by Faludi (1973b) in his substantive-procedural framework of planning. Friedmann (1967, p. 227) has, even before that, discussed more generally the social context of planning, defining planning as “the guidance of change within a social system”, identifying the changing and systemic nature of planning in dealing with interdependent activities and parts of the system. As Friedmann (1967, p. 234) further describes, the “thought and consequent action intended to be rational are contingent on environmental conditions - the social context of planning - which represent the medium on and through which planning decisions are made”. Thus, planning decisions can be understood as socially constructed (e.g., Innes 1998; Healey 1999; Friedman 1967; Othengrafen 2010), which creates a need for improving the understanding of the social processes and their relational structures, beyond the characteristics of individual actors and organizations.

Many have indicated the interactive nature of planning (e.g., Innes 1998; Innes & Booher 2010; Forester 1983; Healey 1997). As Innes (1998, p. 52) has suggested, “What planners do most of the time is talk and interact”. In the research by Campbell and Marshall (2002, p. 100), practicing planners described planning as "a process of argumentation between professionals". Moreover, the interaction may change the actors and the specific situations, as well as the webs of communicative and interactive activities (Innes 1998). Consequently, it is not irrelevant how the talking and interaction takes place during the processes. According
to Innes (1998, p. 53), the actual conscious and formal decisions are less significant for understanding “the processes through which the individuals’ understandings change and they begin to change their actions”. The complex interactions should be regarded as a part of the outcome of the processes, being changed by and changing the individual actors and their interrelations over time (Innes 1998, p. 53). As Faludi (1973b) has pointed out, recognizing the human and organizational level features of processes, and acknowledging the meaning of memory, learning and human growth are important outcomes of processes. Forrester (1983) has concluded that planning practice can be comprehended as a system of communicative actions in contingent situated activities, rather than a merely instrumental problem-solving action. Interaction in planning processes has multiple benefits, such as the increased commitment and trust of actors, well-rationalized planning outputs, and access to more diverse knowledge during the processes (Innes & Booher 2010). However, collaborative practice does not always lead into consensus. For example, the discussion of agonism in planning recognizes the inherent conflicts and unresolvable disagreements as a natural part of a functioning democracy (e.g., Bäcklund & Mäntysalo 2010; Hillier 2002; McClymont 2011).

Albrechts and Mandelbaum (2005, p. 1) have suggested, "we live in a world in which all societies depend on networks". The networks surpass multiple scales, linking various processes through invisible ties, and enabling knowledge flows across the interconnected structures. In a world of networked complexities, planning presents an ambiguous challenge, which requires spatial consciousness, scalar consciousness, and relational dynamics (Healey 2005a). In the knowledge-intensive planning processes, actors cannot survive independently with the growing complexity and increasing information overflow. Instead, they have to lean on expertise and knowledge flows through various networked structures. An expert network can complement an actor's own ability to solve complex problems by offering access to a wider variety of knowledges, supporting the capability of finding well-reasoned solutions. In the long-lasting and knowledge-intensive processes, the networked structures are often dynamic, as new emerging problems require the inclusion of new expertises over time (Cross & Cummings 2004, p. 929). Understanding of the processes over time can be supported by the development of memories and experiences.

Memories and past experiences are important for understanding the processes and for learning about them for the future. Networked structures enabling fluent interaction and knowledge transfer within and between the processes should be encouraged for the efficient distribution of process memories. Understanding of the planning processes is enabled through the cumulation of process memories, which integrate the substance- and structure-related aspects
of the process. In the context of this research, the substance-related memories include the reasoning behind the content of the process, whereas the structure-related memories deal for example with the networked patterns and dynamics of the processes. Through reflecting on the process understanding, based on the sequences of memories, a planning organization can develop its practices, and support the generation of a learning process. Memory in organizations is challenged by multiple factors (Huber 1991). For example, the process documentation levels, which vary in different organizational practices, might be crucial for process memory development. Personnel ageing and turnover may complicate the utilization of past experiences and memories in the scarcely documented processes. In addition, unawareness of the future information needs and unfamiliarity of the whereabouts of knowledge possessed by the planning organization may hinder the systematic collection and utilization of memories and past experiences. By limiting the access to memories and experiences, these factors may challenge the understanding of existing processes and their possible effects. As examples of Finnish planning processes have shown, plans or parts of them may be declined after long processes. Better understanding of the networked structures and their possible consequences may support the development of more aware process practices. Thus, awareness of the ways of supporting the generation and development of process memories through networked process structures, consequently enabling the understanding of the networked processes and learning, are needed.

Networks have always existed, but the importance of understanding them more thoroughly is still increasing (Innes 2005, p. 57). Due to the complexities of the networks, and the lack of discussion concerning their meaning in planning processes, planners hardly ever have an empirically accurate picture of the networks they are dealing with (Albrechts & Mandelbaum 2005, p. 4). Already Forester (1983, pp. 163–165) has pointed out the need for understanding the institutional world of the planners for identifying the various aspects of the interactive processes in planning practice. The adoption and development of the rich network analysis methodology in planning research and practice has already been welcomed (Innes 2005, p. 57). For example, the number of studies utilizing actor-network theory (ANT) (e.g., Rydin 2014; Doak & Karadimitriou 2007a; Cvetinovic et al. 2014; Boelens 2010) in urban development process research has increased during the past decade, applying ANT as a frame for understanding the interaction of the human and the non-human actors in spatial settings. On the contrary, utilization of social network analysis (SNA) has been more scarce, and focused mostly on community development and place-making processes (e.g., Provan et

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1 e.g., KHO 2012 3263/1/11; KHO 2016 695/1/15; Turun Sanomat 2012

1. Introduction
al. 2005; Prell et al. 2009; Ganis et al. 2016; Zhao & Wang 2017), and plan implementation (e.g., Holladay et al. 2017). Network research is typically challenged by the resource dependency of data collection, and by need of modeling the structural dynamics of the processes, which are unfolding over time (Laurent et al. 2015; Halinen & Törnroos 2005). Currently, there are no established methods for representing the temporary interactive and evolutionary dynamics of the networked processes (Corsaro & Snehota 2012).

Understanding of the actual networked processes in practice is an essential step for developing new institutional practices. A core challenge facing planning research and practice is the insufficient understanding of the interactive process dynamics and their possible effects over time. Innes (1998), Healey (1997), and Forester (2008), among others, have discussed the complexities of planning practice. However, the systematic and replicable methods of validating and analyzing the complexities have lagged behind. Consequently, the adoption of new methods allowing the generation of new understanding of practice-related communicative complexities are needed. For example, the applicability of SNA for planning process research has been already acknowledged by Dempwolf and Lyles (2012).

Social network analysis (SNA) deals with structures of social action (Scott 1991), allowing the exploration of the dynamics and evolution of communicative processes over time. SNA supports the identification of relational structures co-existing within formal hierarchical and inter-organizational structures. The analysis methods utilize relational concepts to explore the processes affecting actors and their actions interdependently (Wasserman & Faust 1994) with the evolution of relational structures and their impacts as the main focus. SNA supports other process analysis methods (e.g., Schipper & Spekkink 2015), such as interviews and surveys, by identifying the networked process structures, and enabling the discussion of their possible consequences for the planning processes and their outcomes. By utilizing time-series data of actual planning processes, SNA may also support the discussion between planning research and practice. This may support, for example, the learning from practice for informing the practice through analyzing the activities of planners (Watson 2002). As Innes (1995, p. 183) has suggested, the practice-oriented researchers "take practice as the raw material of their inquiry", aiming at bridging the acknowledged separation of planning research and practice. However, the growing gap between planning research and practice, and the view that planning as a discipline is facing challenges due to the inability of developing its own practices, have still been acknowledged in recent research (e.g., Ponzini 2016; Kunzmann 2016; Palermo 2014; Campbell 2012b). Campbell (2012a) has highlighted the gap between the answers produced by the academics and the ones requested by the practitioners.
This has created a need for more practice-oriented research, which focuses on generating understanding and methods for development instead of only pointing out the challenges, which planning practice is facing. Consequently, a stronger focus on bridging the division between research and practice is required in planning research.

1.3 Objective of the research

Planning process development is a topical theme in the Finnish statutory spatial planning context at the moment, offering an interesting opportunity for practice-oriented process research. The existing Land Use and Planning Act (132/1999), regulating the public statutory spatial planning processes, is being re-evaluated simultaneously as some of the largest Finnish cities are currently re-organizing their planning processes and practices. As Innes (1995, p. 185) has suggested, "the planning theorists' goal should be to help planners develop a new type of critical, reflective practice which is both ethical and creative". Understanding of interactions and relational dynamics is an essential factor for analyzing real life situations in planning organizations. For generating a learning process, and improving the ability of reflecting the past experiences with the development aims, the understanding of the networked process dynamics, and their possible consequences, is necessary. The traditional process analysis methods, such as interviews and surveys, are prone to memory distortion and post-rationalization (e.g., Corsaro & Snehota 2012; Morçöl 2012). Thus, they ought to be supplemented with methods, which allow the recollection of process activities beyond the actor memories.

This research aims at generating understanding of the possibilities of social network analysis as a method for generating new perspectives to planning processes, focusing on the aspect of process memory. The interdependency of method and phenomena is strong. A method cannot be understood without the phenomena, and the phenomena cannot be understood without a method. In this research, the focus is on understanding the possibilities of SNA as a method, through its application on certain phenomena. By learning from practice, this research analyzes the networked process dynamics, opening up the discussion of the relevance of the theme for planning research and practice. The intention is not to produce generalizable truths applicable to all contexts, but to generate understanding of the applicability of the approach for planning practice and research for improving the comprehension of the specific practice-related challenges of process memory development within the networked process structures. The focus is on the procedural understanding of the networked dynamics.
and their effects over time in enabling or restricting process memory development, instead of the evolution of the content of the plan as such.

By focusing on the procedural understanding of planning, the first objective of this research is to generate new understanding of the often-invisible actor-relational dynamics of planning processes through the utilization of social network analysis and longitudinal time-series data from one municipal statutory strategic spatial planning process. Further, by focusing on the aspect of process memory development, the second objective of this research is to explore the relation between the networked process dynamics and process memory development. And finally, by endorsing the need for more collaboration between planning research and practice, the third objective of this research is to generate discussion between research and practice for understanding the applicability and relevance of the research findings for planning practice. Consequently, the research is structured through the following research questions:

**RQ1:** What can social network analysis contribute to the understanding of the emergent properties of networked process dynamics with the utilization of longitudinal time-series data?

**RQ2:** What effects can the networked dynamics of planning processes have on the development of process memory in municipal planning organizations?

**RQ3:** Can the selectively increased understanding of the networked process dynamics through social network analysis be utilized in the process development practices of municipal planning organizations?

The empirical analysis of this research utilizes detailed time-series data of organized actor interactions during a four-year statutory strategic spatial planning process in one of the municipalities in the Helsinki Capital Region (Finland). The Helsinki Capital Region comprises of four municipalities: Helsinki, Espoo, Vantaa and Kauniainen, having in total over 1.1 million inhabitants in 2015. In addition to the statutory spatial planning practices, the cities organize informal collaboration between other municipalities in the wider Helsinki Metropolitan Area. The time-series data has been specifically collected and processed to be applicable in SNA. Moreover, the SNA findings are validated through a series of individual interviews with participants of the analyzed process. Finally, the relevance and applicability of the findings for planning practice is reflected
through focus group interviews with actors working in diverse positions in municipal planning organizations involved in strategic spatial planning processes. In particular, the study argues that improved understanding of the relation of the networked process dynamics and process memory development enables the generation of long-term learning processes in municipal planning organizations. Moreover, the findings suggest that SNA provides a wide set of possibilities for planning research for deepening the understanding of planning process dynamics in combination with the more commonly utilized methods.

The research is divided into seven sections. Section 2 gives an overview of the most relevant theoretical discussion concerning the topic. The section looks at organizational learning and process memory development, discusses the current understanding of planning processes, and explores collaborative network structures, and their possible effects. Thereafter, section 3 presents the research questions, as well as the methodological framework of this research. Section 4 describes the Finnish planning context, within which the analyzed process needs to be understood. Next, section 5 presents the central findings of the research, which are then further discussed in section 6, answering to the set research questions. In the end, section 7 summarizes the conclusions of the research.
2. In and around networked planning processes

Aiming at synergistically combining insights from various theoretical frameworks, this section outlines the current understanding of the research topic from various perspectives. Subsection 2.1 describes the discussion of organizational and expert knowledge in planning, outlining the multidimensionality and social construction of knowledge in planning. The importance of knowledge in organizational processes has been discussed for long. Planning processes typically apply multiple knowledges related to numerous specialized fields of expertise. Consequently, the discussion of knowledge in planning processes has moved to recognizing planning processes as multi-minded systems in which knowledge is socially constructed. Planning, as knowledge-intensive work, contains both explicit and tacit knowledge. When people change, the tacit knowledge typically follows them out of the organizations. Further, the discussion around process memory -related concepts in addition to learning and forgetting as organizational activities relating to memory development is outlined. Memory storing is discussed as a critical aspect of retaining memory in organizations. Knowledge, learning, and memory are interdependent parts of organizational processes. Learning is based on past experiences and memory, but experiences of processes are still rarely documented, but are transferred through interaction.

Together with the change in understanding that knowledge is generated in interaction rather than through value neutrality, the discussion of social processes in planning has emerged. Consequently, subsection 2.2 presents views to the current understanding of planning processes, beginning from public policy processes as a framework, and more closely examining the substantive-procedural framework and further process discussion in the context of planning. In the end, the subsection moves to the direction of networked complexities in planning processes. A more process-focused view of planning supports the understanding of the specific steps of planning as a part of a larger systemic whole, aiming at explaining temporal structures and patterns of processes. In addition, the dis-
cussion of planning processes is central for example because there is a dependency between the multi-actor process and the substance, influenced by the interpersonal relationships forming networks.

Networks transfer and create knowledge and memories, mediated by their structural characteristics. Consequently, subsection 2.3 discusses networks and their structural effects presenting various network structures, and the possible network structural effects on knowledge transfer. The network-focus moves the unit of analysis to actor-relational level, embracing the meaning of interaction in the knowledge-building activities. Planning, as a complex adaptive process, rarely remains stable over time. So far, the dynamics of networks in public administration have not been understood well. Thus, for understanding networked process dynamics in the planning context, multilevel understanding, actor-network theory and social network analysis are outlined as frames for approaching networks in the context of planning. In the end, based on the literature overview, subsection 2.4 summarizes the conceptual framework, and the identified research needs concerning the topic of this research. After laying down the theoretical foundation of the research, the study will move on to the section 3 presenting the methodological framework.

2.1 Process memory is a prerequisite for organizational learning

2.1.1 Planning combines multiple knowledges

The multidimensionality of organizational knowledge

The importance of knowledge in organizational processes has been discussed for decades (e.g., Nonaka 1994; Nonaka et al. 1994; Nonaka & Takeuchi 1995; Spender 1996; Cook & Brown 1999; Hoopes & Postrel 1999; Alvesson 2004; Argote & Miron-Spektor 2011; Mishra & Uday Bhaskar 2011). There is no commonly shared definition of knowledge across scientific disciplines, so in this research its multidimensional understanding and experience-based situatedness are embraced, and. For this research, the exact definition of knowledge is less important than acknowledging its importance and the ways in which its transfer can be affected by procedural structures. Knowledge is often defined as “a belief that is true and justified” (Polanyi 1967). As Alvesson (2004, p. 1) defines, knowledge-intensive jobs are “not highly routine and call for some degree of creativity and adaptation to specific circumstances”, typically requiring extensive education and experience, leading to power asymmetries.

A commonly utilized taxonomy for knowledge is the separation between tacit and explicit knowledge discussing the embeddedness and codification of knowledge (e.g., Polanyi 1967; Nonaka & Takeuchi 1995). Polanyi’s meaning of tacit
knowledge is different from the traditional knowledge management theories, in which it is commonly defined as an opposition to explicit knowledge and reduced only to what can be articulated, whereas it is in fact only its other side. Polanyi’s (1967, p. 4) argument that “we can know more than we can tell” is an integral part of his definition of tacit knowledge. Thus, tacit knowledge can be obtained by itself, whereas explicit knowledge depends on tacit understanding (Gourlay & Nurse 2005, 302). Traditional knowledge management theories (e.g., Nonaka 1994; Nonaka & Takeuchi 1995; Nonaka & Konno 1998) divide between explicit and tacit knowledge in a different sense. Explicit knowledge is formal (data, formulas, general principles and theories etc.), residing for example within certain disciplines and reflecting the institutionalized standards about the way of generating new knowledge. Tacit knowledge, on the other hand, is merely related to individual experiences and understanding, and more challenging to codify. Hence, tacit knowledge cannot be easily communicated or shared with others (Nonaka & Konno 1998). The interaction between these two dimensions has been studied (e.g., Lam 2000) to create four categories of knowledge: individual-tacit, individual-explicit, collective-explicit, and collective-tacit. These dimensions describe well the various knowledge types in planning processes, in which various individuals and actor groups hold and transfer different amounts of codified and uncodified knowledges.

The wider utilization of tacit knowledge in organizations requires that it is first transformed to explicit (Nonaka 1994). Knowledge transformation refers to enabling the interaction between actors through translating the knowledge to a usable form. One way for knowledge transformation has been introduced by Nonaka (1994) and Nonaka and Takeuchi (1995) in the SECI-model (socialization, externalization, combination, internalization). In their model, socialization implies to the creation of tacit knowledge through the sharing of experiences. Externalization means expressing tacit knowledge explicitly through for example writing, or utilizing metaphors and models. Combination involves the handling of the explicit knowledge by, for example, sorting and adding. Internalization is about learning new knowledge through developing shared understandings. (Nonaka & Takeuchi 1995)

The social construction of knowledge in planning
The significance of knowledge and learning in the context of public administration and planning organizations has been widely discussed (e.g., Friedmann & Hudson 1974; Mahler 1997; Papavassiliou et al. 2003; Rydin 2007; Rydin et al. 2007; Campbell 2012b; Head 2015; Tennøy et al. 2016). Public sector organizations have been criticized due to their inefficiency of learning (Moynihan & Landuyt 2009).
Previous research has suggested that learning in public sector organizations occurs in structural settings, which allow individuals to discuss and exchange information, and encourage interaction between individuals (e.g., Mahler 1997; Moynihan and Landuyt 2009; Siciliano 2016). Thus, planning processes typically apply a variety of knowledges related to specialized fields of expertise. In the traditional view of discussing knowledge and information in planning processes, information has been generally thought to be produced by experts for answering to specific needs of political decision-makers (Rydin 2007). Practicing planners have been described to utilize easily quantifiable information in analyses to produce an expert opinion for the political decision makers to decide on (Innes 1998, p. 53). Pointed out by Innes (1998), the practical utilization is not as straightforward, and only a small amount of the information is actually utilized. Value neutral expertise is not a valid presumption in planning processes anymore, as the contradictions and disagreements of experts, based on same information, are evident (Innes 1998).

According to Rydin (2007), the effective utilization of knowledge has been seen as a central element in achieving positive change in planning. Consequently, she suggests that planning processes should enable the testing and recognizing of knowledge claims, as expert information is not as strong in influencing a process, as if it is socially constructed. Together with the change in understanding that knowledge is generated in interaction rather than through value neutrality, the discussion of social processes in planning has emerged (Rydin 2007). Accordingly, Davoudi (2015, p. 323) has suggested that knowledge is a “socially constructed understanding that emerges from practical collaboration”, changing over time. Her (Davoudi 2015, p. 318) conceptualization of knowledge in planning distinguishes between knowing what (cognitive and theoretical knowledge), knowing how (skills and technological knowledge), knowing to what end (moral choices), and doing (action and practice), which should all be intertwined for planning to serve as a practice of knowing. Accordingly, Davoudi (2015) points out that professional and informal frames direct behavior in planning, in addition to the legal and regulatory rules.

The understanding that knowledge is situated only among expert planners has shifted to the recognition of knowledge being dispersed outside the planning organization as well (Rydin 2007, p. 55). The discussion of knowledge in planning processes has moved to acknowledging multiple knowledges and recognizing planning processes as multi-minded systems. As Rydin (2007) has suggested, knowledge is associated with various social locations and can take a variety of forms. However, bringing the various actors to the same table has proved to be challenging due to the differences in their backgrounds, expectations and lan-
Hillier (2002, p. 4) has pointed out the diversity by describing, "Planning cannot achieve empirical reality through the work of planners alone. It is essentially intertwined with a whole range of other participants and their networks, each bringing to the process a variety of discourse types, lifeworlds, values, images, identities and emotions". Consequently, knowledges in planning are never neutral (Watson 2002), but "inevitably infused with biases reflecting particular interpretative predispositions and normative values" (Healey 1992, p. 9).

Multiple knowledges cause knowledge variety in processes. Knowledge variety can be characterized as the “coverage or range of different types of task knowledge in a group” (Wong 2008, 591). The variety depends on the generation of new knowledge, and on the ability of importing it from outside the processes. In the social constructionist view, knowledge evolves continuously by flowing through social processes, being purposefully and unconsciously filtered, selected, and post-rationalized on the way. The diversity of actors in processes can enhance the capacity of increasing knowledge variety through better access to new knowledge (Wong 2008), but also cause challenges for understanding. Specifically, the inability to understand knowledge from different domains is a major reason for knowledge exchange failures (Dougherty 1992). On the other hand, diversity may also support understanding. By exposing the actors to various perspectives, and increasing their ability of interpreting diverse knowledge, also the challenges of misunderstanding may be alleviated (Wong 2008).

In addition to knowledge variety, knowledge overlap is important in supporting shared understanding of the planning problems. Knowledge sharing reduces the risk of misunderstandings (Wong 2008; Hoopes & Postrel 1999). Knowledge overlap can be defined as “the extent to which group mentors have common task knowledge” (Wong 2008, p. 591). Shared problem framing has been identified as a major importance in establishing collaboration, but is commonly challenged by the tacit understandings of problems, which makes the explicit sharing of frameworks more difficult (Nowell 2009, p. 108). Shared knowledge and framing take time to develop, but are more resilient to personnel turnover in processes than reliance on individual capabilities (Hoopes & Postrel 1999, p. 838). The challenge of shared understanding in planning is a result of the internal and external complexities of processes. Already a city, as a target of a planning process, is a constantly changing imagined phenomenon, understood differently by all actors (Healey 2007, p. 27). Thus, communication is needed for enabling the generation of shared understanding. As Boh (2007, p. 28) has pointed out, knowledge sharing has also discontinuities. These are specifically prominent in project-based organizations, such as planning organizations, where projects are typically separate from each other, and not cumulatively building on each other.
Consequently, the effective sharing of knowledge may also decrease the amount of overlapping work (Boh 2007).

**Process knowledge in planning**

Many authors (e.g., Friedmann & Hudson 1974; Healey 1992; Rydin 2007; Campbell 2012b) have discussed the relation of knowledge and action in planning. According to Campbell (2012b, p. 135), “planning operates at the interface of knowledge and action” dealing with four types of knowledges. First, descriptive knowledge is utilized in answering to what is going on. Second, the question of why it is like that can be approached with analytical and explanatory knowledge. Third, prescriptive knowledge can indicate what to do. And finally, what ought to be done requires normative knowledge. Davoudi (2015, p. 317) has conceptualized planning as a practice of knowing and as a process of learning, pointing out the importance of knowledge and action as interlinked, rather than subsequent, parts of the processes.

Tennøy et al. (2016) have described the various types of knowledge used, or non-used, by planners in order to produce new knowledge (such as plans and analyses) for decision-making, as shown in Figure 1. They divide between expert knowledge, project and objective related knowledge, knowledge of the context, and process knowledge. By process knowledge, they mean the "knowledge about laws, regulations and procedures of planning decision-making defined in planning legislation; knowledge about how to carry out planning processes; knowledge about public participation in planning processes, and so on" (Tennøy et al. 2016, p. 2). Their description contains both societal (e.g., legislation and regulatory framework) and organizational (e.g., planning process structures, codes of conduct etc.) level factors, but does not acknowledge social process aspects. Societal level factors are more remote from the planning processes, and changing them requires time and is more challenging for individual processes. Organizational level factors, on the other hand, can be more easily and rapidly influenced by the experiences from the organization’s own processes, considering that the organization is aware of its own processes.

The access to various knowledges may affect the power and ability to act in the planning processes (e.g., Flyvbjerg 1998; Forester 1982; Tennøy et al. 2016). A classic example of rationality and power in planning decision-making has been suggested by Flyvbjerg (1998), explaining how power is confusing the division of rationality and rationalization. As Flyvbjerg (1998) points out, the knowledge perspective is important in relation to power, as rationality in processes is context-dependent and based on rationalization and legitimization of one’s own arguments. Power is more involved with determining specific realities than with the comprehension of the reality (Flyvbjerg 1998, p. 36). Flyvbjerg’s theory has
also faced critique for example from Forester (2001), who has considered it controversial, over-generalized, and vague. However, limiting the knowledge transfer is a major source of power play in planning (e.g., Forester 1982; Tennoy et al. 2016), as up-to-date information, internalized to knowledge, and externalized back into the process serves as a foundation for all processes.

![Diagram of multiple knowledges used or non-used in planning processes](image)

**Figure 1. Multiple knowledges are used, or non-used, in planning processes for producing new knowledge (Tennoy et al. 2016, p. 2).**

### 2.1.2 Learning through memorizing the past experiences

Knowledge, learning, and memory are interdependent parts of organizational processes, and cannot be disconnected from each other (Spender 1996). The research of organizational learning has evolved from the 1970’s onwards, underlining the importance of knowledge in organizational processes (e.g., Argyris & Schön 1978; Levitt & March 1988; Senge 1990; Huber 1991; Argyris & Schön 1996; Popper & Lipshitz 1998; Easterby-Smith & Lyles 2003; Schindler & Eppler 2003; Argote 2013). As has been suggested, knowledge influences the learning capacity of organizations (e.g., Argote 2013). Learning is not possible without memory (Lehner & Maier 2000, p. 283), as learning is based on the knowledge and understanding of past experiences. Organizations could learn through memorizing their past experiences. According to Huber (1991, p. 89), an organization learns when “through its processing of information its range of potential behaviors has changed”. Organizational learning capacity has been identified as a crucial component for an organization’s progress and development, influencing its capacity of proactively adapting to the changing societal needs (e.g., Senge 1990; Prahalad & Hamel 2000). Organizations, which will flourish in the future, are those that can support actors’ commitment and capability of learning on all organizational scales (Senge 1990).
Learning-related processes in planning and urban development have been discussed from a variety of perspectives, leaning on organizational learning theories (e.g., Argyris & Schön 1978; 1996; Senge 1990). The discussions are ranging from learning regions and regional development networks, to learning from practice through participatory planning (e.g., MacKinnon et al. 2002; Park et al. 2012; Rydin et al. 2007; Apgr et al. 2017). In addition, various evaluation and monitoring processes have been recognized as essential for enhancing the learning processes in organizations and communities (e.g., Apgr et al. 2017).

Argyris and Schön (1996) have described organizations as continuously changing organisms in which the various parts of the organism continually re-evaluate their position in relation to the other parts of the organism. Thus, the analysis of organizational learning capabilities should deal with the dynamic processes of organizing (Argyris & Schön 1996, p. 16). Organizational structures enabling, or preventing, learning include communication channels and patterns of interaction, information systems, spatial environment of the organization, procedures and routines, and incentive systems (Argyris & Schön 1996, p. 28). These structures may also enable second-order learning in which organizations may learn how to discover and modify their learning systems. For allowing this, the organization has to be aware of the structures affecting its learning capabilities. Hence, the organization has to reflect upon its actions in order to generate learning (Argyris & Schön 1996). Borgatti and Cross (2003, p. 433) have added the view of know-who to organizational learning. By identifying the capabilities of its networks, the organization may become more capable of answering to the tasks and challenges it faces. Borgatti and Cross (2003) suggest that social network perspective is important in the relational understanding of organizational knowledge, learning and memory as it makes the networks more explicit. Consequently, Coughlan and Coghlan (2011) have referred to the importance of network action in inter-organizational learning. According to them, learning is both a capacity and a process, requiring also conscious and intentional actions to be achieved.

2.1.3 Memorizing and forgetting in organizations

Various concepts regarding memory in organizations have been suggested so far. Some of these include organizational memory, network memory, systems memory, and transactional memory (e.g., Wegner 1987; Walsh & Ungson 1991; Spender 1996; Olivera 2000; Soda et al. 2004; Innes & Booher 2010). Walsh and Ungson (1991, p. 61) have defined organizational memory as "decision stimulus and response that, when retrieved, comes to bear on present decisions". Their
definition is highly substance-centric and largely ignores the procedural aspects. Olivera (2000, p. 815) has offered a more recent, but highly technical explanation, defining organizational memory as "sets of knowledge retention devices [...] that collect, store, and provide access to the organization's experience". Spender (1996, p. 65) has suggested that “memory can only serve intelligence, it is not itself intelligence”, acknowledging that memories need a context, which makes them understandable and utilizable also afterwards. Soda et al. (2004), in turn, have utilized the concept of network memory to point out the importance of understanding networked dynamics over time. Their definition refers to the cumulated relational experiences of the past networks, which may have structural consequences for the networks in the future. Accordingly, Innes and Booher (2010, p. 32) have talked about system’s memory, which is not “located at a specific place, but is distributed throughout the system”, referring to the knowledge which flows through the seemingly unconnected parts of networks. Transactive memory refers more to a group mind, to the awareness of what information can be accessed within a group (Wegner 1987), focusing on the identification of who knows what within a network (Borgatti & Cross 2003). Transactive memory is built up of the individual memory systems, and of the knowledge of the various actors’ domains of expertise.

Through the iterative utilization of memory, organizations become capable of consciously unlearning and forgetting as the original memories develop further (Holm & Phillips 2004; Fernandez & Sune 2009; Easterby-Smith & Lyles 2011; Martin de Holan 2011). Unlearning has been considered important for learning new ways of doing things (Martin de Holan 2011). Holan and Phillips (2004, p. 1606) have defined organizational forgetting more specifically as "the loss, voluntary or otherwise, of organizational knowledge". Organizational learning, thus, may include intended forgetting of knowledge, which is not valued for upcoming activities. However, accidental forgetting may have surprising and negative effects, as valuable knowledge may be unintendently lost (Holan & Phillips 2004). Consequently, memory and understanding can also become a burden. Sometimes the past may be seen as a weight for future aims, offering a critical view to the memory-centered perspective. In relation to the increasing understanding of organizational processes, Burden et al. (2012, p. 742) have referred to the concept of administrative burden as "an individual’s experience of policy implementation as onerous". Based on their study, Burden et al. (2012) discuss the public officials’ experiences of their work, suggesting that the administrative burden may have negative influences on policies, governance structures, and demoralization in work context. As Harvey and Braun (1996, p. 419) have described, "The dead weight of conventional spatio-temporal thinking and actual spatio-tem-
poral forms weighs like a practical nightmare on the thoughts and material possibilities of the living”. Despite of the suggestions that the increasing amount of memory may turn counterproductive at some point, organizational memory and related concepts, such as experience, are discussed merely as conceptual constructs, and are often not measured (e.g., Wegner 1987; Walsh & Ungson 1991; Spender 1996; Lehner & Maier 2000; Olivera 2000; Argote & Miron-Spektor 2011).

When referring to the importance of learning from past in the planning context, Abbott and Adler (1989, p. 467) have suggested, “Historical awareness and reasoning can be incorporated readily into the processes and practice of planning and can thereby make a customarily present-minded and future-oriented profession more effective”. The quote by Abbott and Adler considers planning history in general, but can also be applied to the context of planning processes. The more aware a process is of the past, the better it may be directed to the future. Further, Abbott and Adler (1989, p. 468) have suggested that the appreciation of historic understanding is typically not easily rooted into the planning practice: “... planners as a group are action-oriented and future-oriented. They are likely to exhibit the “clean desk / clear deck” syndrome, in which the new occupant of a position ignores the record and records of predecessors. Everyday planners do not much care about the past [...] and would not have time to investigate it, even if the interest were there”. Memory of the past could, however, support the framing of the challenges in planning processes, as they could be informed by the past experiences. As Abbott and Adler (1989, p. 470) have suggested, understanding of the relations and interests of actors is essential for process memory: “… a planner who walks into a situation without knowing the expectations that other participants have built up or how they are invested in an issue can easily be blind-sided. Among the first questions a planner should ask in a new position are: How did my predecessor get along with colleagues in other agencies? What experiences has the president of the neighborhood association had with my organization in the past?” Thus, understanding of the relational dynamics in planning process are important for process memory development. Process memory may also support the understanding of the values and routines beneath the processes as conscious and unconscious parts of the organizational culture.

There has been considerable discussion about whether organizational learning and memory resides on the individual or organizational level (e.g., Senge 1990; Simon 1991; Walsh & Ungson 1991; Nonaka & Takeuchi 1995; Crossan et al. 1999; Lehner & Maier 2000). According to Senge (1990), individual actors learn, but the learning itself happens through interpersonal dialogue as a relational activity. However, organizational learning does not necessarily equal the sum of actor-level learning in the organization as part of the knowledge may be more tacitly
integrated into the organizational structures, routines and traditions (e.g., Fiol & Lyles 1985; Argyris & Schön 1996). Moreover, Argyris and Schön (1978, p. 11) have stated that "organizations do not literally remember", suggesting that memory resides on the level of individuals and their interaction, allowing also their learning. The learning of individual actors in organizations is supported by organizational structures and cultures, which enhance learning and knowledge transfer (Popper & Lipshitz 1998).

Walsh and Ungson (1991) have discussed the various possibilities of storing organizational memory for later use, identifying six alternatives: individuals, culture, transformations, structure, ecology, and external archives. In addition, some organizations have developed special practices for knowledge capture, memory storing and experience sharing in case of personnel turnover, such as exit interviews or surveys (e.g., Garretson & Teel 1982; Kulik et al. 2012; Mishra & Uday Bhaskar 2011; Findlay 2003). According to Walsh and Ungson (1991, p. 81), organizational memory is specifically distributional in nature. Thus, memory cannot be stored in one central location, but has to be distributed throughout the organization. In project-based organizations, the importance of individuals transferring knowledge from one project to another increases, as otherwise the organizational level memory between projects is limited (Walsh & Ungson 1991).

Planning has been understood in some contexts as consisting of separate projects (e.g., Faludi 2000; Alterman 2001; Healey 2007; Albrechts 2006; Allmendinger 2009; Healey 2010).

In knowledge-intensive processes, the explicit context-specific knowledge and memories of previous processes are typically scattered in personal memories, notes, and a diversity of digital information systems (Papavassiliou et al. 2003). Currently, process experiences are rarely documented, and even at best miss a procedural context (Papavassiliou et al. 2003), which challenges their use in subsequent processes. As Levitt and March (1988, p. 327) have pointed out, there is a lack of documentation, because recording the experiences would be too resource-intensive. What is not encoded in information systems has to reside in the individuals, and be transferred through their interaction. Contu and Willmott (2003, p. 284) have described organizational learning to be situated: “in the practice of storytelling through which context-sensitive understandings of the world of work and of working selves, as well as tasks performed, are acquired, shared and elaborated”. In this conceptualization, interaction is essential for sharing memories and generating knowledge of process-related issues.

Innes (1998) has discussed how information becomes embedded in thoughts, practices and institutions in the planning context. As a tacit set of routines and traditions, information may also unconsciously affect the actors through routinized procedures, assumptions, and ways of thinking. As Innes (1998, p. 54) has
suggested, “When information is most influential, it is also most invisible”, influencing the processes unconsciously, as understanding and meanings are collectively created in the processes. In addition to the unconscious memories, which are then generated into routines and traditions, organizations may also store memory consciously in their standard operating procedures, and routines (Huber 1991). For example, communities of practice refer to the routines, and ways of doing, which evolve in the processes over time (Wenger 1998, 2000). The main dynamics concerning communities of practice, according to Rydin et al. (2007), are related to learning through shared practice and its influence on actors’ identities, as they learn from the more experienced practitioners.

2.1.4 Research gaps concerning process memory

The importance of knowledge, in addition to its socially constructed nature, has been recognized in the context of planning. Planning processes can be framed as multi-minded systems, integrating multiple knowledges. Due to the long and knowledge-intensive processes, and the lack of documentation, planning organizations are challenged, for example, by personnel turnover. When people change, tacit knowledge typically follows them. Knowledge, learning, and memory are interdependent parts of organizational processes, and organizational learning capacity has been identified as a crucial element for an organization’s development. Thus, learning in planning organizations would require structural settings, which allow information exchange and interaction between individuals. Previous research about organizational learning in the context of public administration has acknowledged the importance of social interaction and dialogue, but merely emphasized the interactions among organizations and groups. In this research, the multidimensional understanding and experience-based situatedness of multiple knowledges are acknowledged. Thus, understanding of the relational dynamics in planning process are an important element for memory development, as through the identification of its social networks, the planning organization may become more capable of answering to the challenges it faces. In the understanding of this research, organizational learning is enabled through the knowledge flows and memory development in various networks. For enabling the understanding of planning as knowledge-intensive process, which utilizes various knowledges in multi-actor interaction over time, this research focuses on the actor-relational process structures, which enable knowledge transfer, and affect process memory development over time. Based on the current research of organizational memory, the characteristics of process memory development in networked planning processes are not yet well understood. Consequently, building on the current understanding, this research
approaches the organizational learning processes through the concepts of networks and process memory.

### 2.2 Planning processes are complex adaptive systems

#### 2.2.1 New methods are needed for researching practice-related processes

Spatial planning processes are often referred to as “projects” (e.g., Faludi 2000; Alterman 2001; Healey 2007; Albrechts 2006; Allmendinger 2009; Healey 2010), distancing them from the continuum of planning, development, and implementation on multiple scales. In addition, more process-focused views have been suggested over time (e.g. Banfield 1959; Lindblom 1959; Dror 1963; Alshuler 1965; McLoughlin 1969; Faludi 1973b; Chadwick 1978; Forester 1999; Innes & Booher 2010; de Roo 2012). A process-focused view of planning supports the understanding of specific plans as a part of a larger systemic whole, which ranges from strategy-making to implementation, and living. The variance in process definitions has been discussed by many (e.g., Gore & Nicholson 1991; van de Ven 1992; Pettigrew 1992; Langley 2007; Bizzi & Langley 2012; Halinen et al. 2013; Pettigrew et al. 2001). There are at least three ways in which processes are understood: as a logic in variance theory to explain relations between cause and effect, as a concept referring to the activities taking place in organizations, and as a sequence of events unfolding over time (van de Ven 1992, p. 169). Based on these, Pettigrew (1997, p. 338) has highlighted the meaning of the temporal dynamics, defining a process as "a sequence of individual and collective events, actions, and activities unfolding over time in context".

According to Pettigrew (1997, p. 338), the central purpose of process analysis is to “catch reality in flight”. In particular, the past shapes the emerging future, and the location of an event in the processual sequence carries a meaning of why and how the event was formed (Pettigrew 1997). Thus, the purpose of process analysis is to recognize patterns and structures in processes, and the causalities behind them. The analysis should not stay on the level of acknowledging complexities, but should find methods for revealing their temporal structures and patterns (van de Ven 1992). Various authors (e.g., Pettigrew 1997; Dawson 1997; van de Ven & Huber 1990) have stated that process analysis is always context-specific and multidisciplinary, and a combination of different methods should be customised accordingly. According to Langley (1999, p. 706), a good process research can take a variety of routes, as all methods have different strengths and weaknesses. Combining various methods can decrease the risk for methodological inaccuracy.
The need for in-depth methods for understanding processes has been acknowledged, but the complexity of process data has challenged the possibilities of aiming for more than a superficial level of understanding (Langley 1999). As Pettigrew (1992) has stated, sequences of events are relevant in process analysis, but also their underlying mechanisms should be understood. The simplistic and linear process models have consequently been questioned for long (e.g., Schwenk 1985; van de Ven 1992), and researchers have attempted at representing the complex character of organizational processes (e.g., Mintzberg et al. 1976). So far, the temporal sequences of events, focusing on why and how the change happens, have been studied for example in organizational change research for supporting process development practices (van de Ven & Huber 1990). Municipal planning organizations usually describe their processes in a simplistic manner with a linear sequence of legally mandatory phases, which portray the process on a general level. However, simplified descriptions do not enable more thorough understanding, as they ignore the often invisible, dynamic, and complex structures of the processes.

One factor, which is challenging the process development practices in planning organizations, is that planning research often fails to contribute to planning practice, as the link between these two is too weak (Rydin 2013). Part of the problem has been that the theory offers advices on a too general level, relying too much on the capacities of practicing planners to turn these into action (Rydin 2013). Moreover, Friedmann (1967, p. 226) has pointed out the challenge that practice-related research typically focuses only on the easily identifiable activities of the processes, and does not pay attention to describing the prevailing preconceptions. Further, the “self-perceptions of the world within planning practice” should be also recognized in order to influence the practice (Rydin 2013, p. 41). The need for more collaboration between practice and research is not restricted to planning process research only, but has been pointed out in public administration research more commonly (e.g., Isett et al. 2011; Newman 2014; Head 2015). For example, Isett et al. (2011, p. 1169) have suggested that research “ought to address the real problems that practitioners face, rather than questions driven solely by theoretical interests”. Of course, the question is not that simple, as practice-related challenges may be identified in research as well. The situation between research and practice is not all that simplistic, but there may be individuals and subgroups crossing these boundaries already (e.g., Newman 2014; Head 2015). Elaborating on Dewey’s (1960) view that practical knowledge is dependent on actual experience, Straatemeier et al. (2010, p. 580) have suggested that the complexities of practice cannot be completely understood from outside, but “one can only learn the real meaning and value of knowledge by trying and probing it in action”.

Susa Eränta: Memorize the Dance in the Shadows?
2.2.2 Public policy processes offer a framework for planning

Municipal planning processes take place within the frame of public organizations. Attitudes towards public sector activities have traditionally been sceptical. As Sørensen and Torfing (2011, p. 2) have pointed out: “many people consider the public sector merely as a slow-moving bureaucracy characterized by red tape, inertia and stalemate”. Public administration has been traditionally driven by expert solutions, siloed and hierarchical structures and a lack of involving other actors in the processes (Hartley 2005). On the other hand, Morçöl (2012, p. 9) defines a public policy as "an emergent, self-organizational, and dynamic complex system. The relations among the actors of this complex system are nonlinear and its relations with its elements and with other systems are co-evolutionary", pointing out its dynamic and relational nature. Further, Morçöl (2012, p. 10) has suggested that due to complexities, there is no direct relation between legislation, goals and outcomes. Instead, public policies deal with "the whole of the activities of and relations among self-conscious, purposeful, and interdependent actors" (Morçöl 2012, p. 10). Through the relational understanding of public policies, van Buuren et al. (2009) have suggested that a policy system emerges from the relations of the interdependent actors. Consequently, the self-organizing governance processes have become a large stream of research. Along with the rise of collaborative bottom-up activities in urban planning, alternatives for the traditional institutionalized form of planning have been suggested. For example, self-organizing civic networks have been studied (e.g., Innes et al. 2010; Horelli et al. 2015; Portugali 2012), identifying the capacity of bottom-up networks in contesting traditional urban development processes. Collaborative governance (e.g., Ansell & Gash 2008), community collaboratives (Nowell 2009), and complexity planning (e.g., Boonstra 2015) all endorse the more horizontal and collaborative tradition of governance and collaboration between the public, private, and third actors, driven by voluntary memberships in the networks.

Recently, Koppenjan and Klijn (2016) have suggested three perspectives of public administration: traditional public administration, new public management, and the governance network perspective together with their differences, as shown in Table 1. According to them, complex policy problems require a governance network of various interdependent actors and knowledges to be acted upon.
Table 1. Three dominant perspectives in public administration (adapted from: Koppenjan & Klijn 2016, pp. 9–10).

<table>
<thead>
<tr>
<th>Focus</th>
<th>TRADITIONAL PUBLIC ADMINISTRATION</th>
<th>NEW PUBLIC MANAGEMENT</th>
<th>GOVERNANCE NETWORK</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objectives</strong></td>
<td>Differentiation and coordination within bureaucracy.</td>
<td>Internal functioning of governmental bodies and contractual relations.</td>
<td>Relations between governments, and with other actors.</td>
</tr>
<tr>
<td><strong>Core ideas/management techniques</strong></td>
<td>Production of policies and services according to principles of equality, legitimacy, and legality.</td>
<td>Improving effectiveness and efficiency of public service delivery and public organizations.</td>
<td>Improving inter-organizational coordination and quality of policymaking and service delivery.</td>
</tr>
<tr>
<td><strong>Politics</strong></td>
<td>Using hierarchy and command and control; line management; building on rule following, loyalty and a public service orientation of civil servants; policy cycle as control mechanism.</td>
<td>Using business and market instruments to improve service delivery.</td>
<td>Using network management: activating actors, organizing research and information gathering.</td>
</tr>
<tr>
<td><strong>Complexity in society</strong></td>
<td>Politicians set goals that are implemented by the executives in a neutral way.</td>
<td>Politicians set goals. Policy implementation and service delivery is done by independent agencies or market mechanisms based on clear performance indicators.</td>
<td>Goals are developed and negotiated during interaction processes. Politicians are part of these processes or facilitate these processes.</td>
</tr>
</tbody>
</table>

2.2.3 Strategic spatial planning processes

The generic term planning is in itself problematic (Alexander 1981, 2016), as planning involves a variety of complex phenomena and procedures. By referring to all these by just planning does not give right to the external and internal complexities that the planners face day-to-day on multiple scales. Thus, in order to generate procedural understanding of planning, this research focuses on a more specific type, on strategic spatial planning. Strategic spatial planning has been widely discussed, but there is no commonly shared definition. In the last decades, strategic planning has spread to many cities and contexts (e.g., Albrechts & Balducci 2013; Healey 2009; van den Broeck 2013). Albrechts (2004, pp. 751–752) describes the meaning of strategic as implying that “some decisions and actions are considered more important than others and that much of the process lies in making the tough decisions about what is most important for the purpose of producing fair, structural responses to problems, challenges, aspirations, and
diversity”. Thus, strategic is not only about leaving all possibilities open for the future, but about ensuring flexibility within a certain frame. These strategic frames are elaborated through collective sense making over time, as dominant ideas are identified through strategic judgements (Healey 2009; Forester 1989). There is no generally utilizable frame for strategic spatial planning processes, but the process and the content should be tailored to the context-dependent needs (Albrechts 2004). Strategic spatial planning process in this research is understood as a form of municipal long-term statutory spatial planning, giving strategic and spatially located directions for future development, and leaving flexibility for the more detailed levels of planning. A strategic spatial plan is more strategic in its character than a traditional blueprint plan.

Facing the dynamic societal complexities, the traditional planning instruments, such as blueprint plans, may seem misfit (Lapintie 2015) due to their reliance on the stability of situations (Albrechts & Balducci 2013). Albrechts and Balducci (2013, p. 18) have defined strategic spatial planning as “a transformative and integrative public-sector-led co-productive socio-spatial process through which visions or frames of reference, justification for coherent actions, and means for implementation are produced that shape, frame and reframe what a place is and what it might become”. In addition to the plan, the process itself is also important. In particular, the process is important for mobilizing the needed stakeholders for co-creation, acceptance and implementation. Furthermore, Mäntysalo et al. (2015, p. 175) point out the challenge between the focus of strategic spatial planning and the stakeholders involved. Strategic spatial planning ought to have dynamic problem descriptions and action orientation, whereas the objectives of the stakeholders involved are generally more "static", aiming at fixing the land uses. Strategic spatial planning aims at making choices of prioritization for the future development directions, adapting to the dynamically changing societal needs rather than on a comprehensive analysis of the present situation as is typical for rationalist planning (Mäntysalo et al. 2015). Due to the uncertainties of the future, strategic spatial planning is dynamic, and decisions may have to be specified as new information evolves over time.

According to Mäntysalo et al. (2015), for example in the context of Finland the strategic spatial planning is often separated from statutory planning to informal arenas. Strategic spatial planning is being developed in informal forums and through informal instruments, bifurcating from the statutory planning system in Finland (Mäntysalo et al. 2015, p. 2). This movement towards the more informal processes has also faced criticism due to its dissociation from the law-based checks and participation practices guaranteed by the statutory planning system (e.g., Mäntysalo et al. 2014a). However, during the past decade there have been examples of more strategic spatial planning processes also on the statutory local
master planning level. For example, Norvasuo (2017b) has pointed out the strategizing nature of the master plans in Finland. In addition, as Mäntysalo et al. (2014a) have stated that the informal strategic planning instruments, such as structural schemes, have become increasingly popular for coordinating local master planning attempts.

Mäntysalo et al. (2015) have discussed the contradictions of strategic spatial planning and statutory planning (for example, traditional local master planning) pointing out that they have some basic differences. Strategic spatial planning aims to set strategic directions and give more flexibility in how to implement the chosen policies, whereas statutory planning includes more defined rules and regulations considering the spatial formulation of the plan. In this research, strategic spatial plans refer to the municipal master plans as regulated by the national legislation (Land Use and Building Act 132/1999), with more of a strategic rather than blueprint focus. In this research, it is important to divide between the statutory and informal, and the strategic and blueprint planning, as the differences may affect the communication structures during the processes.

### 2.2.4 The substantive-procedural framework as an example of process thinking

One of the first more comprehensive descriptions of procedural planning was suggested by Faludi (1973b). Faludi (1973b) distinguishes between two interconnected streams of theory: the procedural theory of planning and the substantive theory of planning. The procedural part discusses planners’ understanding of their roles and ways of working, whereas the substantive part focuses on the content of their work. For understanding planning, both are needed, but the focus may be on either one. As Faludi (1973b, p. 7) has suggested, “planners should view procedural theory as forming an envelope to substantive theory rather than vice versa”. Faludi’s (1973b) substantive-procedural framework of planning offers a multi-scale explanation of the individual and organizational level of planning. In the multi-scale view, the various organizations interact through social relations, as do the actors within the planning organizations.

Faludi’s (1973b) view of developing procedural planning theory is strongly based on practical experience, which is then analyzed through a specific frame, as shown in Figure 2. Faludi’s (1973b) view of rationality is based on defendable and procedural rationality of thought and action. Faludi and Altes (1994, p. 6) have stated that decisions during processes can only be understood by the ones involved in those, not enabling the reconstruction of the situations for outsiders. Thus, the decision chains and reasoning behind the processes should be explained for being understandable. According to Faludi (1973b, p. 33), rational
planning is also about generating a learning process by supporting the practice in understanding how to move forward through “promoting human growth both as a product and as a process”.

In addition to the individual level, Faludi (1973b) has discussed multi-planning agencies on the strategic planning scale, as the increasing specialization is challenging planning organizations, which are dealing with a variety of interrelated issues. According to Faludi, no organization can master such a complexity by itself, but has to specialize. This specialization, then, creates a need for collaboration networks between organizations for enabling the exchange of information. Thus, networking is a natural feature of the strategic planning scale. Such networks are dynamic by character, as the participating organizations are at various stages in their processes, and proceed in different ways.

![Diagram](image)

Figure 2. The route for developing planning theory (Faludi 1973b, p. 24) is based strongly on practical experience, beginning with the experiences and actions of planners and being analyzed through a specific frame.

According to Faludi’s (1973b) substantive-rational framework of planning, as shown in Figure 3, a learning system integrates the interaction of its various components with their different functions. Most importantly, the learning system essentially involves memory against which the evaluation and judgement of the various alternatives can be done. General memory saves knowledge on a wider scale, whereas active memory focuses on knowledge, which is estimated to be important. Memory itself is divided in two interrelated parts: to the limited short-term memory required for immediate problem solving, and memory at large, containing a wider amount of information. The memory is limited by the human capacity to memorize and handle large amounts of information. In addition, time is an essential component, referring both to the time needed to act on received information, and for actions to take effect. Thus, the active memory
also contains a future image of the environment after a time. In relation to the future image, Faludi (1973b) points out that planning can also itself be the object of planning, opening up a level of meta-planning as “systematically improving planning agencies and their procedures”.

Figure 3. Planning process as a learning system (Faludi 1973b, p. 74) integrates the interaction of its various components.

Faludi’s focus on procedural planning has been criticized, for example, of not acknowledging the substantive side of planning (e.g., Frost 1977; Roweis 1983; Thomas 1979). However, as Faludi (1979; 1985) himself has pointed out, the meaning has not been on ignoring the meaning of substantive knowledge, but on acknowledging also the importance of procedural understanding. In addition, Faludi (1973b) refers to “technology image” and “view of society” as essential substantive elements of planning practice. According to him, the substance varies between cases, whereas the procedural understanding is easier to apply between processes. The substantive-procedural framework of planning has also been criticized for its lack of locating planning in its historical context, and for depolitzing planning (e.g., Thomas 1979; Roweis 1983), although there might be counterarguments as well.

2.2.5 Further process discussion in planning theory

The research of planning practice has traditionally focused largely on the roles (e.g., Howe 1980; Alterman & Duncan 1983; and Friedmann & Hudson 1974), working methods (e.g., Forester 2008) and objectives (e.g., Davidoff 1965) of planners. The procedural aspects have also been discussed by many (e.g. Banfield 1959; Lindblom 1959; Dror 1963; Altshuler 1965; McLoughlin 1969; Faludi 1973b; Chadwick 1978; Forester 1999; Harris 2002; Innes & Booher 2010; de Roo 2012) through a range of
views, as shown in Table 2. Moreover, the importance of processes has been pointed out, for example, by Faludi (1986), Faludi and Altes (1994), and Alexander (2002) suggesting that planning processes and the decisions relating to those should be defendable and understandable also afterwards. However, the procedural discussion has so far given scarcely weight for the importance of procedural structures and their effects. However, the discussion about planning processes is central, because there is a dependency between the process and the substance (e.g., Innes & Booher 2015; Pettigrew 1997; Faludi 1973a). The outcomes of the processes are affected by their procedural structures.

Table 2. Various procedural views have been discussed in the context of planning.

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>EXAMPLES</th>
</tr>
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<tbody>
<tr>
<td>Technical</td>
<td>Objective reality examined through independent components in a linear continuation of phases by an expert. Banfield (1959), Davidoff and Reiner (1962)</td>
</tr>
<tr>
<td>Incremental</td>
<td>Gradual problem solving in a simplified manner due to reduced human capacity of dealing with complexity. Lindblom (1959), Friedman (1973), Simon (1955), Faludi (1973b)</td>
</tr>
<tr>
<td>Scenario</td>
<td>Advancing through iterative feedback loops through a cyclical planning model. Mitchell (1961), McLoughlin (1969), Rittel and Webber (1973)</td>
</tr>
<tr>
<td>Complex adaptive</td>
<td>Non-linear emergence through socio-temporal dynamics and multi-level interactions over time. Innes and Booher (2010), Innes and Booher (1999)</td>
</tr>
</tbody>
</table>

De Roo (2012; 2016) has suggested a classification for the evolution of planning theoretical thinking by linking it to the systems perspective, as shown in Figure 4. In the 1960’s the rational planning thought (e.g., Banfield 1959) adhered strongly to the idea of a closed system (class I), which illustrates a static reality without interaction with the surrounding environment (Kauffman 1993). In scenario-planning as a semi-open feedback system (class II), internal feedback loops were suggested for evaluating the plans and changing the direction if needed (e.g., Mitchell 1961; McLoughlin 1969). The communicative turn in planning (e.g., Innes 1995, Forester 1982) was based on the idea of open systems (class III) in which the planning process is affected by contradictory values from the outside world. In addition to these, an emerging thought of complex adaptive systems has been identified (class IV), integrating the features from the class I-III systems with non-linear dynamics over time (de Roo 2017).
Figure 4. Planning theory in systems thinking (adapted from: de Roo 2012, p. 145; de Roo 2016, pp. 110–112) can be divided into process thinking around closed, semi-open and open systems - and complex adaptive systems as an emerging thought combining features from all of these.

Technical planning processes

The comprehensive-rationalistic planning paradigm typically outlines planning processes as linear continuations of phases in which rational decisions and steering take place (Bäcklund & Mäntysalo 2010). The technical planning process assumes that comprehensive understanding of the society is available already in the beginning of the process so that clear outcomes with predictable results can be defined (de Roo 2016; Klijn & Snellen 2009; Altshuler 1965; Banfield 1959). Comprehensive rationality emphasizes objectivity and functionality, highlighting the importance of the outcome rather than the process itself (Taylor 1998).

The rational-comprehensive descriptions usually expect that the processes scientifically and thoroughly analyze all available information for ending up in well-reasoned conclusions, evolving fluently from one phase to another. The planning problem and its environment are treated as an objective reality, which
can be examined through independently manageable components by neutral experts to reach an optimal solution. During a process, planners may present their work for other interest groups, but conduct the processes mainly by themselves, working out the complexities and dynamics in a rational manner with factual knowledge.

One of the earliest process descriptions available in planning theory has been proposed by Banfield (1959) as a four-stage process. In the first phase, the planner should examine all possible alternatives answering to the selected objectives through the analysis of the situation. The second stage contains the identification and description of the objectives and courses of action. In the third phase, the process and methods for reaching the objectives are defined, after which all consequences are evaluated. Other examples of rational-comprehensive processes have been suggested as well. For example, Davidoff and Reiner (1962) approached planning processes as sequences of choices on three levels. First, in the value formulation phase the planner should work for understanding the future and the desired future conditions. In the second phase, the goals should be processed into means of attaining the pursued ends. In the third and final phase, the means should be directed through managing programs and controls to the effectuation of the selected goals.

Incremental, transactive and meta-planning processes
The comprehensive-rationalist view has been criticized for example by the incremental model of Lindblom (1959), and the transactive model of Friedman (1973) due to the expected challenge of reaching complete rationality. Lindblom (1959) has referred to the challenges as *muddling through*, and Simon (1955) has discussed *bounded rationality*. These suggest that the human ability to tackle complex planning problems is limited, and the problems should be approached gradually in a more simplified manner. The incremental and transactive models differ from the comprehensive-rationalist version by focusing on the cumulative learning and aggregation of experiences during the processes. In addition, Faludi (1973b) has described planning evolving gradually through meta planning in which a planning organization continuously learns from its processes and adapts its practices on the operational level.

Scenario planning processes
Scenario planning was developed partly as an answer to the recognized challenges in the rational model. In the scenario planning processes, information is expected to be available in the beginning, after which various scenarios are drafted, and the best solution is chosen (de Roo 2016). Typical for these models are the subsequent feedback loops of evaluation, creating a cyclical model of
planning. Mitchell (1961) has suggested a model of a continuous planning process, discussing an iterative model of planning through continuous feedback loops from information refinement towards better-programmed actions. As an answer to the doubts of the effectiveness and ends of planning, McLoughlin (1969) suggested a six-phased cyclical model for an ideal planning process. His model iterates from the decision to plan to goal formulation, proceeding through development and evaluation, implementation, and review of the plan and its control mechanisms, returning eventually to the first phases of the process. Later on, Rittel and Webber (1973) suggested an idealized planning process describing planning as an iteratively emerging loop in which the feedback from information to simulation and decisions enhances the acknowledgement of errors in the outputs. According to Taylor (1998, p. 69), the recognition of the continuous character of planning processes has been a substantial breakthrough compared with the conventional design-based planning perspectives.

**Communicative planning processes**

Communicative planning has differed from the earlier views by seeing planning issues as social constructions of the involved actors. Communicative rationality has placed the meaning of a multi-actor network and its outcomes at the center. The communicative turn in planning focused on mediating interactions between interested actors. As Huxley and Yiftachel (2000) have stated, the significance of communicative planning has been in providing new understanding for the discussion of shared futures. For example, Forester (1983, p. 165) has suggested that planning should be understood as “a practical communicative activity, structurally staged, situationally contingent, and encouraging or discouraging, organizing or disorganizing, ongoing social processes of social learning and reproduction”. Later, Forester (2008, p. 152) stated that accepting the communicative side of planning changes process structures by "pooling expertise and nonprofessional contributions", "informal consultation and involvement", and "careful use of trusted resources, contacts, and friends", and not mainly through "rational management procedures". In communicative planning, the rationality of processes can be worked out collaboration (Innes & Booher 2016, p. 9), or sensing together with other actors in a dialogic process (Albrechts 2015, p. 515). However, the multi-actor processes also induce conflicts and clashes between actors.

In the last decades, communicative planning has become a normative goal (Verma 2007), and the actors may participate in order to gain access to social capital through networking (Booher & Innes 2002; Olsson 2009). Social capital is not located in the actors themselves (as human capital), but inheres in the relations between actors (Coleman 2000; Rhodes et al. 2008; Alexander 2007). In communicative planning, the processes are considered “socially constructed in the
interactive social relations of policy contexts” (Healey 1999, p. 1129). Better understanding of the social relations in the interactive processes is important, shifting the focus to the relational structures, and their effects on the communicative processes. For example, Healey (1999, p. 1131) has defined her social-relational perspective of collaborative planning as one that “locates individuals, as knowledgeable subjects with capacities for autonomous action, within social relations which shape the identities they evolve, the ways of thinking they develop, and the ways of acting they devise”.

According to Innes (1995, p. 184), “planning is more than anything an interactive, communicative activity”. Networks are central for communicative processes, and their importance will increase as the pace of societal changes and the complexity of planning grows (Innes & Rongerude 2013, p. 96). Moreover, Innes & Booher (2016, p. 9) have suggested that a collaborative process is the true rational process as it considers "a full range of views, depends on well-vetted information, and reaches conclusions that stand up to scrutiny from many perspectives". Booher and Innes (2002) have called the ability of networks to transfer knowledge between the actors who might not even have met one another the network power.

Communication and collaboration are easily paralleled, whereas they may also refer to quite different practices. Communication may also be more one-way focused on informing, whereas collaboration requires two-way interaction. There are at least three main ways in which collaborative practices may support public policy making processes (Innes and Booher 2010). First, collaborative processes may produce shared understanding and learning on various levels, supporting the organization’s ability of dealing with wicked problems. Second, understanding how the collaborative patterns unfold over time, and how they affect the process direction, is of major importance for attaining the desired objectives. Finally, collaborative processes may lead to wider systemic changes and process resilience as actors adapt their experiences in other processes as well.

The communicative turn has also been criticized. Tewdwr-Jones and Allmendinger (1998), for example, point out that communicative planning theories largely do not acknowledge the political and professional nuances, which are inherent to all planning practice. The communicative turn in planning, with its focus more on planning processes and interaction, has also faced critique concerning the position of content. As de Roo (2012, p. 144) has described: "Another important criticism arising as a result of the strong commitment to a communicative perspective on spatial planning in the past twenty years concerns a shift away from content and an overwhelming emphasis on processes of planning and the interaction of stakeholders within these processes. This has resulted in
a neglect of the content side of spatial planning (Imrie, 1999). With this awareness, a third crisis in planning theory is just a few steps away (Alfasi and Portugali, 2007; Schönwandt, 2007)

**Complex adaptive systems as an emerging thought of networked planning processes**

In addition to the closed, semi-open and open systems, there is a class IV of complex adaptive systems, taking explicitly into account the non-linear behavior, and the nested nature, which requires multilevel interactions (e.g., de Roo 2012; Kauffman 1993). Planning unfolds as non-linear dynamics of adaptive systems over a long time-scale (Innes & Booher 2010; Innes 2005) and may be understood as a complex adaptive system. Thus, the analysis of complex adaptive systems has to acknowledge their dynamic nature. Innes and Booher (2010), de Roo and Silva (2010), de Roo et al. (2012), Batty (2005), and Portugali (2012) have applied complexity sciences, for example, for describing cities as complex adaptive system, emerging of various spatio-temporal dynamics. De Roo (2012, p. 153) has stated, "Complex adaptive systems cannot be defined on the basis of a fixed 'it'. Nor can they be defined as an 'is', which would make such a system unchangeable and atemporal. The 'complexity' of complex adaptive systems expresses a system in motion..." Complex adaptive systems acknowledge time as flowing and cyclical, and not only as extrapolating from the past and present to the future as in scenario planning.

Complex adaptive systems are able to learn from experiences through responding and adjusting to the changes in the surrounding environment (Rotmans et al. 2012). Complexity science sees the world as capable of changing and learning over time, instead of a machine, which is designed to work in a certain way (Innes & Booher 1999, p. 417). As Innes and Booher (1999, p. 417) have stated, this ability to change and learn depends on the “information flows through linked networks of agents”. Rotmans et al. (2012, p. 181) have described, "Complex adaptive systems contain special objects, agents that interact with each other and adapt themselves to other agents and changing conditions". Thus, complex adaptive systems are multi-minded. According to Innes and Booher (1999, p. 418), "a complex adaptive system depends on each individual being empowered to act autonomously and in an informed way, so that manipulation of any participant or suppression of their own views can only make a system less intelligent". The complexity of planning processes arises partly from their interactive nature. Consequently, it is essential to achieve better understanding of process structures, which may empower or suppress people as informed actors in the networked planning processes. As Innes and Booher (1999) have pointed

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out, complexity science allows the identification of the immaterial outputs of processes, such as learning.

2.2.6 Networked complexity of planning processes

The human actors, who form social networks in the planning processes, have received limited attention in planning research. The research has mainly dealt with the roles (Lauria & Long 2017; Puustinen et al. 2017a; Fox-Rogers & Murphy 2016; Sehested 2009; Sager 2009a; Inch 2010) and values (Campbell & Marshall 2002; Kaufman & Escuin 2000; Howe & Kaufman 1981) of planners. Limited emphasis has been given on the empirical studies of the everyday planning practice (Forester 2012; Fischler 2000; Hoch 1994; Healey 1992; Birch 2001; Healey & Underwood 1978) or the emotions and personalities (Sturzaker & Lord 2017; Osborne & Grant-Smith 2015; Baum 2015; Ferreira 2013; Hoch 2006) of the actors, affecting their interaction and work within the planning processes. In addition, only rarely the practitioners have been given the possibility of describing the practice-related challenges of their work (e.g., Tasan-Kok et al. 2016). For understanding the relational perspective of the social interaction in networked planning processes, this research focuses on the actor-relational scale, which has neither received much research attention.

One possibility for understanding the interactions in planning processes is to analyze their networked dynamics. Networks in public administration have been discussed by many (Meier & O’Toole 2003; Berry et al. 2004; Provan et al. 2005; Kenis & Provan 2009; Henry et al. 2010; Andrews et al. 2011; Isett et al. 2011; Provan & Lemaire 2012; Kapucu et al. 2014; Lecy et al. 2014; Hu et al. 2015; Siciliano 2016). Understanding of networks in public administration is important for resource coordination and knowledge development, as for example the network functionality may have a direct influence on the resource distribution of an organization (Kapucu & Demiroz 2011). In addition, the networked structures may influence the actor’s behavior in the networks, and vice versa (Innes & Rongerude 2013). So far, network analysis in public administration has focused mainly on the network structures, and touched only scarcely upon network formation and development over time (Hu et al. 2016).

The various networked process structures may lead to different outcomes. Traditionally, plans are seen as the only outcome of planning processes. However, the processes have also various other outcomes (Innes and Booher 1999). Thus, interaction as a non-tangible outcome of learning processes may support the ability to work together in subsequent processes as well. Organizational research has discussed capacity building (e.g., Brown et al. 2001) as an outcome of
learning processes, referring to, for example, human resource development, intra- and inter-organizational strengthening, and institutional reforms. In addition, by providing various insights into the discussed themes, interaction during the processes may increase the awareness of the various perspectives, and the systemic interrelations more generally. For example, Innes and Booher (1999) have described that actors in consensus building processes have declared to create stronger mutual relationships, which have allowed the generation of trust. In turn, the mutual relationships have increased the possibility for accessing social capital (e.g., Henry et al. 2010; Berardo 2014), and reaching more genuine communication, problem solving, and shared understanding. The effects may also go beyond the specific processes, as the actors begin to work for the issues also in other processes (Innes & Booher 1999). As Innes and Booher (1999, p. 415) have suggested, “even a process without any agreement may be a success if participants have learned about the problem, about each others’ interests, and about what may be possible”. However, in strategic spatial planning, a process, which is unable to produce a ratified plan in the end, is called seldom a success. The non-tangible outcomes of processes are acknowledged rarely.

In the context of planning processes, the various planning paradigms describe different networked realities. Whereas rational-comprehensive planning is centered merely around one neutral expert, communicative planning processes suggest a more diverse network structure. Klein et al. (2016) have elaborated on the different planning paradigms, which normatively direct process structures to a certain direction. In communicative planning, all stakeholders participate equally in the dialogue from the beginning of the process onwards for reaching a consensus and generating shared understanding, and increasing the density of the network. On the contrary, the rational-comprehensive planning paradigm is centered traditionally around a central player generating and providing knowledge for other actors. Typically, when public policies fail, structures or practices of collaboration are rarely questioned (Innes & Booher 2010).

In addition, the various process structures and complexities influence a planner’s position and role within the processes. Whereas rational-comprehensive planning recognizes the planner as a central expert, the communicative turn identifies the planner more as a facilitator or mediator of the multi-actor processes. The planning profession and challenges of the planner’s role have been discussed for long in planning theory (e.g., Howe 1992; Rydin 2014; Tewdwr-Jones 2002; Grange 2013, 2017; Forester 1999; Sager 2009a; 2009b; Hoch 1994; Beckman 1964; Sehested 2009; Howe 1980; Puustinen 2006). For example, Wildavsky (1973, p. 127) has suggested: “Where planning does not measure up to expectations, which is almost everywhere, planners are handy targets. They have been too ambitious or they have not been ambitious enough. They have perverted their
calling by entering into politics or they have been insensitive to the political di-
mensions of their task. They ignore national cultural mores at their peril or they
capitulate to blind forces of irrationality. They pay too much attention to the
relationship between one sector of the economy and another while ignoring
analysis of individual projects, or they spend so much time on specific matters
that they are unable to deal with movements of the economy as a whole. Planners
can no longer define a role for themselves”.

Typically, planners become planners for a reason; often the reason being is
having a strong will to make a difference (e.g., Grange 2013). However, the reality
of practice is not as simple. For example, Gans (1969, p. 33) has suggested that:
"If the proverbial 'Man from Mars' came face to face with city planners, he would
surely be amazed. Here is a profession which sees itself as planning for the com-
munity, but deals with only a portion of that community”. According to All-
mendinger (2002, p. 88), the post-positivist view of planners sees them as “falli-
ble advisors who operate like everybody else, in a complex world where there
are no ‘answers’ only diverse and indeterminate options”. Further, Ozawa and
Seltzer (1999, p. 264) have suggested that planners "need to be able to hear and
to be heard, to bring diverse bits of information together, to interact successfully
with a wide range of colleagues and publics, and have a demonstrated ability to
get the job done”. Thus, as Brooks (2002) has said, "Rarely do planners complain
of professional boredom!"

Planning has been identified as a multi-actor decision-making process, which
is influenced by interpersonal relationships (Forester 1983, 2008; Innes 1995; Hea-
ley 1999, 2007; Tewdwr-Jones 2002; Forester 2008; Albrechts 2015; Innes & Booher
2010, 2016). Ability to work in and around networks influences the planning pro-
cess, as stated by Christensen (2012, p. 86): "Planners plan in the midst of this
complexity. The agencies, their networks and their intricate interactions consti-
tute the medium of planning. Planning takes its effect through the actions of
planning agencies and of other government and non-profit agencies and the in-
teractions among them. Planners' ability to work within and through this com-
plex intergovernmental system influences planning effectiveness". Christensen
(1985) further suggests that planners have various ways for taming the complex-
ity, ranging from ignorance, unawareness, passivity, and dependence on rou-
tinized rules to more engaging and active roles. Tewdwr-Jones (2002) has raised
discussion of the planner's personal behavior, motivations and dilemmas - the
personal dynamics - that have before remained largely unacknowledged. Tewdwr-Jones (2002) has claimed that the motivations of an individual planner
become central in networked processes, as the interpersonal relations and ways
of acting may have strong influence on the process structures and outcomes. As
Tewdwr-Jones (2002, p. 69) has suggested, "planners vary". Thus, they should
also be understood as a varying group of individuals instead of a generalized group of actors.

In line with expanding the role and identity of planners, Rydin (2014, p. 591) has identified at least three roles of planners in an urban network: an enabler, a fixer, and a generator of linkages within the network. The actualization of a plan as physical environment is not straightforward, but is affected by the networked dynamics of various actors. Sehested (2009) has analyzed the changing roles of urban planners, suggesting that better awareness of network management techniques could support the planners in dealing with the complexities of their positions. As Sehested (2009) has suggested in the case of Denmark, also the institutional environment and legislation affect the role of planners, and the composition of planning processes. Consequently, the increasing participation, and changing organizational forms have changed the position of a traditional rational planner to a hybrid role combining professional and external knowledge - to a role of a collaborative and communicative planner (Sehested 2009).

Mäntysalo et al. (2015) and Mäntysalo et al. (2011) have discussed the challenge of a 'pathological planning culture' in the Finnish context, as the planners are driven by requests of responding to simultaneous, partly contradictory aims from various formal and informal levels. In a similar vein, Grange (2017) has discussed the recent role of a planner in the politicizing planning context of Sweden, stating that there is a pressure of making planners loyal to neoliberal politics, and suggesting that the planners should resist the current neoliberal politics with fearless speech and critical ethos. Thus, finding an optimal way of being a planner is not an easy task to accomplish.

2.2.7 Research gaps concerning planning processes

In this research, the focus is on the procedural understanding of planning. A process-focused view of planning would support the understanding of specific steps of planning as a part of a larger systemic whole. The traditional simplistic and linear process models have been questioned, and methods for understanding process dynamics over time have been requested. However, the discussion of planning processes is central because there is a dependency between the process and the substance. The simplistic descriptions do not enable thorough process understanding as they ignore the often invisible, dynamic and complex structures within the processes. In addition, as has been suggested, there is a division of planning research and practice, which challenges the process development practices of planning organizations. Planning has been identified as a multi-actor decision-making process, influenced by interpersonal relationships.
The various process structures and complexities influence also a planner’s position and role within the processes.

In the context of this research, planning processes are embraced as complex systems, changing over time. Thus, the networks may not stay stable, but affect and are affected by their internal and external dynamics over multiple years of time. For understanding the interaction-related complexities of the multi-minded systems, acknowledging their individual and organizational characteristics is not enough. Consequently, the focus in this research is put on the relational dynamics of planning processes. The procedural complexity of planning practice is accepted as it is, and the perspective of the analysis is focused on a certain aspect of process memory for understanding the complexity.

2.3 Relational dynamics in collaborative planning networks

2.3.1 Networks affect knowledge flows in processes

Already Castells (1996) in his theory of the network society and information age has emphasized the open and decentralized social structure with reduced hierarchy and bureaucracy, and actors being active in several networks simultaneously. Planning theory has identified that network analysis may serve as a useful method for understanding governmental structures and dynamics in their reconfiguration processes (Healey 2005b, p. 307). Innes (1998) has suggested that it is essential to understand the interactive processes that reproduce the knowledge and the shared understandings.

Knowledge is an essential resource to be obtained through various networks (e.g., Selman 2000; Kogut 2000; Hansen 2002; Contractor & Monge 2002; Reagans & McEvily 2003; Wong 2008; Phelps et al. 2012), acting as a source of diverse social capital (e.g., Granovetter 1983; Burt 2000; Oh et al. 2004; Henry et al. 2010; Chou & Zolkiewski 2012; Kauffeld-Monz & Fritsch 2013). According to Argote and Miron Spektor (2011), the information held by the individuals in the public sector organizations can be dispersed through the network relations, which affect the knowledge flows (McCubbins et al. 2009). Knowledge can remain in the organizations even when the primary knowledge owners leave, when the networks function as memory repositories. Moreover, networks can improve organizational performance (Reagans & McEvily 2003) by enabling access to a wider array of knowledge. Consequently, network analysis may support the understanding of how the organizations can utilize their networks to enhance knowledge transfer (Wong 2008), process memory development and organizational learning. However, interaction in itself is valuable, but does not necessarily guarantee that
learning is happening within the organization. Networks move the unit of analysis from the individual and organizational to the relational level, embracing the meaning interaction in the knowledge-building activities.

Learning research has recognized the demand for improving knowledge transfer practices within and between various projects in unique and non-routine contexts (e.g., Bower & Walker 2007; Schindler & Eppler 2003). If an organization is not able to learn from its experiences, the projects have to be reinvented every time, contributing to inefficient performance and productivity (Wiewiora et al. 2009). Moreover, Wiewiora et al. (2009) have noticed that projects are focused merely on tangible outputs, investing only a little time on their knowledge transfer activities. Awareness of who possesses what knowledge influences the pursuit of knowledge in the networked settings (Borgatti & Cross 2003). Better awareness of the network’s abilities improves the network’s ability to solve complex problems. Central position and access to a variety of weak ties may be beneficial in order to increase the variety of perspectives available (Perry-Smith 2006). In complex problem solving, knowledge transfer within a network is likely to influence individual’s performance and choices by affecting the individual’s access to information. Thus, a network should withhold divergence and fidelity of knowledge exchange in order to perform better in the long run (Lazer & Friedman 2007, p. 686).

The various network structures have been studied for measuring their performance in relation to the costs of collaboration (e.g., Wiewel & Hunter 1985; Baum & Oliver 1991; Kenis & Provan 2009), and for understanding their relation to knowledge transfer, information diffusion, and learning capabilities in the networks (e.g., Burt 2000; Rowley et al. 2000; Perry-Smith & Shalley 2003; Reagans & McEvily 2003; Wong 2008; Laurent et al. 2015). In public administration research, discussion of the network structural concepts in relation to performance is still scarce (e.g., Kenis & Provan 2009; Lubell et al. 2012), but some examples (e.g., Scholz et al. 2008) have suggested that statistical models may support the understanding of network performance. As Muñoz-Erickson and Cutts (2016) have stated, the credibility of knowledge-action networks depends on the diversity of the knowledge available in the network, and on the possibility of interaction between them, as well as on the structures allowing knowledge flows across the network. The scale of the performance measures are usually on the level of organization-organization networks, instead of on the relations of individual actors. By discussing the public administration mainly on the level of organizations, some essential actor-relational level factors may be left undiscovered.

Networks transfer and create knowledge, mediated by their structural characteristics (Wong 2008). The network structures affect knowledge transfer for instance by influencing the willingness of individuals to transfer knowledge with
one another (Reagans & McEvily 2003). However, the willingness to transfer and create new knowledge is also dependent on other factors, such as personal characteristics and social features (Wong 2008). Consequently, the networked structures are not the only thing affecting knowledge transfer processes, but offer a possibility for identifying the structures, which may have different outcomes considering knowledge transfer (e.g., Robins et al. 2011; Robins et al. 2012). For example, Lazer and Friedman (2007) have studied how network structures influence system-level operation in knowledge transfer and communication. Consequently, their results have suggested that an inefficient network preserves variety in the system and is more appropriate for the investigation of complex problems in a long run. The influences of the networked structures on group performance have been studied also in innovation and organizational change studies (e.g., Henttonen 2010), for example from the view of effect on performance and access to social capital (Henttonen et al. 2013), and on the ability of solving complex and non-routine tasks (Cummings & Cross 2003).

More specifically, network density influences direct communication and access to knowledge, whereas centrality concerns the relational power of actors within a network (Burt 1980). As Muñoz-Erickson and Cutts (2016, 58) point out, actors’ ability to manipulate or affect knowledge flows depends partly on how many other actors are dependent on them as knowledge sources. This dependence can be analyzed through betweenness centrality. In addition, Scholz et al. (2008) speculated degree and centrality to be more important in dynamic and unstructured networks. Based on studies (e.g., Muñoz-Erickson & Cutts 2016; Vignola et al. 2013; Bodin et al. 2006), it has been suggested that for example actors with high score in betweenness centrality may have improved access to diverse and unique information. Thus, they may have increased ability to act as knowledge brokers and manipulators due to their relational position. According to Rydin et al. (2007, p. 16), the importance of knowledge brokers is in their role as “trusted sources of knowledge, information and guidance”.

Weak ties and a peripheral position in a network, complemented with ties to external networks, are considered beneficial for creativity and learning (Perry-Smith & Shalley 2003). The accessibility of contacts to various kinds of actors supports the possibilities of gaining new ideas and thinking. Thus, the diversity of backgrounds, areas of specialization, and work responsibilities should be acknowledged in the networked settings (Perry-Smith & Shalley 2003), supporting the acquisition of different perspectives in the process. It has been suggested (Burt 2000, p. 354) that an actor with bridge connections to other groups may have the advantage of reaching a higher volume of information by accessing more people indirectly. Location in the crossroads of various networks gives an
actor the opportunity to learn from all networks, having an access to redundant information (Burt 2000, p. 354).

2.3.2 Effects of the various network structures vary

Andrews et al. (2011) have suggested that the networked structures are influenced both by organizational factors and by environmental characteristics. Still, networking is still relational activity between individuals, and cannot be reduced to only environmental and institutional forces (Hansen & Villadsen 2017). One of the debates concerning network analysis has been dealing with the agency of the actors in a network. Some authors have suggested that the network structure determines actor behavior and process outcomes to some degree, whereas others have seen that actor behavior is determined only by the actors themselves (e.g., Kenis & Provan 2009; Dempwolf & Lyles 2012). Marsh and Smith (2000, p. 5) have discussed policy networks and outcomes through a dialectical model of relations stating that the networks affect the actors, constraining or facilitating their agency within the networks, and being continuously renegotiated. In addition, networks enhance the institutionalization of routines, values, and cultures through shaping the behavior of the participants (Marsh & Smith 2000, p. 6). Furthermore, networks have a dialectical relation with their environment, affecting and being affected by the changes in the surrounding environment (Marsh & Smith 2000). As Marsh and Smith (2000, p. 8) have suggested, “... the context within which networks operate is composed, in part, of other networks and this aspect of the context has a clear impact on the operation of the network, upon change in the network and upon policy outcomes”.

A part of policy network studies has concentrated on the interrelations between the network structures and their outcomes (e.g., Rowley 1997; Scholz et al. 2008; McCubbins et al. 2009; Argote and Miron Spektor 2011). For example, McCubbins et al. (2009) have investigated the relation of network structure and the network's capability of solving coordination problems in policy settings. According to their findings, with asymmetric incentives, better-connected networks mediate coordination more effectively than less densely connected networks. In asymmetric incentives, outcomes are dependent on facilitation, but differ between actors. Network structures may also influence with whom the actors collaborate with. For example, Scholz et al. (2008) have found that collaboration between estuary management organizations leans on the network in which they operate, as highly connected actors are more likely to work together. Complex and non-routine group work benefits from more integrative network structures (Cummings & Cross 2003, p. 208) by joining diverse expertise in the
networks. In addition, sufficient ties among the members can support knowledge transmission, preventing over-reliance on one member only.

Some simple examples of typical structures for presenting the inherent logic of network thinking are the star-shaped, the core-periphery, and the complete networks. A *star-shaped network*, as shown in Figure 5, is centered around one core node (e.g., Scott 1991; Wasserman & Faust 1994). A star network structure may provide efficient information distribution as one central actor is able to contact directly all other nodes in the network. However, it may limit the possibilities of the peripheral actors to collaborate directly with each other. In addition, the central actor may have dominance over the knowledge transfer in the network, and thus, affect the information available in the processes. In larger networks, the work demanded to hold the network functioning may be resource-consuming for only one actor especially if the same actor is also responsible for the other legally mandated parts and the preparation of documentation in the process.

![Figure 5. Example of a star-shaped network structure, where a central actor is connecting all other actors into the network.](image)

A *core-periphery network* is a structure consisting of only one group, without subgroups, to which all of the actors belong more or less intensively (Borgatti & Everett 1999). The core-periphery networks include two sets of nodes: a cohesive core and a more loosely connected periphery, as shown in Figure 6. This structure is a continuation of the star-shaped structure with duplicates of the central node added (Borgatti & Everett 1999). According to Cummings and Cross (2003), the core-periphery structure is related adversely to network performance in complex and non-routine tasks. However, hierarchical and core-periphery structures may still be efficient for the accomplishment of routine and less complex tasks. Typically, this structure may allow the flexible transfer of knowledge through the central nodes, but can also risk the effective diffusion of knowledge between the peripheral actors, and marginalize their input, which would be important when working with complex problems. The central nodes may influence the network structures depending on their contribution in actively helping the more peripheral actors to connect with each other.
Figure 6. Example of a core-periphery network structure, where a group of more central actors are connecting the peripheral actors into the network.

In complete networks, all actors are connected to each other, as shown in Figure 7. Complete networks, meaning networks with perfect closure, usually enable more efficient transfer of knowledge within the network (Burt 2000, p. 351). Complete networks influence the actors' access to information, and facilitate the generation of trust (Burt 2000, p. 351). However, when the actors are strongly dependent on each other, they are more likely to hold similar knowledge, reducing the possibility of accessing diverse knowledge through more diverse peripheral ties.

Figure 7. Example of a complete network structure, where all actors are connected perfectly to each other.

2.3.3 Network-centered research of public organizations requires new methods

Policy research has gradually evolved to a more network-centered approach, acknowledging the institutional context in which the interactions happen (Klijn & Snellen 2009). Recently, the interest in studying public administration networks has increased (e.g., Kapucu et al. 2014; McGuire 2006; Provan & Lemaire 2012; Lecy et al. 2014; Kenis & Provan 2009; Meier & O’Toole 2003; Isett et al. 2011; Ahuja 2000; Alexander et al. 2016; Väyrynen 2010). Policy network research has evolved around
the understanding that interpersonal ties influence power in decision-making settings, more than the formal structures of decision-making hierarchies (e.g., Hillier 2000; Fowler et al. 2011; Berardo 2014; Jordan 1990; van Buuren et al. 2012; Huckfeldt 2009). The ideas of inter-organizational and policy network theories rely on the strong interdependence of public and private actors (Adam & Kriesi 2007), who share their expertise for tackling the complexities. The possibilities of network analysis have been acknowledged, for example, in the context of information accumulation practices of public sector organizations (e.g., Siciliano 2016).

Moulaert and Cabaret (2006) have listed challenges of utilizing the network concept in policy research. According to them, one of the main risks of the network concept is its inability of illustrating the real institutional structures. Their critique is partly based on the image of network as an ideal organizational form to be pursued for enhancing equal power among the actors, which can only rarely be attained, due to the organizational lock-ins. Moulaert and Cabaret (2006) have claimed that the ideal of an easily attainable equal and democratic network structure may lead to the overestimated perfectibility of real-life social systems. However, even with the networked structures, equality and democracy may stay merely as unattainable ideals. Moulaert and Cabaret (2006) have pointed out that the analyses of the real life network dynamics traditionally fail in two ways: by understanding the institutional structures, or the power relations. According to Adam and Kriesi (2007, p. 131), the most promising way for policy network research would be in linking the quantitative analyses to the existing forms of analyses, allowing a better understanding of the structural dynamics in the policy networks. Moreover, Isett et al. (2011) have pointed out that network research in public administration has mainly focused on static networks, not acknowledging their changes over time. Schipper and Spekkink (2015), among others (e.g., Doreian & Stokman 1997; Robins 2015), have identified the need for acknowledging the dynamic nature of networks, and the need for moving away from the static descriptions of networks, even as the collection of longitudinal time-series data may be resource intensive.

2.3.4 Multilevel approach supports the understanding of nested networks

Schipper and Spekkink (2015) have suggested that the explanations of the networked structures and outcomes have been mainly sought at the macro level. Thus, the micro and meso level factors shaping the network and the outcomes have been largely unacknowledged so far. Byrne and Callaghan (2013) have pointed out that the network descriptions may end up being oversimplified in case only one level of analysis is applied. The need for analyzing the multilevel
dynamics of the nested networks in planning has been indicated by Henry et al. (2010), based on their findings of policy networks in regional planning. Stokman and Doreian (1997, p. 241) have suggested, “the most important characteristics of social processes is that the outcomes of “macro” processes are not simply the result of a central (planning) authority. Rather, outcomes are the intended or unintended consequences of the simultaneous choices of persons or other social units, represented by these persons (as social actors). Social actors try to realize their own goals by choosing between behavioral alternatives that are available to them under certain restrictions”. Consequently, instead of focusing on a single-level analysis, Moliterno and Mahony (2011) have suggested a multilevel approach, which connects the micro, meso and macro levels, suggesting an integrated network theory of an organization.

The multilevel model is based on the idea of nested networks (Harary & Batell 1981), suggesting that networks are comprised of various elements and their interaction, being grouped into a nested structure. Consequently, the multilevel view assumes that actors do not act as isolates, but belong to various levels of relational social systems (e.g., teams, units, organizations), which as well influence their behavior (Moliterno & Mahony 2011, p. 7). The multilevel network approach is a continuum of multilevel organizational theories, which suggest that organizations are complex systems in which reasons and consequences may be located on various scales (e.g., Kozlowski & Klein 2000; Hitt et al. 2007). For analyzing the interdependency of the network relations and their structural effects on various scales, the internal and external variables can be discussed (Contractor et al. 2006). The internal variables refer to the effects, based on the ties themselves, whereas the external variables describe the factors outside the ties.

Later on, Lubell et al. (2012) have proposed a model for portraying the relationships of the social elements in a policy system, including micro, meso, and macro levels, and their interdependencies, as shown in Figure 8. The model links the institutional arrangements of the macro to the individual behavior in the micro, mediated through the networked structures in the meso. The combination of all these levels is what then affects the outputs and outcomes of processes, and receives feedback over time, as could be revealed with longitudinal analyses (Lubell et al. 2012, p. 355). Moreover, Lubell et al. (2012) have suggested that institutions and networks in planning organizations direct behavior simultaneously, and cannot be seen as substitutes.
2.3.5 Actor-network theory as an approach in planning research

Actor-network theory (ANT) has been a popular way of analyzing networks and associations in planning research (e.g., Davies 2002; Doak & Karadimitriou 2007a, 2007b; Cvetinovic et al. 2017; Duineveld et al. 2013; Georg 2015; van Boelens 2010; Tait 2002; Murdoch 1997). ANT perceives the human, social and technical elements in a symmetric way as integral parts of networks. According to Latour (2005, p. 71), “any thing that does modify a state of affairs by making a difference is an actor”. According to actor-network theory, social actions emerge as the integration of the social relations themselves, and of the context-related non-human entities and resources, such as the financial resources restricting the solutions to be reached with plans (Boelens 2009). However, the non-human actors are different in a sense that they are not value-driven by themselves, or do not have an intention or motive to make decisions within the network (Rydin 2014, p. 592). ANT research has discussed how the ways of doing things become routines, ending up as cultural practices and finally embedding the cultural practice into the material objects themselves. A central understanding in ANT is that the elements are not defined primarily through their inner qualities, but by their relations and historical co-evolution with other elements (Rydin 2014, p. 591). In this view, the emerging outcomes are dependent on the relationships through, what Rydin (2014, p. 591) calls, the distributed agency.

In recent years, actor-network theory has been considered as a relevant possibility for planning research, and has been utilized in a variety of planning-re-
lated studies. Actor-network theory, as a method, enables the analysis of the socio-spatial phenomena through the urban dynamics (Gad & Bruun Jensen 2010), constructing a view of the urban development processes (Cvetinovic et al. 2017). ANT has been applied on various scales of urban studies, from the building-level (e.g., Fallan 2011) to the neighborhood level (e.g., Doak & Karadimitriou 2007a), and to the regional level (e.g., Kauffeld-Monz & Fritsch 2013). Many of the applications of ANT in urban research and analysis are tied strongly to the spatial element, decoding the spatial development processes. Moreover, the meaning of the human and the non-human elements has been elaborated in some studies (e.g., Doak and Karadimitriou 2007a). For example, Boelens (2010) has developed an actor-relational approach suggesting that the material objects can only engage in planning through human agency.

The examples of ANT in urban studies and planning are various. For example, Fallan (2011) has utilized actor-network theory for studying the character of the non-human actors in architecture, and Gabriel and Jacobs (2008) have applied ANT for the identification of the non-human actors in practice and policy related housing studies. Cowan et al. (2009) have analyzed the housing regulation through ANT for describing the active mediators and the passive intermediaries of the processes. Rydin (2013), in turn, has applied ANT in the context of commercial office development, studying the networks that emerged, but focusing more on energy consumption and carbon emissions. Further, Duineveld et al. (2013) have applied ANT to study the complexity of object formation and stabilization processes in the planning and governance context. In addition, Georg (2015) has studied design tools as a way of transferring knowledge in the planning and building processes of sustainable cities. Moreover, Boelens (2010) has applied ANT in the research of bottom-up activities in the urban development processes. Cvetinovic et al. (2017) have studied an urban transformation process through ANT, suggesting that the method portrays the city as a product of the human and the non-human actors, relationally embedded in the specific spatial settings.

The applications of ANT in planning and urban studies have suggested that a city is a dynamic and complex group of human actors and material objects (e.g., urban elements) participating in the urban development processes (e.g., Farias & Bender 2011; Cvetinovic et al. 2017). Cities consist not only of the spatial elements, but also of their interrelatedness with the diverse socio-material and socio-technical systems (Farias & Bender 2011). According to Huang (2012), the urban development processes should, indeed, be comprehended in a more comprehensive way by looking at the human networks and the various materialized objects simultaneously. Doak and Karadimitriou (2007a) have investigated the complex socio-spatial phenomena in property redevelopment processes with ANT. Based
on the classification provided by Capra (2002) for understanding social phenomena, Doak and Karadimitriou (2007a, p. 210) have suggested that “Networks (form) and interaction (process) are the ‘glue’ that give rise to and sustain phenomena, ‘generating’ meaning which is then embodied into matter”. In addition, Tait (2002) has studied relations on the central and local governmental levels of planning with ANT, focusing on identifying how various actors become involved in the development planning processes, and how their interests become explicated in the plan.

Social networks differ from other kinds of networks. In social networks, all actors may have intentionality (Robins 2015). This is not the case, for example, in ANT, where some of the actors may be non-human. ANT is concerned with the processes of how things are formed over time (Tait 2002). In ANT, the networks are not stable systems, but combine sets of different actors, both social and material, which can alter and be altered by the networks (e.g., Tait 2002; Doak & Karadimitriou 2007a). There has been already wide discussion of the potentials of ANT in improving the understanding of the socio-material coevolution (e.g., Gad & Bruun Jensen 2010; Farias & Bender 2011; Cvetinovic et al. 2017). In the spatially related actor-network theory approach, “networks configure space, but they are also configured by space (and time)” (Doak & Karadimitriou 2007a, p. 220). Thus, in ANT, the non-human actors play a big role. Typical for the ANT applications in the research of urban planning and development processes is that they are bound to a specific location, which is described in a detailed way in the research for reasoning the collection of the non-human elements in the networks. Consequently, wide anonymization of a process (and the non-human elements) would not be a suitable option in actor-network theory for still keeping the analysis understandable. In addition, Cvetinovic et al. (2017) have suggested that ANT is not a self-explanatory method for practice to address and interpret the relational complexities of processes, but would require thorough explanations for being able to turn into practical understanding.

2.3.6 Overview of social network analysis

Social network analysis (SNA) includes the intentional actors, and their relations. Social network analysis has a diverse history, and has been developed in a number of various strands joining up to a mainstream every now and then (Scott 2017; Freeman 2004). Social network analysis was developed first as a way of thinking in sociology (for example by Georg Simmel and Emile Durkheim), identifying the importance of studying complex relations between social actors, and analyzing the society through various social systems. Network as a metaphor came into the use in the 1920’s, emphasizing the interrelations between
the various actors (Scott 2017). In the 1950's, social networks were connected with the study of the patterns of ties (for example by John Barnes), utilizing concepts developed by social scientists. The more systematic development of SNA as a methodology began in the 1960's on a more mathematical basis (Scott 2017), and has been developed by multiple researchers, for example by utilizing graph theory. Since that, along with the increasing computational capacity for utilizing larger datasets and making data more easily available and analyzable, SNA has been applied in various disciplines.

Currently, SNA is an emerging trend, and has been adopted so far, for example, in policy and organization theory. SNA as a method is based on systematic empirical data, and drawing on graphic imagery and mathematical models (Freeman 2004). SNA examines the networked structures through nodes (in this research the human actors) and their ties (in this research their organized interactions) (e.g., Scott 1991; Wasserman & Faust 1994; Knoke & Yang 2008; McCulloh et al. 2013), and has been explored also in the context of planning (e.g., Dempwolf & Lyles 2012; Lyles 2015). One of the principal ideas in SNA is that the interdependence of the actors is an asset, as it brings more opportunities to learn from the other actors. On the other hand, it is also a source of complexity in planning processes. Thus, understanding the structures and effects of social networks may support the planning organizations in developing their processes. Muñoz-Erickson and Cutts (2016) have suggested that SNA is suitable for investigating and understanding the challenges of knowledge flows in complex knowledge-action networks.

SNA offers a visual-analytical method for revealing and remembering the dynamics of the interaction episodes bringing new possibilities of understanding the evolving communicative processes. Instead of concentrating on the permanent characteristics of the actors, objects or events, SNA considers the attributes as arising from the relational networked processes (Wasserman & Faust 1994). Consequently, SNA is a method for analyzing the patterns of interrelations that are generated among actors when they engage in activities (Heaney & McClurg 2009). The patterns cannot be categorized as the features of individual actors, as they only exist through their interconnectedness (Rowley 1997), being the systemic properties of planning process networks. The benefit of SNA is that it can disclose the invisible connections, the relational spaces, of complex networks. Information of the nodes and their ties can be utilized to display the overall network structures (Wasserman & Faust 1994). One strength of SNA is, indeed, the ability to utilize graph visualization techniques in identifying the patterns and unexpected structures in the networks more easily than with metrics-based analyses alone (Gibson et al. 2013). The graphs can support the understanding and analysis of the networks by visualizing their structures.
Borgatti and Foster (2003, p. 992) have defined a network in SNA as "a set of actors connected by a set of ties", their dynamics depending on the unfolding interactions between the actors. The actors can be also called nodes. Groups are larger sets of actors. Similar actors (e.g., the participants of a process) form a one-mode network. Two-mode networks deal with two different sets of actors (e.g., the participants of a process, and the thematic meetings, in which they attend). Affiliation networks are a subset of two-mode networks, combining a set of actors with a set of events (Wasserman & Faust 1994, p. 30). Actors are linked to each other through ties, which are defined as establishing “a linkage between a pair of actors” (Wasserman & Faust 1994, p. 18). Relations refer to specific kind of ties, and there may be various relations for a pair of actors, although only one tie. Ties can be directed or undirected, depending on what they are expressing. The ties within a network signify each actor's dependency on the other actors, constituting a useful means for examining network structures over time (Chou & Zolkiewski 2012, p. 249). The ties may, for example, enable or constrain information flows between the nodes. Usually the frequency of ties is thought to be a prominent factor in network analysis. However, the frequency of ties is not the only thing, as weak ties and infrequent contacts may offer access to non-redundant information, enhancing the organization’s capacity of learning (Hansen & Villadsen 2017). For example, the classical theory by Granovetter (1973) has suggested that actually the weak ties are the best possible sources of new knowledge, as they can act as bridges to other networks. The amount of new knowledge usually decreases as the frequency of interaction increases (Hansen & Villadsen 2017). Granovetter (1973, p. 1361) has defined tie strength as “a (probably linear) combination of the amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterize the tie”. Strong ties usually entail frequent interactions, and overlapping networks (Hansen & Villadsen 2017). Burt (1992) on the other hand, suggests a more ego-centric view of the networked structures by seeing a correlation between each node’s ego network structure, and their possible access to novel information, affecting also the node's organizational performance. In addition to the various sets of nodes, social networks can include various sets of relational ties, such as advisory and friendship ties. Such a network is called a multiplex or a multivariate network (Robins 2015, p. 21).

The possibilities of social network analysis have been acknowledged in multiple disciplines. For example organizational, policy, and public administration research have applied SNA to develop their practices. In addition, planning research has utilized SNA focusing mainly on community development. Social network analysis has been utilized in organizational research primarily as a tool
for identifying networks through which information flows in organizational processes (Cross et al. 2002). As suggested by Salancik (1995, p. 345), SNA has been mainly utilized as “a tool for analyzing data about organizations rather than for understanding organizations”. Intra-organizational studies have utilized SNA, for example, in revealing network structures and key individuals in their processes, using the results as a means for developing commitment and mobilization (e.g., Chuvileva et al. 2017). In addition, Cross et al. (2006) have utilized SNA to analyze communities of practice, facilitating or impeding effectiveness in organizations. Their analysis has revealed, for example, the method’s capabilities in identifying organization’s over-reliance on few central experts, network silos and the expertise distributed in the network. Political studies, in turn, have found SNA as a useful method for understanding policy processes, acknowledging its possibilities in understanding policy network dynamics (e.g., Heaney & McClurg 2009; Kapucu et al. 2014; Lecy et al. 2014). In the context of public administration, SNA has been utilized for understanding, for example, the social structures and interorganizational relations of management and policy issues (Kapucu et al. 2014). So far, the contribution of SNA in public administration research has been considered significant (Kapucu et al. 2014). More methodological triangulation and research are needed in order to understand more thoroughly the collaborative networks in public administration (Kapucu et al. 2014).

In planning research, a lack of empirical research utilizing SNA has been identified (e.g., Lyles 2015; Dempwolf & Lyles 2012). So far, the traditional empirical methods of planning as an interactive practice (e.g., interviews, surveys) have offered a variety of perspectives of the individual planner’s role in planning processes (e.g., Healey 1992; Hoch 1994), revealing aspects of, for example, how the planners act in the interactive contexts (e.g., Fischler 2000). These give thorough snapshots of the work of individual planners, but SNA may offer a method for widening the understanding of planning processes to the actor-relational level, giving more weight to the inherent interactions over time. Dempwolf and Lyles (2012) have suggested that SNA may support the detection of the sources of communicative distortions in planning processes. Planning literature has acknowledged SNA mostly as a method to be applied in a spatial context in relation to place-making and community development (e.g., Ganis et al. 2016; Zhao & Wang 2017). Apart from these, Lyles (2015) has analyzed planner involvement in environmental planning processes through SNA. Holladay et al. (2017), in turn, have tested SNA in a plan implementation process, aiming at identifying and interpreting the patterns of ties among the actors for stakeholder coordination purposes. Thus, the requirement for better understanding of networks (e.g., Innes 2005), and the utilization of SNA in planning process research (e.g., Dempwolf & Lyles 2012) have been identified.
2.3.7 Research gaps concerning network analysis

As the current planning theoretical views suggest, planning is constructed in social processes, increasing the importance of understanding their relational structures. The importance of understanding the interactive processes that reproduce knowledge in planning has been acknowledged (Innes 1998). Knowledge is an essential resource to be obtained through various networks, acting as a source of diverse social capital. Planning theory has identified that network analysis may serve as a useful method for understanding the procedural structures and dynamics (Healey 2005b). Networks move the unit of analysis from the individual and organizational to the relational level, embracing the meaning of communication and interaction in the knowledge-building activities. Network structures and participants have an effect on what is considered during the process, or memorized after the process.

Previous research has suggested that network changes are explained mainly through external factors, not acknowledging the internal aspects. The scale of the performance measures are usually on the level of organization-organization networks, instead of the relations of individual actors. Consequently, some essential actor-relational factors may be left undiscovered. For understanding the internal structures of the multi-actor processes, the focus of this research is on the actor-relational level of planning process networks. The common focus on detailed complexity may challenge the ability to understand patterns and interrelations, pointing out the need for understanding the dynamic complexities. New understanding of the interrelations and processes should be generated instead of focusing on snapshots of linear cause-effect chains. In addition, the possibilities of network analysis in planning process development from the organization theoretical perspective have remained largely unacknowledged. In this research, the focus is on analyzing the networked dynamics of planning processes over time in order to generate new understanding of their effects on process memory development. The research of networks in public administration has increased, but has so far mainly unacknowledged the dynamics of networked structures over time. Moreover, explanations for network structures and outcomes have been sought mainly at the macro level, largely ignoring the micro and meso level factors. SNA may support the detection of the sources of communicative distortions in planning processes (Dempwolf and Lyles 2012). A lack of empirical planning research utilizing SNA has been identified (e.g., Lyles 2015; Dempwolf & Lyles 2012). In addition, Lyles (2015) has pointed out that a "key challenge in the future analyses will be generating network data that can be used
in quantitative analyses”. The potential of SNA in widening the scope of the current socio-spatial discussions to the social network dynamics and their possible effects on the process, are explored in this research.

In this research, the focus is put on the relational aspects and interaction of the human actors in planning processes. This research considers the aspect of organizational development more than the actual spatial development. The point of departure for this research is that enabling process memory development is important for supporting organizational learning. The main focus is not on the actual spatial negotiation, but on the networked structures concerning process memory development. In previous research, the networked dynamics of planning processes over time, in addition to their impacts on process memory development, have not yet been well understood due to the lack of applicable data available. The collection of longitudinal data for analyzing how the processes unfold over time has been considered as resource-intensive. Consequently, this research approaches the networked dynamics of planning processes with the perspective of process memory development by utilizing longitudinal time-series data, which has been specifically collected and processed to be analyzed with SNA.

2.4 Conceptual framework of the research

The conceptual framework of the study is built around three perspectives: process memory, process as a complex adaptive system, and collaboration networks, which are analyzed from the view of planning practice. Based on these, the prevailing research needs have been identified, and the research questions have been formulated, as shown in Figure 9. Procedural structures and their possible effects over time are not understood adequately, partly challenged by the stated gap between planning practice and research (e.g., Breheny 1983; Isett et al. 2011; Rydin 2013; Newman 2014; Head 2015). The traditional simplistic and linear process models have been questioned (e.g., Schwenk 1985; van de Ven 1992), and the need for methods to understand process dynamics over time has been acknowledged (Langley 1999). The focus on detailed complexity has challenged the ability to understand patterns and interrelations (Senge 1990) over time. Focusing on snapshots of linear cause-effect chains may challenge the understanding of the interrelations and processes. Moreover, the generalized descriptions ignore the often invisible, dynamic and complex structures within the processes, which may challenge the understanding of the complexities, which influence planning processes over time.
The importance of understanding the interactive process that reproduces knowledge in planning has been acknowledged (Innes 1998). Research of organizational learning in the context of public sector has acknowledged the importance of individual level dialogue and social interaction, but has still merely emphasized the interactions among organizations and groups (Siciliano 2016). Moreover, explanations for network structures and outcomes have been mainly sought at the macro level, largely ignoring the micro and meso level factors (Schipper and Spekkink 2015), such as the actor-relational dynamics. In addition, network changes have been explained mainly through external factors, and not through acknowledging their internal aspects. The strong focus on organizational level may leave the actor-relational aspects of public sector processes unacknowledged. Various descriptive concepts regarding memory in organizations have been suggested, but the characteristics of process memory development in networked planning processes are not yet well understood. One possible reason for this may be the scarce documentation of public administration processes. Memories of knowledge-intensive processes are documented rarely, complicating the applicability of longitudinal or quantitative process analyses. Furthermore, it has been suggested (Lyles 2015) that a challenge for future network analyses is the generation of data that can be utilized in the quantitative analyses.

Discussion of the network structural concepts in relation to performance in public administration is still scarce (e.g., Kenis & Provan 2009; Lubell et al. 2012), and focuses mainly on static descriptions of network structures (e.g., Doreian & Stokman 1997; Adam & Kriesi 2007; Isett et al. 2011; Robins 2015; Schipper & Spekkink 2015). Some examples (e.g., Scholz et al. 2008) have suggested that statistical models may have the ability to support the better understanding of network performance. In addition, a lack of empirical planning research utilizing SNA has been identified (e.g., Lyles 2015; Dempwolf & Lyles 2012). However, it has been also suggested that SNA may support the detection of the sources of communicative distortions in planning processes (Dempwolf and Lyles 2012). Based on the identified research needs, the research aim and questions are presented in the next section.
For developing the methodological framework, this research assumes that the planning system is the context in which the municipal planning organization operates, as described in Figure 10. The systems boundary of a statutory planning process in this study is seen as the activities and structures, which are linked directly to a specific process. Based on the premises of this research, knowledge and memory are analyzed from the perspective of actor-relational networks, which are embedded in organizations, planning ecosystem, planning domain, and the society. In the context of this research, the higher levels set frame for the lower levels, giving inputs in their operations. For example, the interaction of the actors within the planning process are framed by the organizational structures, traditions and culture. The lower levels actively aim at influencing the higher levels of the framework, and filter the inputs from the higher levels, adjusting them to meet their own goals. For instance, the planning process may aim at altering certain regulations or organizational structures for attaining its objectives. Every level of the system is open to its environment,
having a bidirectional relationship in which it is affecting, and being affected, by its environment. Planning process is the focal systemic level in this research, consisting of various parts and their relations, as described in Figure 11 and Figure 12. In addition to the inputs from the environment, planning processes and planners are affected also by their internal dynamics.

In the context of this research, planning process as a system contains the networks of actors, activities, and actions over time, establishing a relational web driving the process further, as shown in Figure 12. Ties are formed through the interactions between actors, who are participating in activities. The human actors are restricted by various systems and frames in their work, but also have their individual personalities, emotions, and values directing their work. The network of actors (such as a municipal civil servant) from various organizations (such as a planning organization) collaborate in activities (such as meetings) in order to contribute to a set of actions (such as a decision), as shown in Figure 11. A process is continuously evolving through the interaction of its components, and through having a bidirectional relationship with its environment. Consequently, the process has to be planned and adapted continuously.
The focus on the relations between the human actors in this research moves the understanding of the planning processes from the institution-centered to the social-relational level. In this context, a planning process is considered as the sequence of interactive activities of various actors, coordinated by a municipal planning organization within one statutory strategic spatial planning process over time. Generally, urban development processes do not have clear boundaries, but are more or less continuously ongoing, and discussed in various formal and informal (urban) arenas. Thus, urban development processes do not typically have an exact beginning or an end. However, a strategic spatial planning process, as a regulatory instrument, does have a legally mandated beginning and an end. The boundaries of the regulated process, as a part of a wider development process, can be explicated even as the discussion of commencing the regulatory process may last long before it is commenced. Furthermore, the process does not necessarily end on the day when it is approved, but appeals may be made. In this research, the process begins from the first recorded meeting organized by the municipal planning organization, and ends when the plan is approved by the City Council.

Figure 11. Central concepts in this research form a frame in which a network of actors, utilizing multiple knowledges, collaborates in activities for contributing to a set of actions, and developing process memory over time.
Figure 12. A central focus in this research is the emergence of the various networked structures over time.
This section presents the overall research design. The research was conducted as a single longitudinal illustrative case that enabled comparisons within the analyzed process over time, as well as reflection with planning practice in general, to answer three research questions. The research is based on discussion between planning research and practice. This is accomplished through data and methodological triangulation, as shown in Figure 13. For the first research question (RQ1), SNA is utilized as a method for generating new understanding of process dynamics, and individual interviews are utilized for validating the SNA findings. For the second research question (RQ2), individual interviews and focus group interviews are conducted for analyzing process memory development. For the third research question (RQ3), focus group interviews are utilized for analyzing the applicability of the SNA findings for process development purposes in municipal planning organizations.

Figure 13. Methodological triangulation was applied for analyzing three research questions.

### 3.1 Research aim and questions

Based on the identified research needs, the aim of this research is to approach the often-invisible networked dynamics of strategic spatial planning processes from the perspective of process memory development. This is done by utilizing longitudinal time-series data, which has been specifically collected and processed to be analyzed through SNA. The utilization of SNA was expected to reveal the emergence of the communicative dynamics over time. The SNA utilizes
time-series data from one four-year statutory strategic spatial planning process in one of the municipalities in the Helsinki Capital Region. The findings are validated through individual interviews with participants of the specific process. The interviews are conducted in two parts for enabling also the discussion of process memory development, before the SNA findings were shown. The interviews were expected to serve in testing the validity of the SNA findings, and to open up perspectives to process memory development in planning practice. Finally, focus group interviews with strategic spatial planning professionals in the Helsinki Capital Region are utilized for testing the applicability of the findings for process development purposes. The focus group interviews were expected to serve in testing the relevance of the research findings for the planning practice.

The premise of this research embraces the significance of multiple knowledges in multi-actor planning processes, and acknowledges the constantly reproduced multidimensional understanding and experience-based situatedness of knowledges. This research acknowledges planning processes as complex adaptive systems, changing over time through non-linear communicative dynamics. Procedural structures, and their effects over time, are not yet widely understood. SNA has been identified as a method for exploring the actor-relational dynamics, but a lack of empirical applications of SNA in planning research has been identified due to the difficulty of obtaining applicable data. By focusing on the procedural understanding of planning, the first objective of this research is to generate new understanding of the often-invisible actor-relational dynamics of planning processes through the utilization of social network analysis and longitudinal time-series data from one strategic spatial planning process. Consequently, the research addresses the following question:

**RQ1:** What can social network analysis contribute to the understanding of the emergent properties of networked process dynamics with the utilization of longitudinal time-series data?

Learning is not possible without memory. Memory, knowledge and learning are inseparable parts of knowledge-intensive processes, driven by the networked structures, which may enable or restrain the knowledge transfer practices. The characteristics or the possible measurability of process memory development in the networked planning processes are not yet understood well, and infrequently acknowledged. This research acknowledges the actor-relational process structures, which may possibly affect the actors’ process memories by enabling or restraining knowledge transfer in the planning processes over time. Consequently, the second objective of this research is to explore the relation between
the networked process dynamics and process memory development, addressing the following question:

**RQ2:** What effects can the networked dynamics of planning processes have on the development of process memory in municipal planning organizations?

Previous research has recognized a gap between planning research and practice. The practical contributions of planning research have been considered too general and placing too many expectations on the capabilities of practitioners to turn them into action. By endorsing the need for more collaboration between planning research and practice, the third objective of this research is the discussion between research and practice for understanding the applicability and relevance of the findings for planning practice. Consequently, the research addresses the following question:

**RQ3:** Can the selectively increased understanding of the networked process dynamics through social network analysis be utilized in the process development practices of municipal planning organizations?

### 3.2 Methodological and data triangulation

#### 3.2.1 Planning process as an illustrative example for exploring process dynamics over time

The aim of this research is to approach the often-invisible networked dynamics of planning processes with the perspective of process memory development by utilizing longitudinal time-series data, which has been specifically collected and processed to be analyzed through SNA. The data has been collected from one four-year statutory strategic spatial planning process in one of the municipalities in the Helsinki Capital Region. Illustrative case studies enable the exploration of holistic explanations within processes better than other comparative methods (Pettigrew 1997), by allowing the thorough investigation of one entity from many different angles. The meaning is not to develop a general theory of an optimal network structure for all planning processes. Instead, the meaning is to utilize an illustrative case as an example for generating new understanding of the possibilities of utilizing SNA by examining the diversity of perspectives it can offer to planning research and practice. Simultaneously, the intention is to
create awareness of the importance and possible effects of the networked dynamics on process memory development.

The research data consists of:
- MS Access database with processed raw data of the process.
- Eleven transcriptions of individual interviews.
- Four transcriptions of focus group interviews.

The raw data includes the documented process data, which was available still after the process was finished. The raw data was provided for the research by the municipal planning organization, including 40.31 GB of digital process documentation in 1,128 folders in 10,533 files in addition to the hand-written and hand-drawn material. The raw data consists mainly of:
- Decision-making related appendices (.doc, .pdf).
- Detailed plan related data (.dwg, .jpg, .msg, .pdf).
- Formal decision documents (.doc, .html, .msg, .pdf).
- Meeting agendas (.doc, .msg, .pdf).
- Meeting invitations (.doc, .msg).
- Meeting memos (.doc, .pdf).
- Meeting notes (.doc, hand-drawn, hand-written).
- Other background data (.doc, .jpg, .msg, .pdf, .xls).
- Plan-related investigations (.doc, .pdf).
- Plan-related presentations (.ppt, .pdf, .skp).
- Process management documents (.doc, .msg, .ppt, .xls).
- Resident collaboration related data (.doc, .msg, .pdf, .xls).
- Spatial base data (.dwg, .jpg, .msg, .psd, .tab, .tif).
- Thematic data (.dgn, .doc, .jpg, .msg, .pdf, .xsl).

Strategic spatial planning processes are inherently complex and unfold over time in a systemic context. What happens within a process is not solely determined within the process, but by a diversity of external factors as well. Consequently, the research began with an initial process analysis by analyzing the process documentation for generating an overall view of the process, its connections to the surrounding environment, and its interconnections with other simultaneously ongoing processes. Selected parts of the initial analysis are presented in Appendix 5. The analysis of planning processes requires data and methods that allow the holistic and thorough description of the selected theme over time. Process data collected from a real context is typically longitudinal,
complex and qualitative, leading to multiple levels of analysis (Langley 1999; van de Ven 1992). In the past, this kind of process data has been very limited. However, digitalization has transformed information recording during processes, and more data is now accessible in various information systems of a planning organization after the process has officially ended. Stokman and Doreian (1997, p. 233) have pointed out that the collection of longitudinal SNA data is time consuming and resource dependent, suggesting that these are a part of the reason why network dynamics and evolution have not been investigated more. Other identified challenges of SNA data gathering have been the boundary specification problems and the utilization of interviews and surveys as primary data sources (Lyles 2015), encouraging the use of data triangulation (Carrasco et al. 2008). First, the boundary specification problem is about defining the closure of the network by specifying which actors to include in the network, and is due to the inherent complexities of interaction (Chou & Zolkiewski 2012, p. 247). Second, the network data gathered through interviews and surveys can be easily biased, for example, because of the interviewees’ inability of memorizing, survey non-response, and post-rationalization by the respondents.

Methodological triangulation has been regarded to increase the validity and reliability of the network studies within public administration (Kapucu et al. 2014). Utilizing mixed methods for validation purposes reduces the probability of biased findings (Axinn & Pearce 2006). Data triangulation means the use of multiple ways of collecting and analyzing data, whereas methodological triangulation refers to utilizing a mix of quantitative and qualitative methods (Jack & Raturi 2006). Both data and methodological triangulation have been utilized in this research. There are several reasons for the choice of utilizing triangulation. Planning is an inspiring and emotive domain, as it concerns the living environments, with the views of it ranging from mystery and superstitious rituals to rigid bureaucracy. Some more common methods of planning research have involved, for example, ethnography (e.g., Healey 1992; Healey & Hillier 1996; Hillier 1993), action research (e.g., Apgar et al. 2017), interviews (e.g., Grange 2017; Sehested 2009; Mäntysalo et al. 2015), document analysis (Mäntysalo et al. 2015), and surveys (Rydin et al. 2007; Battista & Manaugh 2017; Axhausen 2008). All methods have flaws, but the utilization of various methods with non-overlapping weaknesses better allows the validation of the findings, and the widening of the descriptive perspective. Data triangulation supports the forming of a more thorough and coherent picture of a process (Halinen et al. 2013), opening up multiple perspectives to it.

Flyvbjerg’s (1998) case study of power and rationality in urban planning is an example of how complex issues can be understood more thoroughly through an in-depth case as an illustration. However, despite of their thoroughness, case
studies are criticized traditionally for example because of their inability of contributing to scientific development due to the un-generalizability of their findings. Thus, their value is seen merely as being the context-dependent means of developing hypotheses in the beginning of a research (Flyvbjerg 2006). The challenges of generalization in the in-depth process case studies have also been acknowledged in the organizational studies due to the challenge that their analysis methods are only scarcely reported, complicating the understanding of the analyses (van de Ven & Huber 1990). Thus, process research should at least consider the detailed description of the data and methodology for the research to be understandable. However, illustrative case studies still offer the access to in-depth understanding of practice, simultaneously opening up perspectives for new research needs (Flyvbjerg 2006).

3.2.2 Triangulation through the discussion between research and practice

According to Pettigrew (1997, p. 338), “processes cannot be explained just by reference to individual or collective agency. Actions are embedded always in contexts... But the dual quality of agents and contexts must always be recognized”. For this reason, the actor-relational analysis was complemented with bipartite thematic analysis, and individual interviews. In addition, the validity and applicability of the findings were analyzed through individual and focus group interviews. Qualitative methods can support SNA by offering more in-depth information about the reasonings behind the process. Consequently, in this research, both qualitative and quantitative methods have been utilized for enabling in-depth understanding of the potentials of SNA in urban planning.

Furthermore, for supporting the iterative reflection between planning theory and practice, Straatemeier et al. (2010) have suggested the experiential learning cycle model. In the experiential research design model, the generation of new knowledge and learning advances cyclically through four sequential phases. In the model, the concrete experiences are more on the practice side, and the forming of abstract concepts belongs more to the research side. Observation and reflection, as well as testing in new situations are where the interaction between these two takes place.

Straatemeier et al. (2010) have suggested that due to the complexity of planning practice, tests should be done outside real processes. When the practice needs to tackle the complexity and dynamics in their everyday processes, detaching the research from the experienced reality may be a challenge. The solution for integrating research and practice in this research was to analyze and understand planning processes in their real settings, not distracted from the experienced complexities and dynamics they are facing, but as integral to that
framework. For this reason, the findings of this research were tested also in planning practice. When the challenges in the practice need to be solved, they should not be extracted from the reality, but be analyzed within the real-world processes. In the context of this research, the model of Straatemeier et al. (2010) has been adapted by advancing through the various components of triangulation, as described in Figure 14. The methodological triangulation in this research consists of the initial phase (component 1), and the three main components (2–4): social network analysis, individual interviews and focus group interviews. Throughout the cycle, the literature review was deepened and widened.

![Figure 14. The iterative cycle between research and practice as applied in this research (applied from Straatemeier et al. 2010, p. 582) is built around methodological and data triangulation to support the reflection between research and practice.](image)

In the beginning, based on literature and practical experience, it was recognized that the lack of process memory poses a critical challenge for planning processes. In the initial phase of component 1, based on the preliminary analysis of the raw data together with a literature review, the interrelated elements of process memory, planning processes, and networks were identified.
SNA, as the second component, enabled the visual-analytical understanding of the networked process dynamics over time. A standardized set of longitudinal data from one strategic spatial planning process in the Helsinki Capital Region was specifically collected and processed to be analyzed by SNA. The data was based on the organized meetings during the process. The standardized time-series data served as the foundation for the analysis with various statistical measures in order to explore the actor-relational dynamics emerging over time.

The individual interviews, as the third component, were utilized for validating the SNA findings, and discussing process memory development. As SNA has not been applied before for understanding the dynamics and process memory development in planning processes, the findings were carefully validated in order to see if they tell of the specified phenomena or not. Consequently, individual interviews were organized with participants of the analyzed process. In addition to the validation aspect, the individual interview protocol (Appendix 3) was designed to allow also the comparison of the interview-based and SNA-based process descriptions.

The focus group interviews, as the fourth component, were utilized for analyzing the applicability and relevance of the SNA findings for process development purposes in planning practice. A division between planning research and practice, specifically concerning the applicability of the research findings in practice, has been identified for long. Consequently, the applicability of the SNA findings in this research was discussed in focus group interviews with practicing planners. The utilized focus group protocol is presented in Appendix 4.

Methodological triangulation allowed the analysis of the process and the SNA findings from multiple perspectives. The selected methods affect the understanding of the research problem. For decreasing the effect of reliance on a single method, methodological triangulation was utilized, as shown in Figure 15. The integration of SNA and the individual interviews supported a more profound understanding of the process dynamics, and the reasons behind the dynamics. In addition, the comparison of the interview-based and SNA-based process descriptions allowed the understanding of the specific strengths of the SNA-centered analysis. The focus group interviews, in turn, supported the exploration of the applicability of the SNA findings in planning practice also from the practice side.
3.3 Social network analysis

3.3.1 Data Synthesis

This research approaches the previously identified research needs by drawing upon longitudinal data of a strategic spatial planning process in one of the municipalities in the Helsinki Capital Region (Finland). The analyzed process lasted approximately four years since it became pending until it was approved by the City Council. This has enabled the gathering of a thorough data set and allowed the analysis of the process evolution over time. The input data was specifically collected and processed after the process to be analyzed through SNA.

The standardized event-based time-series data of organized and documented interactions defined the network boundaries by the records of meetings during the process. Consequently, an undirected tie between two actors is established when they have participated in a same organized meeting during the process. The relations in this set of data consist of communication between actors, through the physical presence in a same meeting. The intensity of a tie is specified as the sum of shared meeting attendances. The network spans from the individual to the inter-organizational levels, combining a variety of actors (not residents, as they were not individualized in the data set) from multiple organizations across a wide array of roles in the process. The data was complemented with process documentation, including for example project proposals, memos, reports, investigations, sketches, and presentations, allowing the analysis of the networked process dynamics through various measures simultaneously.

For each meeting, the following details were retrieved: start date, end date, participants, agenda, level of publicity, duration, and possible memo and notes.
In addition, the possible documented outputs (e.g., investigations, formal decisions) were linked to the specific meetings when available. Based on these, the events were classified based on their type, role and meeting group. The anonymized participant data was classified to contain actor attributes, meaning the information of the characteristics of the actors. The actor roles were classified as municipal civil servant, elected official, landowner, developer, consultant, and public authority. The classification was chosen to represent their official role in the planning process, as commonly utilized by municipal planning organizations. The roles were defined according to the specific sectors or organizations of the actors. Municipal civil servants represent the municipal authority, which is formally responsible for the planning process across a diversity of units within the municipal organization. Elected officials are the political decision-makers, carrying out the formal decision-making power in the process (in addition to the managerial level municipal civil servants), based on the representative democracy. Landowners represent the mainly private sector landowners in the planned area, and developers are their collaborators with whom they may have a contract for the construction phase. Consultants represent private organizations carrying out specific tasks (such as investigations) during the process. Public authorities are other authorities than those of the municipal organization, representing for example, regional and national level authorities (e.g., the Centre for Economic Development, Transport and the Environment). In the analyzed process, none of the actors represented two of these roles. Information of the residents was not individualized during the process. Consequently, the residents have been limited out of the analyses. The term *actor* or *node* is utilized in this study to denote the individuals representing the various organizations and roles in the process. All data has been treated anonymized to protect the privacy of the actors.

Figure 16 presents the data tables utilized in this research. Five linked data tables were constructed to provide more information about the actors and the activities: Actors, Activities, ActorsInActivities, ActivityThemes, and ActivityNotes. The Actors database includes actor characteristics (e.g., role, organization, department, and unit). The Activities database includes activity characteristics (e.g., start date, end date, participants, agenda, level of publicity, duration). The ActorsInActivities database links the actors to the certain activities. In the affiliation analysis, the meeting data was further categorized according to the general themes of the specific activities. To provide more information of the activities, two data tables were constructed and utilized in the affiliation analysis: ActivityThemes and ActivityNotes. The ActivityThemes database includes the general level themes of the agenda, classified into 15 themes. These were
validated through the more detailed thematic notes, when available in the process material.

The 15 activity themes were further divided into two subgroups: the procedural themes, and the sectoral themes for allowing the comparisons between the two sets of themes. The procedural themes include eight of the more universal themes. The decision-making related theme contains activities, which are linked directly to the formal political decision-making procedures, for example the City Council, City Board, and City Planning Committee meetings. The plan documentation theme integrates the meetings linked to the official plan documents, such as the plan map, the plan report, and the plan provisions and symbols. The other official documentation theme includes all other official documents than the planning documentation, such as the preparation of the various complementary materials provided for the elected officials, and the documentation affiliated with responding to the given statements. The detailed plans theme contains collaboration with the more detailed plans in the same area, or in its close vicinity. The site visits include the visits to the planning area. The alternatives and modelling theme integrates the themes directly linked to the formulation of the alternative solutions of the plan, or to the modelling of the plan solution. The plan situation is a theme for the general checks, where the situation and the proceeding of the process were informed. The goals theme contains the general discussion and the setting of the objectives for the plan.

The sectoral themes include seven topics, which are related to the sector-specific meetings. The mobility theme includes topics, which are related to the transportation network, accessibility, and mobility services. The commerce and business theme contains topics, which are related to the location of, for example, the commercial services, offices, and industrial areas. The public services theme combines questions of the services provided by the municipality, such as schools, daycare and healthcare services. The cultural heritage theme consists

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**Figure 16.** Contents of the meeting-based time-series data are divided into five interlinked datasets to provide information about the actors and the activities.
of the subjects, which are related to the history, and the cultural and built heritage in the area. The nature and recreation theme encompasses themes such as nature conservation, landscaping, recreational areas and routes, and the natural areas. The municipal engineering theme contains matters dealing with, for example, the municipal infrastructure, runoff water, and contaminated lands. The economics theme includes topics dealing with economic matters, cost-benefit analyses, and other topics, which are related to the plan and city economics.

3.3.2 Analysis Methodology

Decoding planning and policy network dynamics is methodologically challenging, as there are no established practices. For supporting the understanding of change over time, continuous time can be split into timescapes in process research. In this research, the process is divided into four periods, as in the four generally acknowledged phases of the Finnish statutory spatial planning processes: goal-setting phase, draft phase, proposal phase, and ratification phase. In order to reveal the dynamics within these phases, each of them has been divided further into intervals of approximately two months. The scale of two months was selected for the data to be detailed enough for showing the changes over time, but aggregate enough for protecting the anonymity of the process and the actors. The network data involved the use of matrices (an example of a matrix is presented in Appendix 2) representing the ties at various phases of the process among the actors. Matrices for each two-month period were calculated, with the cell $x_{ij}$ representing the number of meetings in which both $i$ and $j$ have attended.

The analysis commenced by producing an event-based description of the planning process over time. After the first overall view of the process, analyses of the socio-temporal network structures during the process were elaborated through various measures. Several network level and node level measures were utilized. The software used for the data analysis was Gephi 0.9.1, which allows the simultaneous analysis and visualization of the datasets. Gephi utilizes a list of unique nodes and a list of edges between the nodes to construct the network. Attributes can be added both for the nodes (e.g., role) and for the edges (e.g., weight and direction). For the visual placement of the nodes and ties, the Fruchterman-Reingold algorithm (Fruchterman & Reingold 1991) was utilized in the one-mode analyses, and the Force Atlas algorithm (Cherven 2013) in the two-mode analyses. Both are commonly used algorithms for force-based visualizations, using force-directed placement by pulling together nodes with stronger ties. The more interactions there are between two nodes, the closer to each other
they are situated. In addition, the nodes with the most connections are placed in the center of the graph.

To overcome the challenges of decoding the network dynamics, the temporal structuring of the networks during the process was acknowledged in the analysis. By presenting various points in time ($t_1...t_{27}$) during the process, a representation of the sequences of process phases was revealed. However, the network graphs require also thick descriptions in answering to the causal questions of why the dynamics take place in the network. For answering these questions, the graphs were complemented with the analysis of the process documentation describing the network evolution, and recognizing for example the documented outputs (e.g., formal decisions, investigations) produced in the phases. The chosen method can overcome the limits of representing only the static snapshots of the given points of time.

In the findings, four analyses (network size, degree centrality, betweenness centrality, and in-degree of thematic affiliation networks) are presented and validated. The four analyses were chosen based on their relevance for procedural knowledge flows, and accordingly, for process memory development. All other SNA findings are available in Appendices 6–9.

**One-mode network analysis**
One-mode networks consist of only one type of actors and their ties at a time. Figure 17 represents an example of a simple one-mode network structure, in which the ties (the black lines) connect the actors (the purple circles) to each other. In this research, a tie is formed between two nodes when the actors have documentedly participated in a same organized meeting during the analyzed process. In the network graphs presented in the findings, the size of the nodes varies depending on the measures used, and the strength of ties represents the intensity of the tie between the two nodes (i.e., how often they participated in a same meeting).

**Figure 17. Example of a one-mode network structure, where all nodes are of a similar type (actors).**
Network-level measures

Network size and modularity

The network size was calculated by the number of actors participating in the meetings during a period of time (G1...R6). The larger the network, the more varied the inputs of the actors in the process may be. However, large networks may also require more resources for knowledge transfer and coordination purposes. In addition, the networks may be structured with a diversity of subgroups. Modularity measures how a network decomposes into communities. The communities refer to sets of nodes organized into densely linked clusters. One node can belong to multiple communities, and thus, the communities may overlap. High modularity indicates a structure where the network is compartmentalized into multiple subnetworks. The number of communities shows the amount of subnetworks within the network. One possible effect of compartmentalization is that knowledge transfer between the various subnetworks may be restricted unless there are enough actors connecting the various subgroups together, and transferring knowledge between them. Planning is traditionally described as a highly sectoral activity, lacking fluent knowledge transfer between the various silos. Consequently, modularity may help to understand the subgroup structure of the planning process networks.

Network density

The network density quantifies the relative amount of ties present in a network (Wasserman & Faust 1994, p. 101). In this research, the density of the network was calculated among the nodes based on their ties in each phase. Network density \( \Delta \) can be calculated with Equation 3.1 by Wasserman and Faust (1994, p. 101). In the equation, \( g \) presents the nodes in the graph, and \( \frac{g(g-1)}{2} \) the possible ties that can be present in the network. \( L \) is the number of ties present in the network.

\[
\Delta = \frac{2L}{g(g-1)}
\]  

(3.1)

In dense networks, the nodes are equally connected (Burt 2000), and the density equals one. One interpretation of the measure is that in a dense network, communication becomes more efficient, and greater density means more efficient communication and dispersion of norms through the network by reducing the risk of developing segregated subgroups (Rowley 1997). Higher density may suggest that the actors in a network seek more advice from one another (Wong 2008), increasing the amount of knowledge transfer in the network. The suggested reason for this is that a dense network structure may increase the shared
understanding and expectations, the ease of knowledge transfer, and the potential for forming affiliations, leading toward strong and unified pressure and conformity (Rowley 1997). However, dense networks may also restrict actions in the network as actors depend more on each other, and expectations become more visible and shared, as suggested by Rowley (1997). Low density, on the other hand, may restrict the efficient knowledge transfer, when the actors are not connected to each other, but the knowledge has to transfer over multiple ties to reach all nodes in the network.

In strongly tied networks, the actors are likely to receive similar information from all actors in the subgroup, whereas via weak ties the information is more likely to be more diverse and come outside of one’s immediate social network (Perry-Smith 2006). Thus, weaker ties are more likely to offer nonredundant and less repetitive information (Perry-Smith 2006). One possible effect of tie strength is that an actor with more weak ties can validate potential responses to a problem by having a greater potential for understanding the nuances of the solutions, and enhancing the creativity of the solutions (Perry-Smith 2006).

**Node-level measures**

**Centrality**

The various centrality measures refer to a node’s position in a network in relation to all other nodes. Centrality refers to the informal power attained through a relational position within the network in contrast to the formal hierarchical power (Rowley 1997). The central premise of centrality measures is that actors can only lean on knowledge, which they are connected to somehow. Thus, central actors are presumably more aware of what is happening in the network (Perry-Smith 2006). Consequently, a peripheral position in a network may not be desirable, unless there is also an access to many external connections (Perry-Smith & Shalley 2003). High centrality may influence knowledge variety, as the knowledge of the central actors may become increasingly valued, and decrease the willingness to new information acquisition (Wong 2008). Some of the centrality measures include degree centrality that measures node’s direct ties to others, closeness centrality that measures the independent contact with others, and betweenness centrality that refers to the relational control of information over actors who do not have direct tie between each other (Brass & Burkhardt 1993).

*The degree centrality* concerns an approximation of an actor’s access to the various knowledge sources by quantifying the number of ties to other actors within the network. One interpretation of this measure is that actors with a high degree have greater power and opportunities within the network as they have
less reliance on any specific actors (Chan & Liebowitz 2006). High nodal degree may enable the access to information, but requires also effort to maintain the established ties (Lyles 2015). However, the number of ties does not directly correlate with an actor’s position within a network, but the position in the overall network, beyond the direct ties, is also important (Brass 1984). The actor might only be central in its own neighborhood, or among actors, who are disconnected from the network as a whole (Chan & Liebowitz 2006). Because of this, it is essential to measure the centrality in various ways. The degree centrality can be calculated with Equation 3.2 by Freeman (1978):

$$
\delta_i^{\text{DEG}} = \sum_j a_{ij}
$$

(3.2)

*The betweenness centrality* is interpreted to indicate an actor's ability to control the other actors' access to all parts of the network, measuring how often a node is positioned on the shortest path between two other nodes (Freeman 1978). For example, central actors may be considered as gatekeepers, by being able to manipulate or bias communication in the network due to their relational position (Rowley 1997). In the discussion of knowledge flows in planning processes, betweenness centrality can be seen as essential measure. If the knowledge flows can easily be manipulated or biased by few central actors, the reasoning and credibility of the plan may be challenged. Borgatti (2005) has suggested an equation for the betweenness centrality, shown in Equation 3.3, measuring the number of times that the information reaches a node. In the equation $b_k$ is the betweenness of node $k$, $g_{ij}$ is the number of geodesic paths from $i$ to $j$, and $g_{ikj}$ is the number of shortest paths paths from $i$ to $j$, passing through node $k$.

$$
b_k = \sum_{ij} \frac{g_{ikj}}{g_{ij}}
$$

(3.3)

*Closeness centrality* measures the shortest possible distance between one node and all other nodes. In particular, closeness centrality may be seen to evaluate an actor’s capability of reaching independently all other actors in the network (Freeman 1978), with the central actors having the shortest distances to other actors (Rowley 1997), and being less dependent on the intermediary actors. Low closeness centrality refers to the high dependency on other actors for reaching all parts of the network (Rowley 1997). Thus, one interpretation of the measure is that the actors with high closeness centrality are more aware of what happens in the network, and can adapt their work accordingly. In Equation 3.4, a larger value indicates less centrality for a given node (Borgatti & Everett 2005):
85

\[ c_i^{CL.0} = \sum_j d_{ij} \]  

(3.4)

**Affiliation network analysis**

Bipartite networks connect two different sets of nodes, and are utilized typically, for example, in the analysis of academic collaboration networks (e.g., Newman 2001; Barabási et al. 2002). When a bipartite network represents groups and their members, it can be called an affiliation network (Latapy et al. 2008). An affiliation network consists of two types of actors (in this research the actors and the thematized meetings, in which they attended) and their ties over time. In the affiliation analyses, actors are only connected through the thematized meetings. Consequently, a tie is formed between an actor and a theme, when an actor has participated in a meeting with a specific theme. Figure 18 represents an example of a simple affiliation network structure, in which the actors (the purple circles) are connected to the thematized meetings (the grey circles) with the ties (the black lines). Direct ties between actors are not established. In the network graphs presented in the findings, the size of the nodes varies depending on the measures used, and the strength of ties represents the intensity (i.e., how many times an actor has participated in the meetings of a certain theme).

![Figure 18. Example of an affiliation network structure, where nodes represent two different types (actors and meetings).](image)

Process analysis should be connected always to the context and content of the process for providing thorough explanations of the changes happening over time (e.g., Pettigrew 1997; Dawson 1997; van de Ven & Huber 1990). Consequently, the networked dynamics of the process were analyzed in relation to the thematic contents of the process through an affiliation network analysis, linking the actors with the themes, which were discussed. Thus, it is expected that the thematic affiliation network analysis enables the understanding of how the various general and sectoral themes link together, and how the actors are positioned considering the different themes.
Most of the measures in social network analysis are developed for one-mode networks, requiring the transformation of bipartite networks into one-mode for enabling their analysis (Opsahl 2013). Consequently, the basic measures of the bipartite graphs are derived directly from one-mode statistics (Latapy et al. 2008).

In-degree analysis was utilized to link the two sets of nodes, the actors and the thematized meetings in which they participated. There are no established ways of analyzing the strength of actor relations linking various themes for knowledge flow purposes, so the methods have been applied from the one-mode analyses. The in-degree of a node, \(d_i(n_i)\), is the number of nodes that are adjacent to \(n_i\), that is the number of ties ending at \(n_i\) (Wasserman & Faust 1994, p. 126). In the analysis, the directed ties go from the actors to the meetings, representing their attendance in the various themes during the phases. Consequently, the in-degree of the actor nodes do not score values, as the nodes are connected only through the various themes. The in-degree of a thematic node represents the amount of times the various actor nodes are linked to it during an interval of time. The in-degrees were analyzed in two ways. First, the cumulative in-degrees were calculated within each phase for measuring the amount of in-degree ties connected to each theme. One actor node may be connected to a certain theme more than once during one interval, creating a stronger in-degree tie to the theme. This analysis represents the relative importance of each theme during the various phases. Second, the unique in-degrees were calculated in order to depict the number of the unique actor nodes related to each theme during an interval of time. Each in-degree tie between an actor node and a thematic node scored either one or zero during one interval of time. This enabled more in-depth analysis of how many individual actors were tied to the themes during an interval, and how many themes they were connecting with one another during the interval. This analysis is important for understanding the possibilities of knowledge flow between the various themes, and the width of the possible process memories during the process.

**Ego network analysis**

For analyzing the differences between the documented cumulative network, the documented ego network, and the memorized network, two anonymized interviewees were utilized as illustrative examples. As the interviewees were not able to explain the evolution of the process over time, but as an entity, the cumulative ego network structures for the whole duration of the process were utilized. The documented cumulative networks contain the whole network duration, including all actors during the process. The documented ego network illustrates in grey all of the nodes, with which the specific actor had direct contact during the
whole process. However, the analysis does not show the ego network in a traditional way with only the nodes belonging to the immediate contacts of a selected actor. For enabling the comparison between the three network images, the immediate ego network contacts are depicted as a part of the whole network structure. Finally, the memorized network is compiled based on the interviews, showing in grey the actors that were pointed out in the individual interviews either by name or by some other identifiable factor (e.g., “the actors participating in a certain investigation”).

**Summary of the utilized measures**

Summary of the measures and data tables utilized in the social network analysis are presented in Table 3. In addition, the measures, which are presented in the findings, are highlighted.

Table 3. Measures and data tables utilized in the social network analysis. The measures, which are presented and validated in findings, are highlighted in grey. Other analyses can be found in Appendices 6–9.

<table>
<thead>
<tr>
<th>MEASURE</th>
<th>DEFINITION</th>
<th>DATA TABLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network size</td>
<td>Measures the number of actors involved in the meetings during a period.</td>
<td>Actors, ActorsInActivities, Activities</td>
</tr>
<tr>
<td>Modularity</td>
<td>Measures how a network decomposes into communities. A high modularity score indicates a structure, where the network is compartmentalized into multiple subnetworks.</td>
<td>Actors, ActorsInActivities, Activities</td>
</tr>
<tr>
<td>Number of communities</td>
<td>Measures the amount of subnetworks within the network.</td>
<td>Actors, ActorsInActivities, Activities</td>
</tr>
<tr>
<td>Network density</td>
<td>Measures the relative amount of ties that are present in a network, and how close the network is to complete.</td>
<td>Actors, ActorsInActivities, Activities</td>
</tr>
<tr>
<td>Degree centrality</td>
<td>Measures the number of ties that are adjacent to a node.</td>
<td>Actors, ActorsInActivities, Activities</td>
</tr>
<tr>
<td>Betweenness centrality</td>
<td>Measures the number of shortest paths between two nodes, passing through a third node.</td>
<td>Actors, ActorsInActivities, Activities</td>
</tr>
<tr>
<td>Closeness centrality</td>
<td>Measures the shortest possible distance from one node to all other nodes.</td>
<td>Actors, ActorsInActivities, Activities</td>
</tr>
<tr>
<td>Cumulative in-degree</td>
<td>Measures the cumulative number of in-degree ties to a certain theme.</td>
<td>Actors, ActorsInActivities, Activities, ActivityThemes, ActivityNotes</td>
</tr>
<tr>
<td>Unique in-degree</td>
<td>Measures the number of the unique actor nodes related to each theme during an interval of time.</td>
<td>Actors, ActorsInActivities, Activities, ActivityThemes, ActivityNotes</td>
</tr>
</tbody>
</table>

### 3.3.3 Limitations

SNA, as a method, has its own limitations. Consequently, methodological triangulation was applied in this research. Some of the most prominent limitations of SNA as a method are discussed here. Other limitations of the research design are discussed later in discussion. First, SNA, as a form of quantitative analysis, is more capable of measuring the form, and not the content, of the actor-relations (Schipper & Spekkink 2015). SNA is able to reveal the relational network structures, but may lack the explanatory capabilities in revealing their meaning.
for the processes. When mixed with qualitative methods, such as individual interviews, the reasoning and explanations behind the networked structures can be understood better. It can be expected that networks can be understood best by a mixed methods approach instead of relying solely on quantitative or qualitative methodology.

Second, questionnaires, interviews, and observations are the most ordinary methods of data collection in SNA (Wasserman & Faust 1994). The challenge of these methods is that people are usually not good at remembering or describing their own interactions over periods, but report the stable long-term structures of their social networks (Wasserman & Faust 1994, p. 57). When studying process dynamics over time, the traditional methods have to be complemented with methods that allow the recollection of interactions beyond actor memories for example through the collection of time-series data.

Third, the application of SNA requires the identification of the unique nodes and their ties for constructing a network. For example, in this research, the resident data did not allow the identification of the unique nodes. Consequently, the resident data was ignored in the SNA, which has partly biased the SNA findings. However, the phases of most intensive resident participation have been acknowledged based on the other process documentation, when presenting the SNA findings.

3.4 Individual interviews

The SNA findings were validated through a series of individual interviews with actors who had participated in the analyzed process. In addition, the process memories were discussed in the interviews. Interviewing as a method has particular strengths and limitations (Marshall & Rossman 1995, p. 80). By interviewing, large amounts of in-depth information can be gathered with the possibility of having immediate clarifications. Interviews are prone to personal interaction. For that reason, a certain amount of trust and willingness to collaborate are essential for getting valuable information, and ensuring the quality of the information. Individual interviews are a traditional method also in planning research (e.g., Grange 2013, 2017; Sehested 2009; Mäntysalo et al. 2015).

The individual interviews supported, for example, in assessing the validity of the SNA findings. Eleven semi-structured and confidential interviews were organized with actors, who had participated in the analyzed strategic spatial planning process. The interviewees were selected based on their intensity of involvement in the planning process in order to ensure the quality of the information based on their breadth of experiences within the process. When contacting the
interviewees, many pointed out their doubts of whether they would know anything worthwhile about planning processes, despite their diverse and daily experiences of various strategic spatial planning, and related, processes. In addition, one interviewee was doubtful of why processes should be discussed at all, as they are all too theoretical to be discussed, and not very relevant for planning practice. In the invitation, it was specified only that a process in which they have been involved, would be discussed. The specific process was not yet named for ensuring the anonymity of the process.

The interviews served as a valuable source of information for validating the usability of SNA in a planning context, and for understanding the possible limitations and benefits of the data and the methods. Validity deals with the question of whether the research instrument measured what it was intended to measure (Gray 2009, p. 155). The interviews were carried out based on Gillham’s (2005) instructions for semi-structured interviews and conducted with a set of questions, which is presented in Appendix 3. Ten of the interviews were conducted face-to-face, and one was done as an email interview. The face-to-face interviews lasted from 45 min to 1 h 30 min, and the email interview lasted approximately one week with the questions and answers delivered in multiple parts during the week. All of the face-to-face interviews were recorded and transcribed. All interview data has been treated anonymously. The interviews were conducted in Finnish, and parts of the interviews were translated into English to preserve the anonymity of the participants, and to provide examples of the discussed themes. The quotes from the individual interviews may have been revised slightly not to reveal the identity of the respondents, and other actors. Regarding the contents, the meanings have not been changed.

The individual interview protocol was divided into two parts: the retrospective process memory of the interviewees, and the validation of the social network analysis findings. The protocol left also room for other emerging thoughts during the interviews. By dividing the interview protocol into two main parts, the possibility that the SNA findings would affect the process memory, were excluded. Part of the questions between the two parts were linked for enabling the comparison of the memory-based, and the SNA-based, findings. First, before the SNA findings were shown, the memory-based process description was discussed through a series of questions concerning the analyzed themes, as the interviewees memorized the process. Thereafter, for analyzing the validity of the findings, the themes were discussed one at a time by showing the SNA findings, and discussing the possible similarities and contradictions with the answers in the first set of questions. The second part of the interview was important for understanding the reasons for the possibly varying findings. If the retrospective answers would have differed from the SNA findings, there might have been at
least two reasons for this. The SNA might have produced biased results, or the
interviewee’s memory of the process might have been partly inadequate. As the
actors had participated in the process with considerably varying intensities, it
was expected that their memory concerning the process would differ and would
not be consistent over time. None of the actors in the process participated in all
of the meetings during the process. Consequently, it was presumed that their
answers would vary from each other, and from the SNA findings. For this rea-
son, it was important to discuss the differences for understanding their causes.

Apart from the validation aspect, the interviews allowed also a more thorough
understanding of the possibilities of SNA in supplementing the more traditional
process analysis methods through the comparison of the results between these
two methods. In addition, the interviews supported the process analysis by al-
lowing more in-depth explanations of the reasons behind the findings of the
SNA. The interviews were analyzed through content analysis with a focus on
identifying the phenomena rather than on individual answers.

3.5 Focus group interviews

For testing the applicability and relevance of the SNA findings, a series of focus
group interviews with experts working in and around strategic spatial planning
processes in the municipal level around the Helsinki Capital Region was orga-
nized. Focus groups have been utilized in planning related studies before, for
example, by Folkeson et al. (2013), who identified the focus group methodology
as a suitable way for understanding the differences in the experiences concern-
ing the daily activities in planning practice. In addition, Campbell and Marshall
(2002) have studied values and professional identities of practicing planners
with focus groups.

Focus groups are a group interviewing method with research focus, allowing
interaction between the interviewees, and being facilitated by an interviewer
(Morgan 1996), in this research by the researcher. Focus group interviewing is a
special technique traditionally for groups of approximately 4–10 people (Mar-
shall & Rossman 1995), but the quality of the groups is more significant than the
quantity of the interviewees. In focus groups, the same protocol is repeated with
multiple groups for identifying the trends in the expressed opinions (Morgan
1996). Due to their interactive nature, focus groups are sensitive to group dy-
namics, and to the behavior of the interviewer. Not all topics can be discussed
openly in group settings, if they are too sensitive. A safe and permissive atmos-
phere is essential for the interviewees to speak freely, and it is important to form
groups, which allow open and genuine discussion among the participants. Often
the questions in a focus group protocol are simple (Marshall & Rosmann 1995),
and the value comes from the group’s ability to discuss the various viewpoints simultaneously, allowing the reflection of the various perspectives during the interview. Focus groups allow also the exploration of the complex motivations, as the participants have to take into account each other’s perspectives, and explain themselves to one another (Morgan 1996). According to Morgan (1996), important in assessing the quality of focus group data is to present enough background information of the utilized protocol and the participants.

Three focus group sessions were arranged for testing the applicability and relevance of the SNA findings in the context of Finnish planning practice. Further, one individual interview with the same protocol was conducted. Thereafter, no need for new focus groups was evident, as the four interviews already produced similar findings. The duration of the sessions was approximately between 1 h 30 min and 2 h. The interviews were conducted with a set of questions and procedures, which are presented in Appendix 4, and focused on the SNA findings, and their applicability for process memory and process development purposes. With the set of questions, the comparability of the results between the various focus groups and municipal planning organizations was enabled. The sessions included a short presentation of the research followed by a discussion, which was supported by visualizations of the SNA findings. The interviews were recorded and transcribed. All interview data has been treated anonymously. The focus group sessions were conducted in Finnish, and parts of the interviews were translated into English to preserve the anonymity of the participants, and to provide examples of the themes discussed. The quotes from the focus groups may have been revised slightly not to reveal the identity or organization of the respondents or other actors. Regarding the contents, the meanings have not been changed.

Based on practical experience, strategic spatial planning processes may include various frictions, moments of success, undesirable surprises and other abruptions, which may affect the participants in many ways. As was expected, the focus group interviews also exposed memories of the past and ongoing processes. Thus, a safe and permeable atmosphere was an important precondition for the focus group design. The participants should feel comfortable with discussing their views in a group without feeling vulnerable or threatened. Consequently, instead of group size, the group composition was identified as a primary factor for achieving a safe atmosphere for the participants to discuss freely. The participants were divided to the focus groups according to two factors in order to enable the generation of a safe atmosphere in the focus group sessions. First, all participants within a focus group had to know each other in advance, and have experience of working together either in a same unit or in a same working group. Second, all participants within a focus group had to work
within a same municipal organization with each other for decreasing the risk of ending up into potential process related differences and possible contradictions between the various municipalities. The number of participants in the focus groups varied from two to 15, in addition to the complementary individual interview, depending on the planning organization, and on the composition of the group. In total, 23 interviewees participated in the focus group interviews. They represented a variety of professionals, working in and around strategic spatial planning processes in the municipal planning organizations in the Helsinki Capital Region. Their roles varied from architects, planners, sectoral experts and technical drawers to various managerial positions, offering a wide array of insights into the processes and their development needs.

3.6 Research ethics

The data, which has been utilized in the research, has been completely confidential and anonymized. The priority has been to protect the privacy and anonymity of the actors for avoiding any harm to the actors involved in the research. The time series data was generalized and anonymized to a level, which does not allow the purposeful identification of the process or the actors. In addition, during the transcription of the individual interviews and focus group interviews, all names and other affiliation information was removed from the answers. For the same reason, the applied analyses have been selected based on protecting the privacy and anonymity of the actors, and the process. Because of this, for example ANT was limited out of the scope of this research, even as its potential for revealing complementary insights of the process was identified. For being understandable, ANT-based analyses would have required the disclosure of some of the non-human elements, and these would not have matched the established anonymity requirements.
4. The planning context of Finland

4.1 The Finnish planning system as a part of the Nordic context

This research analyzes a planning process in the Finnish planning context in one of the municipalities in the Helsinki Capital Region, as is shown in Figure 19. There is a need for recognizing the political, historic, socio-economic, and cultural cultural contexts as something that frame the direction of a planning process (Othengrafen 2010, Nadin & Stead 2008). Planning systems have traditionally differed much from each other already within Europe (Healey & Williams 1993), and are not directly comparable due to the inherent differences. As Hytönen (2016) has pointed out, planning works very differently in various contexts due to the varying origins of legitimacy of public planning. The Nordic countries are characterized by the strong role of local authorities, and by the close integration of central and local governments (Baldersheim & Ståhlberg 2002). The Finnish planning system works within the model of a Nordic democracy. The roots of democracy in the Nordic welfare states are not considered only national, but are seen as pan-Nordic (Stenius, 2012, p. 216).

Planning is a central element in the Finnish urban development system. Municipalities hold a planning monopoly, even though the planning processes still involve a diverse set of private and public actors. The Finnish planning legislation guarantees the municipal planning organizations a powerful position, even though the role of the private sector has increased during the last few decades (e.g., Kangasoja & Mattila 2017; Määttänen et al. 2011). In Finland, land use planning is traditionally an obligation of the local authorities. In Finland, public planning organizations are typically responsible of tasks, which in many other contexts belong to the private sector (Mattila 2017), such as some design tasks. Most of the spatial plans do not have to be validated by the central government agencies anymore (Baldersheim & Ståhlberg 2002). However, the regulation allows the use of various response mechanisms to planning processes during, and after the processes. Possibilities of consultation and participation have been approved in the legislation, and if needed, review can be performed still afterwards in the administrative courts (Baldersheim & Ståhlberg 2002).
In the macro-regional perspectives of European spatial planning, Finland is situated within the Nordic context, which highlights the communicative nature of planning (Plurel 2010). However, there are differences already within the Nordic context. Nadin and Stead (2008) have made a review of the various classifications of social models in European countries noticing that Finland and Sweden belong consistently to the Nordic, Scandinavian and social democratic categories, whereas other countries typically appear with different countries in the various categorizations. Most of the classifications of different planning systems are already old, and considering the continuously changing context, may be partly outdated. For example, Newman & Thornley (1996) have suggested a grouping of planning systems into five planning families: Scandinavian, German, Napoleonic, British, and East-European. In 1997, the European Commission published the Compendium of spatial planning policies and systems in the European Union (1997), identifying four groups of planning traditions: the regional-economic approach, the comprehensive-integrated approach, the land-use management, and the urbanism tradition (Nadin & Stead 2013). Within the comprehensive-integrated category, there are two subcategories: the Nordic states where municipalities share the responsibility with the national level, and the federal states, where the federal states have a more powerful role (Farinós Dasi 2006).

In Finland, the institutional trust in planning, and autonomy of local governments, have traditionally been strong (e.g., Puustinen et al. 2017a; Hytönen 2016; Svallfors 2013). The administrative plan preparation and the political decision-making processes are well trusted, when compared with other European countries (Othengrafen 2016). Public rules and norms, such as plans, reach high legal commitment, and illegal development is rare (Othengrafen 2010). Statutory spatial planning in general has a strong position in Finland (Lapintie 2015, p. 32). According to Lapintie (2015, p. 32), the Finnish planning system originated in the age of stable growth and rational structure, and was not designed to cope with the emerging complexities of current times. The trust in the comprehensive planning system has been questioned due to the long duration and bureaucracy of processes (Mattila 2017).
4.2 The regulatory context of planning

In the Finnish context, urban planning and development processes are regulated most importantly by the Land Use and Building Act (132/1999), supported by a variety of other regulation. During the years, this legal act has been constantly renewed through a series of small-scale steps in order to deregulate the norms and procedures of urban development processes. However, it has also been suggested that the Land Use and Building Act does not strictly regulate how to organize a planning process (Valtonen et al. 2017), but offers more target-oriented guidance of sustainable development, participatory planning, and favourable living environments. At the moment, the act is being re-evaluated. In addition, some of the largest Finnish cities are currently re-organizing their planning processes and practices. Consequently, there is an opportunity for learning and process development.

The Land Use and Building Act was originally aimed at decreasing planning bureaucracy and increasing performance, allowing opportunities for local interpretations and emphasizing public participation (Puustinen et al. 2017a). Thus, the act has formalized the participation of various actors by the regulation about involving them in the planning processes, and planning the interaction processes. This has given various actors an official position as part of the planning processes, affecting also the structure of the processes. The act regulates participation in planning processes with the intention to “ensure that everyone has the right to participate in the preparation process, and that planning is high
quality and interactive, that expertise is comprehensive and that there is open provision of information on matters being processed” (Land Use and Building Act 132/1999 § 1). The law further regulates that “Planning procedures must be organized and the principles, objectives and goals and possible alternatives of planning publicized so that the landowners in the area and those on whose living, working or other conditions the plan may have a substantial impact, and the authorities and corporations whose sphere of activity the planning involves (interested party), have the opportunity to participate in preparing the plan, estimate its impact and state their opinion on it, in writing or orally” (Land Use and Building Act 132/1999 § 62). In addition, a participation and assessment plan has to be done.

The current legislation sets some criteria for the strategic spatial planning processes (i.e., local master plans in this case), considering for example planning phases and documentation, and public participation. The Land Use and Building Act (132/1999) regulates that the objective of land use planning is "to promote a safe, healthy, pleasant, socially functional living and working environment which provides for the needs of various population groups, such as children, the elderly and the handicapped, through interactive planning and sufficient assessment of impact". In all municipal planning, the landowners and other interested actors have a right to participate in the preparation of the plans at certain periods regulated by law. In addition, municipalities may choose to involve the interested parties to the process at other occasions also.

4.3 The planning hierarchy

The Finnish planning system is hierarchical. The higher level plans (e.g., regional land use plans) steer the lower level plans (e.g., municipal land use plans), as shown in Figure 20. Nevertheless, in practice, the more strategic scales may also react to more local needs (Mäntysalo 1999; Mattila 2017). The Finnish planning system consists of three main levels: the regional plan, the local (municipal) master plan, and the local detailed plan, as shown in Figure 21. Regional councils are responsible for the regional land use plans. Municipalities have large autonomy and hold a local level planning monopoly, and prepare the local master plans and detailed plans by themselves or in collaboration with for example public authorities, residents and private property developers, ratified by politically elected local representatives. In Finland, municipalities hold a high degree of self-governance, and collect for example their own tax revenue from their citizens and enterprises, deciding on its use by the politically elected municipal council (Salo & Mäntysalo 2017, p. 128). In addition, all of the planning levels are steered by the National Land Use Guidelines, which are outlined by
the state. The regional and local master planning levels are more strategic in nature. In addition to the regional and municipal planning authorities, the Centres for Economic Development, Transport and the Environment supervise planning on the regional and municipal levels.

The national land use guidelines concern the nationally important interests, which should be considered on the regional and municipal planning levels. There is no national plan for the whole country, but the national land use guidelines cover aims concerning, for example, functioning communities and sustainable traffic, efficient transport systems, healthy and safe environment, viable natural and cultural environment and natural resources, and energy supply.

The national land use guidelines have to be considered at all planning scales. Regional plans are generally legally binding, and present policies of land-use and urban structure. They are drafted by regional planning authorities, and approved by a regional council. In addition, on a metropolitan level, other kind of agreements may be established, such as the MAL agreement concerning land-use, housing, and transport planning), which is an agreement between the government, and municipalities in the Helsinki Metropolitan Area. Regulated by law (132/1999 §35, §37), the objective of a local master plan is to supply general guidance regarding community structure and land use of a municipality, presenting the principles of the targeted development and indicating the areas required as a foundation for detailed planning. The plan is typically legally binding. The local master plan is approved by the local council and offers a more strategic tool for planning wider areas, whereas the local detailed plans describe the detailed organization of land use, building and development by designating areas necessary for various purposes as required by local conditions, townscape and landscape and good building practice (Land Use and Building Act 132/1999 § 50, § 52). Local detailed plans are legally binding. In addition to the legally binding planning instruments, municipalities typically apply a variety of non-legally binding instruments.

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Figure 20. The Finnish land use planning system is hierarchical with the more strategic level plans steering the more detailed planning levels.

Figure 21. An example (from Jyväskylä⁴, outside the Helsinki Capital Region) of the various planning scales.

4.4 The Finnish planning practice

The research of the Finnish planning system has mainly discussed the detailed (e.g., Valtonen et al. 2017; Mäntysalo & Saglie 2010; Hurmeranta 2013; Rinkinen 2007; Rinkinen & Kinnunen 2017) and the regional (e.g., Mäntysalo et al. 2014a; Mäntysalo et al. 2014b; Mäntysalo et al. 2015) scales of planning, leaving the discussion on statutory strategic spatial planning on the municipal scale scarce (e.g., Tuomisaari 2015), apart from some governmental reports (Laitio & Maijala 2010; Koivu et al. 2013; Holopainen et al. 2013; Hastio et al. 2018). In 2010, the Ministry of the Environment published a report of the best practices in the strategic spatial planning and development on the regional and municipal levels, aiming at increasing discussion of the relevant factors of the future land use planning (Laitio & Maijala 2010). The discussion focused mainly on the reconciliation of the interests influencing land use, the information basis of planning decisions, and the commitment to the decisions made, acknowledging that there is not one particular correct way of conducting strategic spatial planning, but it can be carried out in context-dependent manner through a variety of methods and frames. In 2013 and 2018 the report was complemented by reviews (Koivu et al. 2013; Hastio et al. 2018) displaying Finnish local master planning processes.

Along with the strong status of municipal planning, the role of municipal planners has traditionally been seen relatively strong in Finland, as the “guarantors of public interest” (Puustinen et al. 2017b, pp. 83–84). However, the professional autonomy of the planners has decreased since the 1990’s as various other actors have entered the planning processes (Puustinen et al. 2017b). The communicative turn has increased the planner’s role as a facilitator of the interactive processes, but also requiring attention on the equal informing and on shaping attention of the participants in the processes (Puustinen et al. 2017b). Thus, planning requires the skills to bring together various expertise. As Healey (2009, p. 452) has suggested, spatial strategy making demands skills of “a capacity to know a place in all its complexities”, “an imaginative capacity to see opportunities”, “intellectual and political courage to engage in synthetic thinking”, and “a capacity for judgement”.

The challenges and needs of planning practice and education in Finland have been discussed further in a recent report (Norvasuo 2017b). In the largest Finnish municipalities, the proportion of planners having architectural education has been considerably high (Puustinen et al. 2013, p. 28). However, the variation of the educational backgrounds has been typically wider in strategic spatial planning than in detailed planning (Norvasuo 2017a). Furthermore, the study concludes that all municipalities are unique in such a way that the education is not able to provide tools for their specific substantive challenges (Norvasuo 2017a).
Instead, much of the substance-related professional skills are learned in practice. As pointed out also in the research of Kangasoja et al. (2010), architectural education as a form of planning education has had its challenges, stated by the practicing planners in Finland. For example, the education has been criticized for leading to “a restricted artistic expression”, “hindered creative capacity”, and “narrowness and only ‘one truth’ at a time” (Kangasoja et al. 2010, p. 33). In addition, the lack of collaboration with the other fields and the inability of understanding real life complexities have been pointed out as being “purified of the messiness and complexity of real life” and “estranged from the societal context and practical challenges planners face in their everyday work practice”. Based on these, the education have seemed to lack some of the aspects, which have been named as important in current planning practice: the understanding of complexity, and the ability of multidisciplinary collaboration. As Brooks (2002, p. 18) has suggested, "Public sector planning practice might be less daunting, however, if students were given more instruction and hands-on experience designed to familiarize them with the nature of such practice". Thus, the students should receive already during their studies a more concrete picture of the planning profession in addition to a set of skills meeting the requirements of the profession.
5. Findings

Building on the conceptual framework and the methodological choices, this section outlines the findings of the study. First, findings to the first research question are described by presenting the dynamics of the networked process structures based on the SNA findings, and on the validation of the four selected measures. Next, findings to the second research question are discussed by presenting the effects of the networked dynamics on process memory development based on the individual and focus group interviews. Finally, findings to the third research question are described by presenting the applicability and relevance of the findings for the planning practice, based on the individual and focus group interviews.

5.1 Dynamics of the networked process structures

**RQ1:** “What can social network analysis contribute to the understanding of the emergent properties of networked process dynamics with the utilization of longitudinal time-series data?”

5.1.1 Dynamics of the network structure with degree centrality

*SNA findings*

When the process network was considered as a cumulative snapshot in the end of the process, as is shown in Figure 22, it formed a typical core-periphery structure with two more densely connected subnetworks. The upper subnetwork was characterized by one considerably central node (measured with degree centrality) in comparison to the other nodes, whereas the lower subnetwork was more equal. However, this representation of the network at only one point in time does not reveal the longitudinal dynamics of the network evolution during the process.
Dividing the process into intervals of approximately two months allowed the detection that the network structure was in a constant change. From Figure 23, one can conclude that the pattern did not stay stable from one phase to another, but was continually evolving through periods of more or less activity. Moreover, the network shape was not tied to a certain phase of the process (e.g., beginning/middle/end of draft phase), but was influenced by a multiplicity of procedural and external factors over time. In some phases, the network formed a balanced structure, whereas some phases had more modularity within the network. Still, even the balanced structures had variation from phase to phase. In most of the phases, there was a core team forming a central cluster of people with a varying...
number of actors forming a ring around them with more or less modular structures. The size and density of the core team varied, as did also the centrality of the core team members. The graph represents ties the weighted with their strength (i.e., the number of times the two actors have met each other in a certain phase, based on the documentation).
Figure 23. Dividing the process into periods of approximately two months shows the diversity of emerging network structures over time. The network evolved in a non-linear manner over the goal-setting (G1...G6), draft (D1...D4), proposal (P1...P9), and ratification (R1...R6) phases. The nodes are weighted by degree centrality.

The first phase, the goal-setting phase (G1...G8) was the beginning stage of the process. In this phase, the objectives were jointly discussed with the actors, who represented various roles. In the end of the phase, the elected officials decided the official goals of the plan. In G1, the municipal civil servants were mostly from the more detailed planning levels. There were no strategic spatial planners involved. In addition, the representatives of the major landowners and consultants were participating. The network structure was complete, and every actor was connected to each other, as all active actors participated in all meetings during the phase. In G2, the managerial level of the strategic spatial planning unit
joined the process. In addition, more major landowners and their consultants entered the process. The network structure began to form a more centralized structure with slightly less peripheral outer ring of actors. In G₃, the actors forming the core team in the following phases began to join the process along with a multiplicity of other actors from the strategic spatial planning unit, which was officially responsible for the plan. The official decision to start the planning process was made in this phase. In the network structure, the actors began to have various levels of centrality. The more detailed planning levels were still centrally involved in the network. The core consisted of twelve actors of various roles, three of them representing formal decision power in the process. In G₄, more landowners joined the process, along with some other landowners exiting from the process. A core team began to show up in the network structure with still a multiplicity of actor roles involved. In addition, there was a clear and dense subnetwork of actors representing various roles.

In G₅, the transportation planners joined the process. The density of the core team decreased, and the network structure became more balanced. In G₆, the elected officials of the City Planning Committee joined the process to decide on the goals of the plan. In addition, a resident meeting was arranged, although it is not presented in the network graph. The core team was still visible in the network, but there was also a central actor working as a link between the elected officials and the rest of the network. In G₇, the process was waiting for the official decision about the goals (to be made in G₈), and there was not much activity in the phase. In G₈, the elected officials of the City Board joined the network to make the final decision of the goals of the plan, seen as a completely separate subnetwork in the graph. In the main network, the core team was dense. One plan-related investigation was initiated, and consequently, a group of consultants joined the process. In addition, a public authority meeting was held, and its participants can be seen as a dense subnetwork in the graph.

In D₁, the process moved on to the draft phase (D₁…D₄) in which the first draft of the plan was done, and put for a public review. In D₁, the network structure seemed balanced, and there was a central team bridging together the various subnetworks and peripheral actors. Various levels of planning were still represented in the core team. Representatives of the environmental department joined the process, and some actors from the landowner organizations exited. In D₂, the structure of the network stayed balanced. In D₃, the first consultant work was finalized, and consequently, the consultant group exited the process. A second investigation was commenced, and a new group of consultants entered the process. Various municipal experts joined the process to address the different themes (e.g., public services, nature and recreation). The network structure
was divided into multiple subnetworks with a central team and various individual actors linking the parts of the network together. In D₄, the network was divided into a clear subnetwork in addition to some peripheral actors, which were linked together by a core team. At this stage, the representatives of the various planning levels moved to the fringes of the network, and the strategic spatial planning representatives were leading the process. Elected officials of the City Planning Committee, seen as a clear subnetwork in the graph, joined the network to decide, for example, of setting the plan draft for public review. In addition, various municipal investigations were finalized.

In P₁, the process advanced to the proposal phase (P₁…P₉) in which the draft was developed further, based on the given opinions and statements. In P₁, the draft was on public review, and a municipal investigation was commenced. Thus, there was not much activity in this phase, and the network structure was considerably simple. The two main representatives of the core team are clearly identifiable in the graph, surrounded by a network of more peripheral actors. In P₅, an investigation was finished, and the consultant group exited the process. In addition, a resident meeting of the draft was held (not shown in the graph). A core team of two persons, instead of the larger core team in the previous phases, began to show up. In P₃, the elected officials of the City Planning Committee joined the process to decide of the objectives for the plan proposal, and can be seen as a clear subnetwork in the graph. One more investigation was commenced. The representatives of the other planning levels stayed in the fringes of the network. In P₄, there was not much activity, and the structure seemed simple. In P₅, one consultant-made investigation was commenced, and the group of consultants joined the process. In addition, two investigations were finalized. The established core with two actors remained stable.

In P₆, one more consultant-made investigation was commenced, and five other investigations were finalized. The network structure remained similar to the previous phase. In P₇, a plan-related initiative was made by the elected officials, causing an unexpected disturbance in the process. The initiative was discussed by two groups of elected officials, seen as dense, but separate, subgroups with an own core team in the graph. In addition, one investigation was finalized. In P₈, more elected officials joined the process to discuss the made initiative, seen as a dense but peripheral subnetwork in the graph. Three investigations were finalized, and the consultants, who had involved in those, exited the process. The structure of the main network remained similar with the previous phases. In P₉, the elected officials of the City Planning Committee and the City Board decided on putting the plan proposal for public review. In addition, the elected officials of the City Council discussed the initiative of P₇ and P₈. Three more investigations were finalized. The network structure was dispersed due to
the various actors participating in the process. There was one central actor bridging together the two main parts of the network.

In R₁, the process moved on to the ratification phase (R₁...R₆) in which the proposal was finally approved. In R₁, the proposal was in public review, and there was not much activity in the process. In addition, a resident meeting of the proposal was held (not shown in the graph). The structure of the network was dispersed, and there was not anymore a central core team visible in the graph. In R₂, the statements of the plan proposal were received, and the municipal civil servants representing the specific expertises joined the process accordingly. More detailed levels of planning were not anymore visible in the network. In R₃, the network structure seemed balanced, but centralized. There was not much activity in the process, and minor alterations were made on the plan. In R₄, the situation stayed similar. In R₅, the elected officials of the City Planning Committee approved the plan, seen as a clear subnetwork in the structure. Otherwise, the structure was dispersed, and there was one central actor bridging together the various parts of the network. In R₆, the elected officials of the City Board and the City Council approved the plan, and all of the remaining actors left the process.

Some of the network dynamics can be explained by externalities (e.g., initiatives concerning the specific area), but much of the dynamics can also be explained by organizational rules and routines. For example, the subgroups in the network were formed on different bases. Some were formed to complete a certain task (e.g., investigation), whereas others were formed more because of obligatory procedures (e.g., City Board), organizational traditions (e.g., steering groups), informal agreements (e.g., core team), or spanning the network for future purposes (e.g., collaboration with the more detailed levels of planning).

Memory-based descriptions of the actors
The question of the activities and changes during the process, and their relative importance for the direction of the process was considered generally challenging by the interviewees. The interviewees referred to the difficulty for example with expressions like “I have no idea... I was not that much involved, I cannot comment” and “Now I can only describe it for the part that I saw.” Many interviewees had challenges in pointing out certain activities over time. Instead, larger patterns of repeating activities were memorized. Consequently, also the description of the process dynamics over time was challenging for the interviewees.

Based on the answers, the interviewees related the amount of dynamics only to their own experiences in the process. Generally, there was not a wider awareness of the process beyond the actors’ individual experiences - considering the
networked dynamics. Consequently, an actor who was attending only in a certain pattern of activities was typically only aware of the dynamics within that specific pattern of activities. For example, an actor who had typically attended in the meetings with three other actors stated, “I think there were three people quite equally involved.” On the contrary, another one stated, “There were considerable differences [in the intensity of involvement].” Many interviewees claimed that they did not have general awareness of the process, as the meetings were usually rather limited in the number of actors, and mainly focused on an individual theme. For example, one interviewee suggested, “I do not remember any meetings with other people than the core team. There were no shared meetings with the other sectoral themes to discuss the issues.” One actor also claimed that this may have caused distrust between actors, as all were not aware of each other’s opinions and aims, as in “And then you do not know how much the others want to change your stuff, as there were not wider meetings for discussing the challenges together”.

Some interviewees approached the question with more rationalization, estimating what the network structures might have been due to the known organizational factors, even if they did not have memory of the exact structures. One interviewee described, “Considering how large the city organization is, there has to be subgroups. [...] Maybe it is more efficient to have different sectors for organizing the process”. In addition, it was suggested, “I guess there have been more frequent meetings for the core team. And more spontaneous meetings for the others”.

Generally, the more an interviewee had participated in the process, the better s/he was able to identify the various groups of actors, and their patterns of participation within the process. In the interviews, it was pointed out that certain sectoral themes were more frequently involved in the process than others, generating fluctuation in the interaction during the process. One interviewee described that “Well, I think it was clear that the mobility planners were very strongly involved. [...] In addition, the other sectoral experts were also important. But they were not present all the time”. Also, other planning levels were identified, as in “If I think about detailed planning, I think they were not very much involved. It was more about informing them. [...] There could have been more collaboration with them, actual planning”. One interviewee pointed out that the participation of actors outside of the municipal organization was too infrequent, and did not form a continuous process, suggesting, “How it seemed to me, there were nice resident workshops and actor workshops and meetings with the City Planning Committee. And everyone was met. However, they were all individual meetings. It was not a process, where the actors could plan as well. It was not that”.

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Most of the interviewees were easily able to analyze the networked structures and their possible explanations when they saw the SNA findings. Descriptions like “in that beginning phase it looks very systematic. And the further it goes, the wider it becomes” and “The beginning is like a spider web. Many participants. And quite equal interaction. And when it proceeds, there are these phases […] The proposal phase, there it converges. […] And then jumps into that phase and diverges again”. The graph-visualization technique was self-explanatory for the interviewees to analyze, and some of the interviewees were even able to recollect and point out certain phases of the process in which they had attended, after seeing the analyses. In addition, the analyses were described as an interesting way of describing the process. Expressions like “Okay, this is interesting!” and “This is an interesting way of approaching the topic. And surprising also” were common. Some interviewees pointed out that they were not used to reading network graphs, as in “I have to say that I am not used to seeing anything like these”. However, also those interviewees were able to connect the graphs to the certain operations in the process, and in planning processes in general.

Many of the interviewees pointed out that there were other simultaneous networked development processes going on in the planned area. For example, it was multiple times described that the landowners had their own network, occasionally encountering with the official strategic spatial planning process for generating development ideas to be implemented in the area. In addition, the municipal managers had their own networks for discussing the development needs of the area. Those parallel networks are limited out of this analysis.

Many interviewees were surprised of the SNA findings, as they contained many aspects, which the interviewees had not consciously thought about before. Expressions like “Oh yes, political decision-makers were also involved. I did not think about that” and “Looks like there is very much movement in the process” were ordinary. After seeing the analyses, many interviewees also commented that obviously they had not been aware of what was happening in the process. Remarks like “Looking at these, I somehow feel that I was not completely aware of everything that was going on”, “Like really? These are from the process? [Silence] Okay. [Silence]”, and “I did not expect that many people. Or maybe I was not able to expect anything. But I can easily imagine it went like this. However, this is surprising […] It looks like there were so many people involved. How can all that be organized!” were typical. In addition, after seeing the findings, some interviewees commented that maybe they should have been more aware and informed of the course of the process, as in “Maybe I should have known more of what was going on”.

5. Findings
Generally, there were no contradictions in the structures for the interviewees. Many interviewees pointed out that the findings described well the structure of the specific process as, for example, in “I think these describe the process as it was”, and “It describes the main characteristics of the process”. In addition, some interviewees pointed out that the findings may also be applied to same level processes in general, as in “As processes contain various phases in which various things are done, it seems only natural that the graphs look like this”, and “Generally I think this describes well a long-lasting planning process with various phases”. As there was a lack of memory for many of the interviewees, some of them were surprised of the findings, but stated that they can still identify the process in the findings. One interviewee, for example, suggested that: “That is possible. It is also surprising. But logical. I could expect this is exactly how it went. These seem familiar to me”. Furthermore, based on the analyses, some interviewees were able to recollect moments, which they had not remembered, like the dense interaction structures in the beginning of the process: “Okay, I did not remember that one. Okay!”

Some structures (such as G1, G8, P7, and P9) caught the attention of the interviewees and raised questions of what had exactly happened in the phases, like in “What has happened there (G8)? How can it be possible that they are so separated from each other!” In addition, some actors tended to rationalize the structures, reasoning why they have to be exactly like that in such a process. For example, in the case of the separated structures, which most actors described as being challenging for collaboration, one interviewee suggested, “As when there are these separate structures, these are maybe also like important parts of the process. That one has to withdraw. [...] It can be that this is a completely different phase, but one can apply these without knowing exactly”.

5.1.2 Dynamics of the network size

SNA findings

The amount of the actors, who were active in each phase changed continuously during the process, and there was a constant influx and outflux of actors, as shown in Figure 24. The amount of the active actors (present in a certain phase) varied from five (in P1) to 150 (in P9), increasing usually in the end of each consecutive phase (goal-setting, draft, proposal, ratification), as the elected officials joined the process. This did not happen in the draft phase, in which the decision was made by the City Planning Committee, which was relatively small. The amount of entries fluctuated in a stable way along the process, but peaked in G8 and P8, when the larger groups of the elected officials joined the process. In addition, the amount of exits fluctuated, peaking in G4 and P5.
The more actors with formal decision power within the planning organization, or the more elected officials there were involved in a certain phase, the less balanced the network structure was. For example, in G1 and R8, the number of actors with formal decision power was low compared with the actors with the lowest power, and the network structure seemed balanced. In G8, P8 and R6, the number of actors with formal decision power was high, and the network structure was divided clearly into various subnetworks, which were connected or sometimes even completely unconnected to the main network.

Figure 24. Variation of the network size during the process with examples of the network structure weighted with nodal degree. The network size changed continuously over the process with actors entering and exiting the process. Some actors stayed in for longer periods, whereas some joined for only one meeting (duration of the involvement in process is shown in Figure A5.3 in Appendix 5).

Some ties in the process were ad hoc in a way that they evolved only for carrying out a certain task, and did not last for the whole process. These kind of ad hoc networks were, for example, the various consultant-made investigations. Various organizations had different entry and exit plans for the process. Some organizations first sent a ‘scout’ to the meetings, finding out details about the process and its goals, after which they selected the right participants to join the process in the subsequent meetings. Some organizations had already experience of similar processes, and a clear understanding of who should join the process, or organizational codes of conduct of who should be present, and they sent in the right actors already from the beginning. Finally, some organizations came in with a wide group of actors, and then decided who should stay in the process, and who should exit. In addition, there was natural fluctuation among the actors due to personnel turnover, ad hoc needs during the process, actors substituting each other for various reasons along the process, and actors coming in to bring extra resources into the process for specific needs.
Memory-based descriptions of the actors

As a way to estimate the process memory and awareness of the process as a whole, the interviewees were asked to estimate the number of actors participating in the process. All of the interviewees pointed out that estimating the number is hard due to their lack of memory, or their lack of participation in the process, as in “That is really hard to estimate”. Based on the calculation process, which many described aloud, one major factor affecting the low estimates was that the elected officials were not counted in the number of actors participating in the process. Generally, the less an interviewee had participated in the meetings during the process, the less s/he estimated the number of actors to be. The estimates ranged from 20 to 200, and the uncertain answers like “Hmm... A wild guess would be something around 20. ... I really do not know”, “There must have been many. I do not know. 100? 200? Well, maybe 100. I’d say” and “I think it has to be at least 50, it can be over 100, as well. If you count these roughly. One investigation is... There are at least ten involved already” were common.

Many of the interviewees were not able to memorize any exact changes in the number of actors during the process, as in “I do not quite remember”. In addition, the pattern of involvement in the process affected the memory of the dynamics: “To me it felt very stable, because I was not involved with those [...] or others”. Investigations were frequently mentioned as one source of dynamics affecting the size of the network. One of the interviewees suggested, for example, “Many investigations were commenced in the draft phase. Then they were completed at some point. Again in the proposal phase. [...] For example the, what was that investigation [...] There were loads of people involved”. Some of the interviewees presumed that the cumulative number of the actors had to change during the process, as there was also personnel turnover during the process. However, the fluctuations of the network size were estimated to be moderate, and in relation to the situation of the process. One interviewee described, “I think it fluctuated along the process according to the situation. Some things were handled with a smaller group, and then a wider group was again brought in”. The interviewees typically estimated a decrease in the number of actors in the process when the plan solution was established, and when their own involvement in the process decreased. For example, one interviewee described, “I guess the number of actors decreased when the solution was established and there were no more big changes. [...] After that, merely certain people conducted it. In the end, I was not anymore sure of what was going on”.
Validation of the SNA findings

All of the interviewees were surprised to find out the exact number of actors in the process. Expressions like “Whoa! I did not think of the political decision-makers. I did not consider them”, “Whoa! That is so much”, “That is terrible! Oh my God!”, “That is so much. [...] Insane!”, and “Oh my God, okay! [...] I did not have a clue there were so many actors involved” were common. One interviewee described that the feeling of surprise might have been because networks, as such, are not considered very thoroughly in planning processes typically. Some interviewees suggested, for example, that “Whoa, oh my God! [...] That is a surprisingly large number of people. [...] Phew! Well, it was a large process, so in that sense. But one never thinks about that”. However, the interviewees were not surprised of the amount of changes during the process, as the processes typically include more or less active phases along the way. The dynamics of the network size were understandable to the interviewees, and they were able to explain the causes of the changes, as in “I think this is quite natural”, “I think it is a natural part of the process”, and in:

“I can easily understand why the number of actors jumps there. Now that I see this graph, I can understand why it is so low in the beginning of the R [ratification phase]. In this process, the proposal phase went quite well, and there was not so much to investigate after that. Compared with the beginning. I can see that the goals were decided in G8, and there became many investigation needs. And those were then investigated in D [draft phase] and P [proposal phase]. This is a really easily readable graph, and those network graphs support it really well”.

5.1.3 Dynamics of the betweenness centrality

SNA findings

The average betweenness centrality varied from zero to 184.92 during the process, as shown in Figure 25. Furthermore, the standard deviation varied considerably, and increased especially in P8, P9 and R6 due to the activity of the elected officials in those phases. In G1...G8 and R1...R4, the betweenness centrality and the standard deviation stayed low for a longer interval of phases.

In G1, the betweenness centrality stayed at zero for all actors, as all were connected equally with each other. In G7, the network structure was simple. The average betweenness centrality was 4.00 (min = 0; max = 20.00), and the standard deviation was 6.00. In D1, the network structure seemed to include actors with varying positions within the network. The average betweenness centrality was 22.40 (min = 0; max = 359.67), and the standard deviation was 51.06. The scores were considerably varying among the actors, with only one actor scoring the highest. In P3, the network structure seemed similar to the structure in D1. However, the number of the core team members had reduced considerably from D1. The average betweenness centrality was 25.36 (min = 0; max = 363.67), and
the standard deviation was 69.93, which was in line with the indication of the network graphs. In P9, the betweenness centrality peaked considerably, and the network structure seemed unbalanced with multiple central actors in various positions. The average betweenness centrality was 184.92 (min = 0; max = 2899.19), and the standard deviation was 423.78. Hence, there was high variance in the centrality among the actors in that phase. In R6, the average betweenness centrality was lower, but the standard deviation still peaked. As is visible in the graph, the network structure was unbalanced, and the actors were having different positions in the network. The average betweenness centrality was 53.97 (min = 0; max 1513), and the standard deviation was 196.48.

Figure 25. The average betweenness centrality and the standard deviation peaked considerably when the City Council involved in the process, and the differences among the actors scores varied.

The betweenness centrality of the various roles varied considerably during the process. The betweenness centrality of the consultants was notable in G2...D3. The developers' and the landowners' betweenness centrality increased in G2...G8. Elected officials' betweenness centrality increased in P7...P9 and R6, as some of them were transferring information between various subgroups of elected officials. The betweenness centrality of the municipal civil servants was substantial during the whole process, and there were altogether four actors reaching relatively high scores. The public authorities did not score betweenness centrality scores in the process.

Figure 26 presents the dynamics of the network structures weighted with betweenness centrality. Betweenness centrality can be expected to be an important measure for analyzing the knowledge transfer and process memory related aspects, as it describes the relational position of the actors, influencing the knowledge flow. The fewer central actors there are, the greater their relational power may be. Based on the figure, one can see that in multiple phases, only one
or two actors had considerably high betweenness centralities, giving them possibly a stronger relational position considering knowledge transfer.
Figure 26. Over time, there were usually one or two actors having considerably high betweenness centrality in the network. Consequently, the information flows were centralized, and majority of the actors had low scores of betweenness centrality.

Memory-based descriptions of the actors

Based on the interviews, multiple actors were named as focal for information transfer in the process, all with a different set of themes to care for. All interviewees referred specifically to one certain actor as focal for knowledge transfer in the process. One interviewee described, “That person had been there since the beginning and knew everyone involved. [...] The stakeholders knew that actor, so it was also easy for them to contact that actor”. In addition, many interviewees pointed out the importance of the core team in relation to the knowledge transfer: “I would say that the core team was taking care of the information transfer, but I do not know if they had various responsibilities there
somehow. I guess there were typical information challenges involved. That some were more on the fringes”. In addition, the sectoral experts were identified as important information sharers concerning their own themes, like in “Then there were these specific themes... And they had their own experts sharing the information”. Municipal managers were identified as an important link to the elected officials, as in “Of course the managers had an important role to play in that, as well. They shared the information for the members of the City Planning Committee. And took responsibility of leading the process”.

The description of the knowledge transfer was very much dependent on the actual networks in which the actor had participated. Some interviewees described, “I think that the information was exchanged really well. [...] But yes, it may be, then, that I was not on all email lists” and “By no means have everyone been equally informed. It is always about role”. In addition, it was mentioned by multiple interviewees that the information exchange was strongly context-dependent. In case an actor had worked only with one sectoral theme, the information exchange was related mainly to that specific theme, challenging the overall understanding of the plan situation and solution. The interviewees also recollected times when they were not aware of what was happening in the process. For example, one interviewee described, “Of course there were moments when it was a bit unclear what the situation was. Especially when there were some tough planning problems to solve, which took much time”. In addition, one interviewee described that the process seemed to be occasionally proceeding in an irrational way, as the rationalization behind the new directions were not clear to all actors. One interviewee suggested, “That caused some bouncing in the process. [...] It was kind of, well, I did not have an overall view of the process. [...] So something had been prepared for a long time. Then someone already wanted something completely different. [...] But maybe it felt different for the ones who were more involved in the process”. The amount of knowledge transfer was not described to be stable throughout the process. Not all themes and topics were handled with the same intensity.

Based on the interviews, some of the lacks in the knowledge transfer were partly structural and intentional. One interviewee pointed out that the challenges in knowledge transfer were due to the organizational cultures in public administration: “I think the situation is like that all the time in the internal municipal communication in projects like this. [...] I cannot say it is well-functioning. Not to mention the external communication. I cannot say that it was functioning. Moreover, not everybody were in any case aware of what was happening. Because there is not even a method for accomplishing that. Projects in public administration just are like this”. In addition, it was described that not in-
forming of surprises, changes and disruptions during the process was intentional. One interviewee described, for example, that “Not everyone needs to be equally aware of everything, because there is so much information”. Consequently, some interviewees described that the actors outside the core team were given intentionally the opportunity to focus on their own responsibilities, when the changes were not considered directly to affect their work.

According to the answers, information was always available by asking. In addition, one interviewee suggested that the amount of information exchange might have been related to the activity of the actors to ask for the information: “The information exchange may depend on how actively someone is demanding to be informed”. In addition, the strictly set responsibilities within the processes and organizations were mentioned as a source of knowledge transfer challenges in planning processes. One interviewee described that “Often you just avoid stepping on someone else’s toes”. Some interviewees had also afterwards thought that they should have been more active at some point, bringing their own opinions to the process. For example, one interviewee described that “Well, I have thought afterwards that it was bad. Like those things that I mentioned earlier. Maybe if I was involved there, and saying aloud the things at some point, maybe they would have been considered differently”. In addition, some of the interviewees suggested that part of the challenges in the information transfer were due to the rush with other simultaneous processes. Actors typically work in multiple simultaneously ongoing processes, and cannot focus on only one process. This was described, for example, by one interviewee stating, “Sometimes I was not aware of what was going on. However, I do not know. It can also be because I did not have time to ask, if it was not an active phase for me”.

Validation of the SNA findings

The interviewees were not surprised of the findings of the betweenness centrality analysis. Some interviewees pointed out that the structures also seemed typical for many other planning processes. Expressions like “This does not surprise me”, “I think these seem logical”, “Yes. Oh, yes. This tells about the process”, and “Yeah, that is logical” were common. Sometimes the interviewees were not able to describe exactly their memories of the certain themes, such as the knowledge transfer during the process. However, based on the findings, they were able to reconstruct the process in their minds. For example, one interviewee first answered, “It is so hard to tell”. Later on, after the findings were shown, the answer changed to “Oh yes! Now, this is interesting. Yes, I think this is how it was”.

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Many of the interviewees were expecting that the core team would show up in the findings, as they did. Some interviewees, for example, suggested that “Precisely. These are like link stations transferring a lot of data. This is such an interesting perspective you have here”, and “Yes, the official information transfer was quite condensed, as much of the information did go through the core team members”. Some of the interviewees who had participated more in the process were able to identify specific actors in the graphs. For example, one interviewee described, “As I told before, every process has a responsible planner; it has to be that one. [...] Then those with two or more nodes are the members of the core team. [...] And those ones [...] are the managers. Yes, that is the manager”. In their answers, some interviewees also rationalized the shown structures, as for example, in “Yes, there we have found one person who can understand how to solve this whole thing. I think it is only a good thing. It tells that someone has understood something. Of course, the understanding might have been wrong, as well”.

Some interviewees were, however, surprised of the phases with multiple nodes having high betweenness centralities (e.g., G₆, R₅), wondering how that can be possible in a planning process, which are thought traditionally to be centered around one responsible planner. In addition, many interviewees pointed out their worry of the single-core structures, and their high possibility of knowledge loss in the case of personnel turnover. Some interviewees told that: “But like, considering how the knowledge can be kept in-house, some of these are really horrifying. That it all depends on one person only” and in “But it is very risky, if there is only one or two, who pass on all of the information. Like, if they leave, all that knowledge is lost. And also if all of the information goes through them. Like if this one wants to tell something to that one. And it goes through that one, so it is like a broken telephone”. However, some interviewees also saw the one-core structures as important for advancing the process. One interviewee suggested, “In a project-like work, even as the one-core structure has its own risks, it is still absolutely essential. [...] It does not go like the Swedish discourse. It just does not work. Someone has to be the brave one. [...] Okay, it is nice and pretty to have a team, but these require project-like working”. In addition, the dual-core structures were highlighted. Some interviewees were surprised that many of the phases had so equal network structures for both of the most central actors. Many told they had expected that both of the core actors would have been responsible for their own subnetworks. This was described, however, as an intentional strategy for supporting the shared awareness. One interviewee explained, “We discussed that a lot. That if one gets sick, or has to attend some other meeting, another can substitute when needed. [...] If there would have
only been own responsibilities, it would have been very difficult to attend the meetings of the other person. So it was a good choice, because it gave flexibility”.

### 5.1.4 Thematic phase-level dynamics

#### SNA findings

**The whole process**

During the whole process, the cumulative in-degree of the various themes varied considerably (min = 26 for economics, max = 1074 for decision-making related), as can be seen in Figure 27. The plan situation theme covered most of the phases during the process. Other themes were more tied to certain phases of the process, or occurred in a randomly distributed manner over time. For example, the decision-making related theme usually occurred in the end of each consecutive phase of the process (goal-setting, draft, proposal, ratification), when formal decisions were made. Detailed plans, on the other hand, began occurring more intensively towards the end of the whole process, as the more detailed plans began to reach their initial phases.

![Figure 27. Affiliation of the actors and the themes during the whole process (G1...R6). Most of the actors participated in only one theme during the process. Typically, the actors connecting the various themes together were municipal civil servants. In the cumulative view, there are multiple nodes connecting many themes together. However, when broken into multiple phases over time, the dynamics can be better understood.](image)

During the whole process (G1...R6, in Table 4), the intensity of ties between the various themes varied considerably. The largest values were related to the plan situation and mobility themes. For example, the plan situation and mobility themes were connected through 66 ties, the plan situation and alternatives and
modelling themes through 58 ties, and the plan situation and plan documentation themes through 54 ties. On the other hand, the goals and the decision-making related themes were the most weakly connected to other themes. The procedural themes, such as the plan situation, plan documentation, alternatives and modelling, detailed plans, and other official documentation, were comparatively well connected to other themes. However, the sectoral themes, such as economics, and cultural heritage, were more weakly connected. The ties between the various sectoral themes were typically considerably weak, suggesting that the knowledge flows between the various sectoral themes were not very firmly established. Exceptions to this are mobility–municipal engineering (29 ties), mobility–commerce and business (28 ties), and municipal engineering–nature and recreation (27 ties).

Table 4. The intensity of ties between the various themes during the whole process (G1...R6). Apart from some (such as plan situation, plan documentation, and mobility), the themes were typically comparatively weakly tied to each other.

The goal-setting phase

In the goal-setting phase, the thematic affiliation network, as shown in Figure 28, and the intensity of the ties between the various themes (Figure A7.1 in Appendix 7), varied considerably. In G₁, in the first phase of the process, there was only one active theme (plan situation) with 25 participants. In G₂, there were two themes: plan situation, and commerce and business. 21 actors (48%) participated in only one theme, and 23 actors in both themes. There were multiple roles participating in both of the themes, and the themes were interlinked strongly through 23 ties. In G₃, there were four themes: goals, nature and recreation, other official documentation, and plan situation. 21 actors (84%) from various roles participated in only one theme, and three actors in two themes. There were multiple roles participating in both of the themes, and the themes were interlinked strongly through 23 ties. In G₄, there were four themes: goals, nature and recreation, other official documentation, and plan situation. 21 actors (84%) from various roles participated in only one theme, and three actors in two themes. Only one municipal civil servant participated in all of the four themes. Alternatives and modelling and the other official documentation were comparatively weakly linked through three ties, whereas the other themes were linked through...
only one tie. In G₄, there were four different themes discussed in the meetings: goals, plan documentation, mobility, and plan situation. 54 actors (87%) from various roles participated in only one theme, and seven actors in at least two themes. One municipal civil servant in all of the four themes. Goals and mobility were linked through six ties, whereas other themes were linked through a maximum of three ties.

In G₅, there were six different themes: goals, mobility, site visit, other official documentation, plan documentation, and cultural heritage. 19 actors (61%) from various roles participated in only one theme, and eleven actors in two to four themes. Only one municipal civil servant participated in all of the six themes. Goals, and the other official documentation theme, were linked moderately through seven ties, and goals and mobility more weakly through five ties. Other themes were linked through a maximum of three ties. In G₆, there were six themes: goals, plan situation, site visit, mobility, other official documentation, and decision-making related. 21 actors (50%) from various roles participated in only one theme, and 20 actors in two or more themes. Only one municipal civil servant participated in all six themes. Goals and the plan situation were linked comparatively strongly through 15 ties. The decision-making related theme was linked moderately to the other official documentation and the plan situation through six or seven ties. Other themes were linked through fewer ties.

In G₇, there were four themes: mobility, nature and recreation, site visit, and plan situation. Nine actors (90%) participated in only theme. In addition, one municipal civil servant participated in all of the four themes. The themes were linked to each other comparatively weakly through only one tie. In G₈, eight themes were discussed: decision-making related, plan situation, alternatives and modelling, site visit, other official documentation, detailed plans, mobility, and cultural heritage. 63 actors (66%) from various roles participated in only one theme. 31 actors from various roles participated in two to six themes. One municipal civil servant participated in seven themes, but nobody participated in all of the eight themes. The alternatives and modelling theme was tied comparatively strongly to the plan situation theme (20 ties) and the site visit theme (19 ties). Site visit was in addition comparatively well linked to the plan situation (eleven ties) and mobility (ten ties) themes. Other themes were linked by a maximum of six ties.
Figure 28. Thematic and actor dynamics in the goal-setting phase (G1...G8), with the amount of themes and connecting actor ties varying. There were no actors connecting all themes through the whole goal-setting phase.
The draft phase

In the draft phase, the thematic network, as shown in Figure 29, and the intensity of the ties between the various themes (Figure A7.2 in Appendix 7) varied. In D1, there were seven themes: alternatives and modelling, nature and recreation, plan documentation, plan situation, municipal engineering, mobility, and other official documentation. 40 actors (74%) from various roles participated in only one theme, and 13 actors in two to six themes. Only one municipal civil servant participated in all seven themes. The plan situation theme was moderately connected to the plan documentation (eight ties), municipal engineering (eight ties), and alternatives and modelling (nine ties) themes. In addition, plan documentation was moderately connected to alternatives and modelling through eight ties. Other themes were linked through a maximum of six ties. In D2, there were five themes discussed in the meetings: alternatives and modelling, site visit, nature and recreation, other official documentation, and plan situation. 21 actors (68%) from various roles participated in only one theme, and nine actors in two or three themes. Only one municipal civil servant participated in all five themes. Plan situation theme was comparatively strongly connected to the alternatives and modelling (seven ties), and the other official documentation (six ties) themes. Other themes were connected through a maximum of three ties.

In D3, there were eight themes: alternatives and modelling, commerce and business, nature and recreation, site visit, plan situation, public services, mobility, and cultural heritage. 36 actors (69%) from various roles participated in only one theme, and 15 actors in two to seven themes. Only one municipal civil servant participated in all of the eight themes. Mobility was comparatively strongly connected with alternatives and modelling (15 ties). In addition, public services was connected moderately with six ties to mobility, and alternatives and modelling. Other themes were linked through a maximum of five ties. In D4, there were eight themes: decision-making related, other official documentation, mobility, alternatives and modelling, public services, plan situation, site visit, and plan documentation. 23 actors (72%) from various roles participated in only one theme, and eight actors in two to seven themes. Only one municipal civil servant participated in all of the eight themes. Alternatives and modelling was connected comparatively weakly to the other official documentation, and plan situation with five ties. Other themes were linked through a maximum of four ties.
Figure 29. Thematic and actor dynamics in the draft phase (D1...D4), showing the diversity of the themes and connecting actor ties. Only one actor connected all themes during the draft phase.

The proposal phase

In the proposal phase, there were variation in the thematic network, as shown in Figure 30, and in the intensity of the ties between the various themes (Figure A7.3 in Appendix 7). In P1, there were four themes: plan documentation, municipal engineering, plan situation, and nature and recreation. All of the actors in this phase were municipal civil servants. Three actors (60%) participated in only one theme, and two actors participated in all four themes. All themes were connected comparatively weakly through two ties. In P2, there were ten themes: plan situation, site visit, commerce and business, nature and recreation, public services, economics, cultural heritage, municipal engineering, alternatives and modelling, and mobility. 32 actors (80%) from various roles participated in only one theme, and seven actors in two to nine themes. Only one actor was connected to all of the ten themes. Plan situation was comparatively weakly linked to the cultural heritage (five ties), public services (four ties), nature and recreation (four ties), and mobility (four ties) themes. Other themes were connected comparatively weakly with a maximum of three ties.

In P3, ten themes were discussed in the meetings: cultural heritage, mobility, economics, other official documentation, decision-making related, plan situation, municipal engineering, plan documentation, commerce and business, and
nature and recreation. 54 actors (78%) from various roles participated in only one theme, 14 in two to five themes, and one in nine themes. Only one municipal civil servant participated in all of the ten themes. Plan situation was moderately linked to decision-making related (seven ties), plan documentation (seven ties), and other official documentation (eight ties). Other themes were linked together by a maximum of five ties.

In P₄, five themes were discussed: plan documentation, alternatives and modelling, cultural heritage, plan situation, and commerce and business. 9 actors (64%) participated in only one theme, and three in two themes. Two actors participated in all of the six themes. The plan documentation theme was linked to mobility, alternatives and modelling, and commerce and business comparatively weakly through three ties. All other themes were connected comparatively weakly through two ties. In P₅, ten themes were discussed: plan situation, mobility, public services, commerce and business, alternatives and modelling, detailed plans, municipal engineering, nature and recreation, economics, and plan documentation. 31 actors (69%) participated in only one theme, and twelve in two to seven themes. Two actors participated in all of the ten themes. The commerce and business theme was moderately linked to mobility (seven ties), alternatives and modelling (seven ties), and municipal engineering (six ties) themes. Other themes were connected by a maximum of five ties.

In P₆, eleven themes were discussed in the meetings: public services, plan documentation, municipal engineering, economics, plan situation, nature and recreation, alternatives and modelling, detailed plans, commerce and business, mobility, and cultural heritage. Most of the actors in this phase were municipal civil servants. 34 actors (65%) participated in only one theme, 15 in two to six themes, and two in nine to ten themes. Only one actor participated in all of the eleven themes. The plan documentation theme was connected comparatively well to plan situation (ten ties), nature and recreation (ten ties) and moderately to municipal engineering (eight ties) and public services (eight ties). In addition, the plan situation theme was linked moderately to the nature and recreation (eight ties), public services (seven ties) and municipal engineering (seven ties) themes. Nature and recreation and municipal engineering were connected moderately with seven ties. All other themes were connected with two to six ties.

In P₇, nine themes were discussed: decision-making related, mobility, commerce and business, site visit, plan documentation, plan situation, public services, nature and recreation, and municipal engineering. 61 actors (88%) participated in only one theme, and six actors in two to seven themes. Two actors participated in eight themes. None of the actors participated in all of the nine themes. Municipal engineering was connected moderately to mobility (six ties). In addition, the mobility theme was comparatively weakly connected with the
plan situation theme (four ties), and commerce and business by four ties. Mu-
nicipal engineering was connected with the plan situation theme by four ties,
and nature and recreation by four ties. Two or three ties connected other themes
to one another. In P8, eleven themes were discussed: decision-making related,
municipal engineering, site visit, mobility, plan situation, commerce and busi-
ness, public services, detailed plans, other official documentation, plan docu-
mentation, and nature and recreation. 132 actors (88%) participated in only one
theme, and 15 in two to six themes. Three municipal civil servants participated
in ten themes. However, nobody participated in all of the eleven themes. The
mobility theme was connected moderately with plan situation (eight ties). Com-
merce and business was connected moderately with the plan situation (six ties)
and plan documentation (six ties) themes. In addition, plan documentation was
connected to nature and recreation through six ties. Other themes were con-
nected through two to five ties.

In P9, there were eight themes: decision-making related, other official docu-
mentation, detailed plans, mobility, plan situation, commerce and business,
plan documentation, and municipal engineering. 126 actors (90%) from various
roles participated in only one theme, and 14 actors in two to seven themes. No
one participated in all of the eight themes. Plan documentation was moderately
tied to the municipal engineering (six ties), and commerce and business (five
ties) themes. In addition, detailed plans was connected to other official docu-
mentation through six ties. Other themes were related through two to four ties.
Figure 30. Thematic and actor dynamics in the proposal phase (P1...P9), showing the variance of themes and connecting actor ties. No actors connected all themes through the whole proposal phase.
The ratification phase

The thematic dynamics, as shown in Figure 31, and the intensity of ties between various themes (Figure A7.4 in Appendix 7) varied in the ratification phase. In R₄, there were five themes discussed: plan situation, other official documentation, detailed plans, mobility, and site visit. Eight actors (36%) participated in only one theme, and 13 in two to four themes. Only one actor participated in all of the five themes. Mobility was comparatively well connected to the detailed plans (twelve ties), and plan situation (eight ties) themes. In addition, the detailed plans theme was connected strongly with plan situation (eight ties). Other themes were connected with one or two ties. In R₅, four themes were discussed in the meetings: public services, detailed plans, other official documentation, and decision-making related. 27 actors (90%) participated in only one theme, and three in two to three themes. No one participated in all of the four themes. Public services, detailed plans and other official documentation were connected through one or two ties.

In R₆, three themes were discussed: nature and recreation, other official documentation, and commerce and business. Twelve actors (71%) participated in only one theme, and four in two themes. Only one actor participated in all of the three themes. The nature and recreation theme was tied to other official documentation through four ties. Other themes were connected to each other through one or two ties. In R₇, five themes were discussed: plan documentation, detailed plans, nature and recreation, commerce and business, and plan situation. Eight actors (47%) participated in only one theme, and eight in two to four themes. Only one municipal civil servant participated in all of the five themes. The plan situation theme was linked moderately to plan documentation (seven ties). Other themes were connected through one to four ties.

In R₈, five themes were discussed in the meetings: decision-making related, other official documentation, plan documentation, detailed plans, and public services. 35 actors (76%) participated in only one theme, and eleven actors in two to four themes. Nobody participated in all of the five themes. The detailed plans theme was moderately connected to public services (seven ties), and comparatively weakly to other official documentation (five ties). One to four ties connected other themes. In R₉, five themes were discussed in the meetings: decision-making related, other official documentation, plan documentation, economics, and detailed plans. 92 actors (97%) were connected to only one theme, and three to two to four themes. None participated in all of the five themes. All themes were connected comparatively poorly through one or two ties.
Figure 31. The thematic and actor dynamics in the ratification phase (R1...R6), showing the variance in themes and actor ties. There were no actors connecting all themes during the whole ratification phase.

Memory-based descriptions of the actors
Generally, the interviewees were able to remember and describe only the themes in which they had participated. Expressions like “I do not have a clue of what was discussed about the themes in which I was not involved in”, “I think they were all ok. But I do not even know what themes were involved. So it is hard to compare”, “There was not a clear overall understanding of the themes and their
interrelations. They were always handled separately”, and “I can only remember those, as those are the ones I was involved in” were common. Many interviewees pointed out that they were generally only aware of their own theme, and did not have a holistic view of the other themes. According to the interviews, it is typical for planning processes, also for the analyzed process, that sectoral themes are discussed separately. As one interviewee described “They [sectoral themes] are unfortunately discussed very separately”. Some interviewees suggested that sectoral experts were not involved in the integration of all themes, but were only invited to join the process for giving their sectoral views of the plan. One interviewee described, “The core team analyzed the findings of the sectoral investigations, and invited the sectoral experts in when needed”. However, it was pointed out also that some themes were discussed together more than usually. Thus, the interviewees pointed out that the knowledge transfer worked out comparatively well in the process, compared with their experiences from other processes. For example, one interviewee suggested that “Well, in fact I think that the communication and information exchange worked better than in many other processes. [...] In some processes it is even more sectoral”.

According to the interviews, there was considerable variation in the intensities of the sectoral themes in the process. The interviewees described that some themes, such as mobility, were emphasized in comparison to the other themes, as in “There was a mobility planner involved continuously”. However, it was suggested also that in the end of the draft and the proposal phases, the themes were integrated to the plan solution in order to form a whole: “Generally those were discussed when the need for investigating a certain theme was identified. And when some phase was wrapped up. Like in the end of the draft phase or the proposal phase. Then all themes were integrated as one”.

**Validation of the SNA findings**

Generally, the interviewees were not surprised of the findings, as they all had already described the separation of the sectoral themes in the first part of the interview. Expressions like “Yes, this represents the process”; “I think this tells about the specific features of the process. [...] This would be completely different if this was done of another process”, “Yes. Oh, yes. As I know what the main objectives and challenges were. I think this describes it much. Very much”, “Oh yes, it was like that!”, “I think that is quite much as I remember it. At least considering my part, this is exactly how I remember it”; “I am not surprised. I am not surprised of the findings. Merely I could say that it was like that” and “Yes. I think this is really. I think this is exactly like it” were common. Some interviewees pointed out that some of the findings could be generalized to other same level processes as well, as in “Yes, this is telling about the process. My memories
are like this. And this is typical for strategic spatial planning processes in general”, and in “These are interesting, as the links between the various themes, and their intensities, can be clearly seen. This information would be worth of gold when planning the resources. Planning processes are always different, but these could be utilized in the various processes”. However, there were also contrary views of this, suggesting that the thematic dynamics are very strongly context-dependent, and would have different emphasis in other processes.

Many of the interviewees were not surprised of the findings, but pointed out that the situation considering the various themes was not optimal. For example, one interviewee stated, “There would be much to improve. […] More should be done together, and all aspects should be considered simultaneously”. Some interviewees also suggested that the sectoral themes are usually brought into a planning process too late, and considered merely as restrictions to a plan. The discussion should be commenced already earlier in the process to integrate all sectoral aspects well into the plan, as suggested by some interviewees.

5.2 Effects of the networked dynamics on process memory development

RQ2: What effects can the networked dynamics of planning processes have on the development of process memory in municipal planning organizations?

5.2.1 Few exact and ordered memories were remembered

Apart from the core team, many of the interviewees were surprised to find out that they were among the actors who had most frequently participated in the organized meetings during the process. Only the ones belonging to the core team were not surprised of their position. Comments like “Really? I am surprised. I felt like I was mostly working on my own in my room”, “It surprises me!”, “Okay. I have? Okay, yes! […] It surprises me”, “I was not expecting that”, and “Okay! That is surprising! […] As I knew, I was very much involved in the beginning. However, I am surprised that I am. Like yes!” were common. The core actors were not that surprised. Their expressions were more like “I cannot say that I would be surprised. I think it is good that I’ve had time to participate that much” and “I am not surprised”. In addition, some of the interviewees pointed out that the identification of one’s own importance in the processes is not generally adequate in planning processes at the moment. When planning and development processes are typically managed as separate projects, the holistic understanding of one’s own role all the way to the implementation of the
plan is lacking, as was told by some interviewees. For this reason, one interviewee suggested that:

“I think that the appreciation of one’s own work or the valuation of someone else’s work... Moreover, the valuation of the goals, they are not like... Even as we are talking about processes, they are not processes; they are always project-based development. Then we will move on to the next one. Therefore, the importance of a project is not visible. Maybe because it is merely seen as planning, and not as implementation. It is one important factor, to see one’s own importance. That it is not only planning, it is going to be implemented at some point. That should be made more visible”.

In the interviews, very few exact memories of the process were told. Many interviewees claimed that they do not have memories of the process, and were not able to explain the evolution of the process over time. The less the interviewees had been involved in the process, the less they were able to describe what had happened over time. Generally, the memories of the process were not exact or ordered in time, and concentrated mainly on the aspects that had directly affected the interviewee’s own work. Answers like “Help! It is hard to say. At least I do not remember”, “I do not remember. Or I do remember that the landowners were quite strongly involved”, “I do not have an overall view. It was more like dropping by every now and then”, “My memory is not that good always”, “I am not, how to say, I am not able to memorize the process very well”, and “My memories are quite thin. [...] It was like... I do not remember. [...] That is what I do remember, because it affects my job” were regular when the interviewees were asked to describe the process over time, or at least some aspects of it. However, some of the more intensively participated interviewees were able to order the most important process phases over time. As one of them described, “I think the draft phase was when the most important decisions were made. The directions. Like what was wanted. I guess that was where the most important questions were discussed”.

Typically, the process was described by comparing it with other processes. No exact memories of any individual activities were described. However, there were recollections of patterns of activities, which were described as typical for the process, distinguishing it from other processes. Statements like “If I compare this with other processes...”, “Already from the beginning, it was very different from any other process”, “It was a distinct and unique process”, and “It was in every way different from all other processes” were common. Many interviewees mentioned that the process was in multiple ways different from the other same level processes, in which they had participated. The actors working with planning and expert tasks in the process commonly described that the process was directed mainly through the various sequences of meetings. However, the actors
of the core team were able to depict factors also in the surrounding environment, affecting the course of the process. For example, the development objectives of the landowners affected the process. In addition, a number of parallel processes by various actors were going on in the area, having more or less interaction with the analyzed process. One interviewee suggested, for example, that “There were various passions considering the area”, and “Then there was the parallel process with other kinds of actors”. In addition, the more general level factors like urbanization, the input of the national land use guidelines, and the planning-related objectives of the Helsinki Capital Region were utilized to describe the factors, which directed the process.

5.2.2 Activity descriptions were commonly pattern-based

According to the interviews, patterns of activities were typical for the process. These included, for example, the frequent process check-up meetings during the process, the more intense involvement of certain themes than usually, and the more frequent stakeholder meetings. According to the interviewees, the process was identified by intensive landowner collaboration, as was suggested for example in: “If I compare this with the other processes, I think it was characterized by the intense landowner collaboration”. Second, the process was described through having more frequent and regular meeting patterns than many other processes. One interviewee explained, “I think this process had especially much various collaboration meetings. At least that was my experience. There were more than typically. […] But it was in that sense much more complex than other same level processes”. There were frequent check-up meetings of the plan situation for the core team, which was responsible for the plan. In these weekly, or biweekly, meetings, the possible plan situation was discussed, needs for the investigations were analyzed, and the plan solutions were discussed. In addition, separate thematic meetings were organized. Many interviewees pointed out that the mobility planners were an integral part of the core team, participating more intensively in the work than in other same level processes.

In the interviews, the process was described through various patterns of organized meetings. For example, the small core team had their frequent check-up meetings for informing each other of the current situation, and for discussing the plan solution. This was named multiple times as an identifying factor for the process, and as a way of enabling the reflection of thoughts, as was suggested by one interviewee: “The team was very important. […] if there was a question on your mind, you could always ask from the team how to proceed”. The process was described mainly through well-functioning team effort, which was based on regular meetings: “A key to the fluently proceeding process was teamwork.”
They were able to spar each other. [...] And it was multidisciplinary”. However, it was pointed out also that teamwork is typically dependent on personal relations, and sometimes it may take time to establish a well-functioning core team to proceed fluently with the tasks. In this process, it was not considered a challenge, and expressions like “We had a lucky situation, because there were no contradictions” and “We had an ideal situation, because the personal relations worked, and we had a clear schedule” were common. In addition, the interviewees had varying views of the sectoral collaboration in the process. According to the interviews, as a way of organizing the sectoral collaboration, an updating process schedule of the most important steps during the process was utilized for everyone to see when they would be needed in the process.

Without exceptions, all of the interviewees pointed out the strong role of the landowners in the process. However, the interviewees had varying understanding of the landowner collaboration. The ones participating in the landowner meetings described the meetings as a useful way of generating shared understanding and overall view of the situation in the process. For example, one interviewee told that: “I think that the landowner discussions were among the most important meetings, because there we had to be able to describe the current situation and the aims of the plan very clearly”. In addition, many interviewees described that the landowner meetings were highly important for directing the process, and the development goals, further. Some interviewees described that the collaboration had various phases of more or less shared understanding, and that the intensity of the interaction varied. Overall, all interviewees mentioned the landowners as the most important stakeholder group, outside the municipal organization, for affecting the direction of the process. In addition, the landowners were recognized as important actors in the process, as they would finally be the ones taking the development thoughts further to the implementation phase.

In the interviews, it was pointed out that municipal planning processes are separated often from the political decision-making processes. However, political decision-making was identified still as crucial for setting the direction of a planning process, also in the analyzed process. Descriptions like “The most important were the discussions with the City Planning Committee. Those were the moments for assessing the process. And is it what is wanted, or is there still something else to investigate” and “Political decision-makers are typically the strongest changing force within the planning processes. The planning thoughts may be turned upside down” were typical. The ones, who were responsible for the decision-maker collaboration described that the interaction was active and important for setting the direction for the process.
5.2.3 Organized meetings were the most important means of interaction for guiding the process

When the interviewees were asked about the importance of the various ways of interaction during the process, all of them identified the organized meetings as the most important way of interaction for advancing the plan and for making decisions. Some interviewees suggested, for example, “Of course meetings”, and in “The most important are of course meetings. There information transfers from everyone to everyone”. On the contrary, one interviewee stated that meetings ought to be the most important means of interaction, but often they may not be, “The most important should be the meetings, but typically it is rather the hallway discussions or e-mails. Those generate much detachment from the process. Because you cannot see the whole. In a meeting, you can always see the whole. And hallway discussions, and emails, only describe a certain theme”. In the interviews, organized meetings were considered important, because they ensure the equal sharing of information for all participating actors. However, they also require resources, and it was suggested by the interviewees that the balance of informing everyone and advancing the process simultaneously is not always easy to find. One interviewee described, for example, “It is many times [a challenge] in a process like that, how to keep everyone informed. On the other hand, how to make sure that all of the time is not spent on the informing. But also on advancing the process and proceeding. So a balance has to be found”.

Despite of their resource-dependency, organized meetings were suggested still to be the most important means for guiding a statutory strategic spatial planning process. Answers like, “That was where the best ideas came up” and “I think the internal meetings were the most important ones for advancing the plan solution” were common. The interviewees described the meetings important for getting people together, for discussing and deciding on things, and for making formal decisions when needed. As one interviewee described, “... it was important to get the managers there to decide on things. As authorities, who could then officially decide on the direction where to head. And many times, they were pressed about the decisions. And then the planners were able to move on to the next level”.

Second, hallway discussions were identified as a valuable way for communication that is more informal and bonding during the process. However, some of the interviewees also pointed out challenges concerning the use of hallway discussions during the process. One interviewee, for example, described, “Hallway discussions are very challenging. Those are random. [...] Maybe good information is transferring, but not to all who would need it”. Third, emails were described as being a more formal way of informing about topics that are more lim-
ited for larger crowds. In addition, some interviewees pointed out that the possibility for spontaneous encounters with people outside the municipal organization should be supported more, as it is not currently a part of a planning process. As one interviewee suggested: “That kind of [spontaneous] encounters are missing largely at the moment. [...] I do not think it should only be about planners meeting each other. But also the other actors, like the ones in the area, should be taken better into account”.

5.2.4 The process was described as actor-dependent

When the interviewees were asked to describe the process as they remember it, many pointed first out the core team responsible for carrying out the process. Some interviewees suggested that the close collaboration of the core team might have challenged the information transfer outside the team. One interviewee pointed out that “The core team was very dense. Very dense collaboration. And could it mean that the information exchange and understanding between them was fluent. [...] But how well they were able to communicate it with others within the unit, I think there were some challenges”. In addition, some interviewees suggested that person-related issues might have influenced the course of the project during the way. One interviewee claimed that “As usually, things are person-dependent. I guess that was evident also in this process”. Some interviewees also pointed out that the turnover of people during the process affected it, as some of the knowledge was lost, and ways of working were changed, during the way. One interviewee explained, “For example, when that person left, it complicated things a bit. Because some of the knowledge was lost at that point. So it became a bit more challenging”. Another told that “Having turnover, of course, showed in the process”. The actor changes during the process were also suggested to have affected what was happening in the process, as everyone brought their own views into the process. In addition, when the actors left the process, their experience was lost, as was suggested by one interviewee: “I think the most important change was when that actor left. There was a long experience and a clear view of organizing a process”.

5.2.5 The various network structures have different impacts on process memory development

The network structures during the process can be classified into five main categories: single-core structures, dual-core structures, multi-core structures, complete structures, and disconnected structures. Examples of the different structures are illustrated in Appendix 10. The different structures have possible ad-
vantages and challenges for knowledge transfer and process memory development in strategic spatial planning processes. These possible advantages and challenges were discussed in the focus group interviews with planning practitioners, working in and around strategic planning processes.

Single-core structures
The single-core networks have one central actor (Figure A10.1 in Appendix 10 illustrates a typical single-core structure in the process). According to the interviews, a single-core structure can be effective for knowledge transfer with one clear coordinator, but enables only few possibilities for wider discourse, as the connections between the actors remain scarce. In a single-core structure, the central actor can easily dominate the information flows between the others, as was suggested by some interviewees. Thus, the structure has a risk of dominance of the central actor, as was described by one interviewee: “What is needed, is a shared frame or objectives... For people to know approximately the direction where to head at. But there should not be any one central actor telling it. It should come from the network”.

According to the interviews, considering process memory and knowledge transfer, the single-core structure is risky, as it is so focused on one key actor. If the one central actor leaves, the rest of the network may be severely disturbed in case the subsequent core actor is not aware of what has happened, and cannot sustain the ties within the network. If the more peripheral actors are not used to having responsibility in the process, it may take a long time to re-arrange the network structure for continuing the process, as was suggested by some of the interviewees. One interviewee even suggested, “When that central actor leaves, only chaos will remain”.

Some interviewees suggested that a single-core structure might also become problematic, when some actors try to be the central nodes in every process. According to some of the interviewees, such a way of working is impossible, and will prevent all processes from moving forward due to a lack of resources concentrated on the processes. In addition, some focus group participants stated that this kind of structure does not enable enough discussion of the goals, or of the plan solution with the others. Hence, the structure may lower the quality of the substance, as was suggested by some of the interviewees. As was pointed out, it is not possible that one actor would know everything, and consequently, should not be responsible for everything. As the interviewees claimed, too centralized responsibility is not beneficial for the individual, nor for the organization. According to one interviewee: “That is the weakest link of this all. The human. No matter how much one would like to know everything, it just is not possible”.

5. Findings
**Dual-core structures**

The dual-core networks have a pair of central actors (Figure A10.2 in Appendix 10 illustrates a typical dual-core structure in the process). As was suggested in the interviews, a dual-core structure is common for strategic spatial planning processes. One interviewee suggested, “It should be accepted that there are more central and less central nodes. It does not mean that the less central ones would be less valuable. But that is how it goes”.

Based on the interviews, a dual-core structure allows either of the central actors to be replaced without a total loss of memory within the process. The dual-core structure was seen in the interviews as similar to the single-core structure, not being wide enough for enabling diverse discussion and new ideas within the network. One interviewee pointed out, “There is still not enough exchange of ideas within this structure”. A possible risk is that the process may end up having highly personalized views of the central actors, as their position is so strong in comparison with the others, as was suggested by the interviewees. The benefit of the dual-core structure is that the actors can support each other, and discuss the issues with each other. A dual-core structure is considered also resilient, as it does not collapse easily. If one of the central actors leaves, the other still remains. Thus, a new actor can be trained to the team with the help of the remaining experience. Some of the interviewees pointed out that for this structure to be efficient; both of the central actors should be able to build up their own sub-networks.

**Complete structures**

In complete structures, everyone is connected with one another (Figure A10.3 in Appendix 10 illustrates a complete structure in the process). According to the interviews, a complete structure has very low risk of changes, as all actors hold the same meeting-based information. From the process memory perspective (not considering the differences in expertise), any actor in a complete structure can be replaced without a risk for process memory, based on the interviews. Thus, if everyone is equally informed of everything, the risk of memory loss in case of personnel turnover is low.

According to the interviews, a complete structure has good possibilities for effective knowledge transfer within the network. However, the structure can be considered also ineffective, and having a low input of externalities, as all are equally connected. As one interviewee suggested: “Even though this would be an ideal solution... It does not necessarily make a good process to have this structure all the time. But it is like life itself. It should include various turns and phases”. In addition, requiring everyone to have equal knowledge all the time is not feasible, and the structure is prone to information overflow. Based on the
interviews, information overflow can cause actors to feel overwhelmed with the amount of information they should be able to absorb. It is not feasible to discuss everything with everyone. Instead, as the amount of information increases rapidly, the actors should be responsible for information acquisition also by themselves. One of the interviewees even pointed out that “The world is expecting something else. Something different from what we have been used to. Information is available, but we should know how to acquire it. And not just sit down and wait for it”.

In addition, it was stated in the interviews that working in a complete structure can be exhausting for the actors, as impulses come in continuously from multiple directions. Some participants suggested that it is not possible for everyone to be equally informed about everything. Hence, the complete structure can affect the work motivation in a negative way, if prolonged, as the actors may feel insufficient in being able to meet the expectations. One interviewee described the experiences of working in a complete structure by explaining that “It just was not possible. Everyone has to be able to focus on something. [...] Information has to flow. But it is not possible to be equally informed of everything”. This kind of a structure can easily become an ecosystem in itself, living only for its own sake, as was described by some interviewees. In addition, the complete structure is very resource-intensive.

**Multi-core structures**

The multi-core networks are built around multiple cores, which are connected to each other (Figure A10.4 in Appendix 10 illustrates a typical multi-core structure in the process). According to the interviews, a multi-core structure allows all of the actors to proceed quite independently with their own subprocesses. The interviewees pointed out that none of the central actors can be replaced without a risk, as they hold on to a diverse set of peripheral nodes, and are not linked strongly with each other. However, a multi-core structure enables the utilization of shared expertise, as was suggested by some of the interviewees. In particular, various experts, each of whom is supported by their own subnetwork, can form the core team. According to the interviews, the experts can develop their own part with the help of their subnetwork, serving as a mentoring structure. Afterwards, they can offer the knowledge for the core team, bringing added value to the process. One interviewee described that “And then the actors, for example architects, can also be together and speak ‘architect’. Take the strength of feeling similar. And then return to their teams to bring in some added value”.

5. Findings
Disconnected structures

A disconnected structure consists of subgroups, which do not have links with each other (Figure A10.5 in Appendix 10 illustrates a typical disconnected structure in the process). In the disconnected structures, actors from the separated subgroups have not attended in the same meetings with each other in the particular phase. Based on the interviews, the disconnected structure is similar to the single-core structure with the difference that there is also a completely disconnected network having its own direction in the process. A disconnected structure was a typical decision-making structure in the process. According to the interviews, a disconnected structure may cause extreme challenges for the process and the end product in case two completely separate streams of action are advanced simultaneously for a long time without any link to each other. One interviewee suggested, “This one is somehow scary. [...] That can be a total disaster for communication and for the plan”.

5.3 Applicability and relevance of network understanding in planning practice

RQ3: “Can the selectively increased understanding of the networked process dynamics through social network analysis be utilized in the process development practices of municipal planning organizations?”

5.3.1 “Maybe I have not understood the full breadth of planning processes” – experiences from the analyzed process

In the individual interviews, some interviewees pointed out that planning processes are not understood well enough currently. One interviewee, for example, suggested that “Well, there is no understanding [of processes] at the moment”. Generally, all of the interviewees agreed on the need for better process understanding in planning practice, as in “People should have a much wider understanding of it [planning process]”, and “I think it would be good to increase the understanding”. Some also pointed out that they do not generally think of their work as processes. One interviewee, for example, explained, “I do not think of our work as processes. [...] So I am not, or my thinking is not tuned to the process world”.

All of the interviewees had already diverse experience of various planning processes. Thus, they had thorough general understanding of processes, but many of them were still surprised of the breadth of dynamics and complexity related to the specific process, when analyzed and visualized through SNA. Expressions like “Well, I have quite a good understanding of how many factors can affect
planning processes. But I still had some surprises. So maybe I have not understood the full breadth of planning processes, working with this perspective only” were typical. Many interviewees considered that they had learned something new of the specific process, or processes in general, based on the SNA findings. The interviewees explained, “Like I have not perceived all that is happening in a planning process”, “Yes, it is opening my eyes in a different sense as usually. As I was not that much involved”, “It has been a surprise that there is a huge amount of different gadgets in the process. And the importance of informing. Like I have not been aware of what all is going on”, and “It has not been clear to me”.

The more the interviewees had participated in the meetings during the process, the less they were surprised of the analyses, and still considered them as a good way of summarizing the process, and learning for subsequent processes. One interviewee described, “Of course I knew the process already. Now that it is reflected here, it is really interesting to see it. Like a summary of the process. I have learned so much. I think these graphs would help all planners to understand. This should be done of every process”. Another interviewee suggested that the analyses could support the planners in understanding the complexities of the processes: “I think the planners can also be blinded by the process. Maybe it is hectic for them also, so they do not have time for clarifying the process. So revealing the interrelations within the process could help them”. In addition, the SNA findings were considered important for supporting the various actors to understand the complexity of the processes. As was suggested, for example, by some interviewees, “I think these should be shown to all participants of the process, so they would understand that okay, it is not that simple that one planner decides about everything, and leads the process. But there are hundreds of people to discuss with, decide with, and ask from. And so on” and “Normally one never sees anything like this. But these are really good, good to visualize and analyze these things. Like, if I have not seen this, I am sure the decision-makers have seen even less of these. Therefore, this would be very good also for the decision-makers to see. That there is such an enormous number of people involved in the planning processes”.

Generally, the approach of the research was considered interesting and important for the planning practice. Expressions like “I think this is very interesting”, “This describes interestingly the main directions of the process”, “This is such an interesting perspective you have here”, “I think this approach and method visualizes the interactional relations really well”, “I think this kind of analysis is really much needed. [...] As I guess there would be quite similar graphs from other strategic spatial planning processes as well” and “I think this is a very good approach, a very important topic. And challenging. [...] This shows
the complexity of a process. There are so many participants in total. And a lot of things have to be investigated before reaching a shared understanding” were typical. In addition, some of the interviewees pointed out that the method and the findings had supported their understanding of the process “These figures and everything, as I have never seen anything like this. I do not know has it been even done before. But it supports understanding”. In addition, some interviewees pointed out that the applicability of this kind of an analysis method is strongly dependent on the documentation of the analyzed process. Respectively, it was pointed out in the interviews that the particular process was better documented than processes in general, which may also have affected the validity of the SNA findings. Some interviewees suggested, “I guess these kind of analyses depend much on how well the process has been documented. Not all processes are documented like this”, “For the validity of these kind of analyses it should be noticed that process documentation varies a lot between processes, and planners do it very differently”, and “The process has to be documented really well for making this kind of analyses. I would say this one was well documented”.

Some interviewees suggested that they could directly utilize the knowledge of these kinds of analyses in their own work, whereas some said that those could be utilized better for unit-level development purposes. Expressions like “Well, I think I could learn something for my own work. But merely for the unit-level development” and “I could also utilize this in my own work. To inform people better of the things I know” were common. Wider utilization of this kind of process analysis could enable the comparison between processes, and learning from one process to another. For example, one interviewee suggested that: “When I look at these, I see many circles and lines, which tells that there has been much interaction. But whether that is much or little, I should have something to compare with”. Better understanding of the processes and their similarities could support the planning of the subsequent processes, as was pointed out by one interviewee: “Then I could reflect what to do in other processes. And what are the most important phases. [...] I think some of these structures remain the same from one process to another”.

In the end of the interviews, all of the interviewees pointed out that the processes and the process structures should be understood better for being able to develop planning practice. Some interviewees explicitly indicated that the processes should be developed, as in “We have very much need for process development”. One interviewee pointed out that when strategic spatial planning processes last long, “there will presumably be personnel turnover during the long processes. [...] It is good to identify various network structures in the processes. Some of them are really vulnerable. If someone leaves or gets sick, what will happen”. Some interviewees pointed out that it should be understood how
knowledge transfer in the processes could be improved, as it is never known when someone leaves the process. One interviewee suggested, “It is really important. Yes, it is important. You can never know when someone leaves the process. And then you’ll lose everything”. Also in the interviews, it was pointed out that some actors had left the process, taking valuable tacit knowledge with them, and affecting the amount of knowledge available for the rest of the process. Interaction was considered essential for planning processes. Consequently, some interviewees suggested that the interaction structures and their possible effects should be understood better. As one interviewee suggested, “It is essential. For understanding. Especially as interaction is so important currently. [...] So one has to be able to understand it, and analyze it. As it may also slow down the process. [...] So, it is important for a planner to understand”.

The interviewees suggested that there is not one optimal structure for all processes, but all processes should begin by process-planning. Some interviewees explained, “All strategic spatial planning processes are different from one another. So when the process is commenced, the objectives of the specific process should be agreed on together”, “I have learned that the proper planning of a process is really important. One cannot just initiate a process like this from nothing”, and “In the beginning of a process, nobody plans how to proceed”. Some interviewees suggested that the process objectives and structures should be lined up in the process-planning phase for deciding, for example, in which phases the various sectoral themes should be discussed more. Furthermore, it was pointed out that specifically the process structures should be better understood and planned to prevent the risky structures in the processes, as in “Yes, it would be very important to understand and think about these things. As how could we prevent that everything is behind one person. And that not all information would go through one person. I think it is challenging. But it would be important”. In addition, it was suggested that the actors usually have so many simultaneous processes to take care of that they do not have time to develop the established practices, like in “Usually people just think they are so busy that they do not have time to think about these things. It does not seem important in the beginning of the process”.

5.3.2 “It is like wandering around in the shadows” – introducing process thinking in municipal planning organizations

Generally, the separation of the organizational (process related) and the spatial (substance related) elements was challenging to understand for the participants of the focus groups, reflecting the lack of discussion of organizational processes in planning practice and research. The focus group discussions were continuously turning towards planning documentation, and spatial features. However,
the discussion of the procedural elements also raised comments of the importance of a better understanding of the strategic spatial planning processes and their development needs. Understanding of the relationship between the process and the substance varies. Some of the focus group participants suggested that processes are not very much guiding the generation of the substance. One interviewee explained, “The process is not necessarily guiding the work. For example, why some plan is as it is, is not necessarily because of a process that was followed”. On the other hand, some interviewees told that the generation of a well-defined content (plan) is very much dependent on the processes, all of which are different. One interviewee described the uniqueness of processes by stating, “Every strategic spatial planning process is completely unique, and somehow different from all other processes”.

Process development thinking in the municipal planning organizations is diverse. Individual process development projects were mentioned multiple times in the discussions, but not any overall strategy for the process development purposes. Changing the established practices was seen as being difficult, as was suggested by an interviewee: “The longer the structure remains the same, the harder it is to change”. In particular, the more aware management and coordination of processes may have an effect on the resource efficiency of the processes in the municipal planning organizations, as was suggested in the focus group interviews. Consequently, understanding of the process structures is important, as they have an impact on how the actors orientate themselves in the processes. Some interviewees told that the discussion of the networked structures is, thus, important as it brings forth the actor-relational perspective of processes. Some interviewees suggested that currently the discussion of planning processes is very institution-centered in comparison to the activity- or actor-centered approaches. Moreover, it was pointed out in the focus group interviews that SNA, which reveals the networked dynamics of the planning processes, is usable for visualizing the number of actors in the processes, by making the dynamics visually understandable. If this amount of actors is not coordinated well, resources may be wasted. In the focus group discussions, this kind of analyses were considered important for learning new ways of thinking about planning process development. One interviewee suggested, “This is very helpful. Great for our profession and for everyone working in and around planning processes”. As well, the analyses were seen to serve as a tool for visualizing the process development needs.

One interviewee suggested that planning processes are currently not understood clearly enough, and that “Now it is like wandering around in the shadows. You kind of see a figure, but you do not recognize what it is”. This may be, for example, due to the recognition of one of the interviewees that “Processes are
curly. They are not linear”. Thus, the non-linear and complex nature makes them difficult to understand. According to the interviews, this kind of analyses are needed for supporting the generation of a process understanding by dividing the long process into understandable phases, and by pointing out the importance of understanding the effects of the various process structures. One interviewee suggested that in case someone would ask why the processes are taking so long, these analyses could show the variety of aspects, which are considered and handled during the processes. Some interviewees suggested that SNA could also enable the discussion of whether all of the phases are needed, and are they in a logical order. As one interviewee pointed out, “It can open up the discussion of marvelling why the various phases are as they are. Or enable focusing on the individual phases”. According to the interviews, process understanding can be supported, for example, by dividing the process into more understandable phases, as typically the strategic spatial planning processes contain many differing aspects over a long time. For that reason, the phased process visualizations are important in supporting the discussion of the process. In addition, the meaning of communicating the overall picture of the simultaneous and partly overlapping processes was claimed to be high for supporting the understanding of the interrelations between the processes. In addition, improved awareness of the overall situation may enable the better utilization of shared expertise in the municipal planning organization as the actors become more aware of where they could share their professional expertise.

5.3.3 “The snowplough will get stuck when there is too much stuff in” – supporting process management

The focus group participants often pointed out that improved process understanding supports the evaluation of how well the process reflects its original objectives. According to the interviews, strategic spatial planning processes are easily affected by the lack of shared objectives or a clear frame of where the process is heading at, or how it relates to a larger development process. One interviewee described, “We do not have a shared objective of the public good we are trying to achieve”. When a clear objective is missing, disturbances influence the course of the process more easily. A more development-aware way of working would be needed. Especially as strategic spatial planning processes are long, flexibility in answering to the upcoming challenges has to be enabled, as was suggested in the interviews. Thus, a shared direction for the process has to be approved on. One interviewee stated, “Everyone thinks they are going to the same direction. However, in reality they are not, because they do not discuss with each other. They do not learn to know each other. They do not know about each other’s objectives”. Continuous communication during the process support
the organization’s ability of answering to the upcoming needs. Commonly agreed objectives, and clearly agreed responsibilities are important in order to have a coherent direction for the process. When law gives much flexibility, the municipality should have a clear strategy for conducting its own processes, for not ending up in an endless path of investigations and disruptions, as was suggested in the discussions.

Suggested by the interviewees, in the beginning of a planning process, a process plan should be made in order to identify the most important things on which to focus. One interviewee suggested, “Processes should be organized in a more determined way to avoid unnecessary bouncing. Part of that may be process waste, which is not necessary to produce”. The process plan should be in line with the goals set for the process. In addition, an adequate level of doing would be easier to define, when the objectives are clear, as was pointed out in the interviews. One interviewee asked, “Could there be a structure to be defined of a strategic spatial planning process? That this process is enough. Or is this world really so complex that it has to be investigated for eternity?” The interviewees suggested that with SNA, understanding of the desirable process structures could be enhanced and further utilized in process planning. What happens during a process may differ considerably from the original goals due to the disruptions affecting the course of the process over time. As was pointed out by one interviewee, processes are competing for the scarce resources of organizations, which also makes them vulnerable to any disturbances: “Of course the snow-plough will get stuck when there is too much stuff in. It is not possible to prepare everything simultaneously. ... If there is an endless amount of processes going on, some of them will have to wait. Then the duration of processes increases. And when new surprises keep coming in, they will mess up everything”. Based on the focus group interviews, having a better comprehension of the planning process, in order to identify factors that cause changes in the process, is necessary.

According to the focus group discussions, every process should be evaluated afterwards to assess the utilized practices. Currently process evaluations are utilized rarely in the municipal planning organizations. Processes are evaluated sometimes during the way, but the development ideas are not documented. During the focus group discussions, it was suggested that SNA could support the organization in recognizing the need for process evaluations. One interviewee explained the current situation of process evaluation practices, as “Unfortunately processes are not evaluated afterwards. It is agreed always that next time will be better. And then everyone leaves the organization”. Evaluation of process development practices in strategic spatial planning is challenging, as the time
scale is long, which makes the cause-effect relations more difficult to understand. Some interviewees pointed out that the detailed planning processes are usually shorter, the time horizon for their implementation is shorter, and they are repeated typically multiple times within a year. Thus, their effects are easier to assess, supporting also the process development practices through shorter feedback loops and comparisons. In strategic spatial planning processes learning is more challenging, as the feedback loops are so long, and comparisons should be done over decades, as was suggested in the interviews. One interviewee described that “A strategic spatial plan is a product of the team which is put up once in every 15 years. They put it together, and afterwards nobody knows how it was done. Then another team comes and starts to think what should be done”. In addition, another interviewee suggested, “Some kind of evaluation discussion would be good for identifying the best practices that could be repeated in the subsequent processes as well”.

5.3.4 “Actors do not know what the others are doing” – enabling the understanding of the importance of networking and collaboration

According to the focus group discussions of the networked structures, shared expertise and responsibility could open up more possibilities for discussing the plan solution already during the process. In the focus group sessions, it was pointed out that currently there is usually only one or two actors having the main responsibility for a planning process. Consequently, the reluctance of opening up the plan for discussion may increase, if the actors feel like coordinating the process independently, as some of the interviewees described. Sometimes the challenges of the interaction can be even more imaginary, as suggested by one of the interviewees: “If we make a strict pyramid organization or another kind of hierarchical structure... Even if it is somehow imaginary, it can prevent collaboration”. The need for developing more efficient and flexible process structures was recognized in several focus group discussions. If municipal planning organizations cannot answer to the societal needs quickly and effectively enough, the actors will move to other municipalities, which have more efficient processes, as some interviewees pointed out. One interviewee explained, “If all this kind of bureaucracy takes very much time, the one applying for a plan will go to another municipality with more agile processes”. According to the focus group discussions, much of the process time is consumed usually on obligatory bureaucratic tasks or overlapping work, and only a minimal part of the whole time is spent on developing and evaluating the plan solution. Thus, it was pointed out by many interviewees that it is significant for a municipality to understand its own processes, and the possibilities of developing them.
Many focus group participants agreed that network thinking is currently lacking in planning processes. People want to work in networks, but usually the current procedural and institutional structures restrict it. External actors are identified usually, to some extent, right in the beginning of a process, but network development in the intra-municipal context is usually inexistent. One interviewee even described that “Like this collaboration between municipal offices... It is completely lacking... Actors do not know what the others are doing in the same organization”. The lack of discussion between the units within a municipality was identified as one source of challenges in the strategic spatial planning processes. Usually the intra-municipal collaboration is seen as laborious and time-consuming, and it is based more on ad-hoc needs than on continuous network management. In the discussions, it was suggested that more informal communication structures between the various departments should be encouraged. Intra-municipal communication should not be based solely on official procedures and statements, but more on voluntary and informal collaboration, which encourages communication whenever needed, regardless of the official stage of the process.

Some interviewees described the strategic spatial planning processes as unique, whereas some others suggested that planning processes are still more or less similar on a general level, and learning from one process to another could be achieved through the transfer of experiences. In particular, the organizational and professional boundaries should be lowered for learning to happen. This problem was described to be even more severe in case any hierarchical boundaries have to be crossed. One interviewee claimed, “If we think of the reasons why the processes stumble, one is the lack of discourse within the municipal organization. Official statements are made of things, which could have been discussed already during the process”. Currently, the intra-organizational structures in municipalities do not encourage open discussion, as was pointed out by the interviewees. Plans are usually thoroughly prepared before they are opened up for others, even within the organization. This delays the access to the needed feedback during the processes. The sooner the feedback is received, the sooner it can be acknowledged in the process. According to the discussions, informal ways of networking should be more encouraged for process knowledge to flow between the units and the processes in order to find synergies between the different processes. One interviewee suggested, “When there is an understandable paper or product, we can get people to gather together and begin to build up communication... That is completely different from the traditional culture of going to meetings and being so official. That is to get people to get together in a more informal way, and chat with each other. To get to know each other”. The interviewees recognized that process knowledge and memory are usually not
situated in one process only, as the actors move between the various processes. Thus, process memory may be transferred from one process to another, if the communication structures between processes allow.

5.3.5 “If everyone leaves the organization” – advancing process memory thinking in municipal planning organizations

Some focus group participants pointed out that actors understand things differently, influenced by, for example, their educational and professional background. Similar backgrounds were seen as a possibility of supporting shared understanding. Even if some actors would be replaced in the process, they would still share a similar frame of understanding. One interviewee suggested, “It [process memory] is not completely person-related, but is also transferred through traditions and professional frameworks”. However, memory will still be lost. As one interviewee explained: “Learning happens by actors. ... If everyone leaves the organization, much of the learning is lost”. According to the focus group discussions, not everything needs to be documented in full detail. However, working and non-working practices should be documented for being able to develop the planning processes further, as was suggested by the interviewees. Even if the processes are considered unique, some practices and structures may be transferable from process to process when understood clearly enough, suggested by the discussion. Role-based memory, which builds up on the similarity of backgrounds, holds up to a certain level, but better documentation of practices and structures is needed for development purposes in the future.

Memory can be transferred also through interaction, as was claimed in the focus group discussions. Much of the knowledge is attached to the actors, which is a risk, for example, in case of personnel turnover. Process memory should be supported by well-functioning information systems containing substance-related information, as was suggested in the focus group discussions. However, information systems do not solve all of the challenge, and the importance of interaction should be emphasized. One interviewee pointed out that “When it is told to others, the probability of the organization to remember it is increased”. Based on the discussions, process memory may be lost through personnel turnover, but also through the voluntary withholding of information. In addition, it was suggested in the focus group discussions that personal documentation, no matter how detailed, is always difficult to understand for the others. When people change, personal documentation cannot be utilized usually for generating understanding of the previous phases of the process, because of the typically unstructured nature of the documentation. One interviewee described, “The previous planner had left behind all these papers. And I destroyed them while cleaning up the closets. But I did not think anyone could utilize them”.

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Some focus group participants pointed out that personnel turnover and unintended forgetting in the municipal planning organizations are not always a challenge. According to the participants, it may also not be good to replicate the process in a similar way, when the methods have developed over time. As one interviewee put it: “If only few people remember what was done, it also has benefits”. On the other hand, memory of the learned practices may reduce the amount of “process waste”, as organizations can save time through learning. Thus, it was suggested that the organizations could also learn through personnel turnover by adapting new practices from outside. Moreover, when people change, the process memory is dispersed to other organizations as well, serving as a basis for process development also in those organizations. One interviewee suggested, in relation to the personnel turnover rates, “Actually we should have a holistically learning planning system. Not only within one process or unit, but within the whole Finnish planning system”. Thus, process memories and process development are influenced by inputs and experiences from the other organizations, as well. However, some interviewees pointed out that the courage of trying new solutions is typically difficult to acquire.

According to the focus group discussions, planning processes are only one possible representation of the organizational practices in municipal planning organizations. Thus, even if the strategic spatial planning processes are unique and occur rarely, the organizations exist also between the processes, developing their practices further in various other processes, as well. If the practices and experiences are not documented, and the actors change, much of the memory is lost, and processes have to start always from zero. One interviewee imagined a situation in which all other actors would have changed: “If I would be the only one left to make the next strategic spatial plan... It would be difficult to know where to start. There would be so much time spent on trial and error on what to focus on, and in which order”. Thus, the beginning phase of processes can be inefficient, if much time is utilized on testing the practices through trial and error, and re-establishing the networks. Process descriptions could support the organization in situations where the personnel turnover is high, as was suggested in the focus group discussions.

5.3.6 “The world has already changed three times in between” – generating resilient process structures

Currently the processes are not in line with the dynamics and complexity of the surrounding environment, as was pointed out in the focus group discussions. The interviewees pointed out that developing more efficient and flexible process structures is important for the municipal planning organizations in answering
to the dynamically changing challenges of the planning environment. If the processes last long, the plan solution may already be outdated when it is approved, and all resources that were spent on the process, are lost. One of the interviewees suggested that “Is it not a risk? If we have a long-lasting process, which follows the traditional procedures. And everything is done as usual. And the world has already changed three times in between”. According to the focus group discussions, the traditional process structures do not acknowledge the increasing pace of the societal changes. In addition, one interviewee stated, “It can be seen that the amount of errors in the process increases significantly in the traditional process model. And obvious problems arise”.

Improved understanding of the processes and networks can support the recognition of where the resources are spent, as was suggested in the interviews. Currently, planning processes contain much overlapping work, because of the lack of communication and networking. One of the interviewees was worried that the “Resources and their scarcity are always discussed. Moreover, I have noticed that we are not focusing on the right things. And there is much overlapping work in the processes. If we would really think who does the work, and how, we could save so much resources”. Typically, the strategic spatial planning processes are not focusing only on their core activities, but contain elements of other levels of planning as well, as was described by some of the interviewees. However, the knowledge of these elements is not necessarily transferred to the appropriate level of planning to be utilized in the subsequent phases, because of the lack of functioning collaboration with that level. One example of the inefficient use of resources are the plans, which are returned to preparation during the political decision-making process. As one of the interviewees suggested: “Think about all of those plans, which are returned from the Committee. What an amount of work is wasted there! Could that have been avoided with clear and shared objectives and with better communication”.

In addition to the resources, such situations may also influence work motivation. According to the discussions, more fluent communication during the processes could have enabled the identification of the challenges and contradictions already during the process, preventing some of the situations. One interviewee even asked, “Is there idling, if the process cannot proceed when experts are tied to something else simultaneously?” Moreover, some interviewees suggested that SNA could assist the understanding of how resources are spent in the process. Currently, planning processes are criticized due to their experienced inability of estimating, for example, the process duration. SNA can visualize in an understandable manner how much time and resource needs the various inputs and disruptions may cause cumulatively in the processes. In addition, SNA can
support the understanding of the time and resources that are needed to complement the process afterwards, if things are not done in a planned order, as was pointed out in the interviews.

Based on the discussions, currently the strategic spatial planning processes are challenged by their unique and non-routine nature. One of the focus group participants explained, “It feels that land use planning and statutory planning have become very critical in a sense. Or have they been made purposely as such. Or because of their resource-intensity, they have become as such. Maybe if they would be less ceremonial... and more flexible and enabling, maybe some of the fears could be alleviated then”. As they are repeated commonly only every 10–15 years, the processes feel more critical to the actors, and memory of the previous processes is not so strongly in the minds anymore. One interviewee wondered, “Can it be that because the terrible crunch is done so rarely, the actors feel that they have to leave their own sign to the process. Or that they have to be very sharp, as the world is built ready at once. There is now a huge pressure on an individual process”. In more commonly repeated processes, the feeling of uniqueness and criticality is not so strong, as the actors still remember the meaning and the procedures of the process, and do not have to be taught again, as the interviewees suggested. When the processes are repeated more often, also the procedures can be developed more easily, as the memory of the previous process is usually still utilizable within and outside of the organization.

According to the interviews, SNA can assist a municipal planning organization to estimate its vulnerability for involuntary memory loss, and develop process structures, which are less actor-dependent and risky. The focus group discussions ended up in thinking about resilient and flexible collaboration structures over planning level boundaries recognizing the networked character of the processes: “These [networks] should be more widely discussed. And the drawbacks of not acting actively as information collectors and listeners in these networks”. One interviewee also described the hierarchical boundaries, which are restricting interaction: “I cannot ask directly from someone, because he is some steps higher in the hierarchy than I am. Therefore, I have to ask from someone closer to my own level of hierarchy. Even as the one higher up would be the one having the information that I need”. Another interviewee continued by explaining that “Now that there are these exact titles... And when you have some title, you will not go to discuss with someone with a different title, because you are somewhat different from each other. Even if you would have something to say. But it just is not correct”. Some participants suggested in the discussions that developing transdisciplinary teams, which work through shared expertise is challenging in an organizational environment, in which the structure follows strictly sectoral themes. Transdisciplinary teams in this kind of an organizational structure
would require the willingness to think in a new way. However, shared expertise could support the actors in developing their expertise further by allowing them to gain new insights. This supports them in identifying systemic connections between the various expertises, and in identifying more clearly their own role and possibilities for professional input in the processes.
6. Discussion

This section discusses the findings further. First, the potentials of SNA as a method for studying the networked process dynamics, is discussed. Thereafter, the relation of networks and process memory development is considered. Next, the applicability of the findings for planning practice is discussed. In the end, the limitations of the research are described, and the implications for planning practice are discussed. Finally, the section closes with recommendations for potential future research directions.

6.1 SNA as a method for studying the emergent dynamics of networked processes

The discussion of planning processes has varied from technical through scenario and communicative planning processes to processes as complex adaptive systems (de Roo 2012, 2016). The procedural structures and their possible effects over time are not yet understood well. Part of the complexity in planning processes emerges from their socially constructed nature. However, the previous research of networks in public sector has been merely limited to the interaction of organizations and groups, and the actor-relational dynamics are not yet well understood (e.g., Schipper & Spekkink 2015; Siciliano 2016). In addition, discussion of network structural concepts in relation to performance in public administration processes is still scarce (e.g., Kenis & Provan 2009; Lubell et al. 2012), and does not support the understanding of procedural dynamics (e.g., Doreian & Stokman 1997; Adam & Kriesi 2007; Isett et al. 2011; Robins 2015; Schipper & Spekkink 2015). Changes in networks are explained mainly through external factors, not acknowledging their internal dynamics, even though the importance of understanding the interactive processes has been recognized (Innes 1998). The potential of SNA as a method for exploring actor-relational dynamics has been identified (e.g., Dempwolf & Lyles 2012; Lyles 2015), but empirical applications are still scarce. This has been partly explained by the claimed resource-intensity of gathering data, but the need for and potential of understanding process dynamics through quantitative data has already been acknowledged (e.g., Scholz et al. 2008;
Dempwolf & Lyles 2012; Lyles 2015). For answering to the identified need, this research utilized a standardized set of time-series data from one strategic spatial planning process for generating new knowledge of what SNA could contribute to the understanding of the emergent properties of networked process dynamics in planning.

6.1.1 **SNA can reveal the networked dynamics of actual planning processes**

SNA, when combined with longitudinal time-series data, has added value in uncovering the previously invisible aspects of networked process dynamics. As one of the first empirical tests of this perspective in the context of planning process dynamics, the findings of this study highlight the significance of understanding the variety of possibilities of utilizing SNA in investigating how the planning networks evolve over time, as well as the properties and structures of the networks. The chosen methods facilitated the analysis of the network evolution over time considering the structural factors and their effects, driven by their contextual dynamics (e.g., the disruptions pushing the process to a certain direction). When the SNA findings are related to the findings from the individual and focus group interviews, and compared with the identified research needs in the context of networked process dynamics, one can conclude that SNA has the potential for uncovering the actual complexities and internal dynamics of strategic spatial planning processes in a way that has not been revealed in planning research or practice before. The findings suggest that the dynamics during a process can be more complex than commonly assumed by the more traditional methods of planning studies, such as interviews and surveys, which are commonly based on single snapshots in time and prone to memory lack and post-rationalization (e.g., Corsaro & Snehota 2012; Morçöl 2012). Whereas it has been acknowledged that planning unfolds through non-linear multi-actor dynamics over a long time-scale (e.g., Forester 1983, 2008; Innes 1995; Healey 1999, 2007; Tewdwr-Jones 2002; Innes 2005; Forester 2008; Albrechts 2015; Innes & Booher 2010, 2016), it has also been suggested that the research of public administration networks has largely not acknowledged the process dynamics (e.g., Doreian & Stokman 1997; Adam & Kriesi 2007; Isett et al. 2011; Robins 2015; Schipper & Spekkink 2015). If one observes Figures 22 and 23, the difference between the static and the dynamic understanding of the networked structures can be seen.

As has been suggested in the context of the networked structures of planning processes (Klein et al. 2016), various planning paradigms may normatively affect the networks in the planning processes. Based on the findings of the individual and focus group interviews, the structures are affected by various other factors, as well. For example, the findings of the network size dynamics (Figure 24) and
the betweenness centrality dynamics (Figure 26), imply that even as the size of the network varies much over time, for example, due to the various decision-making structures and subprocesses (e.g., investigations), the network structure still remains considerably centralized over time. The centralized structures may be explained partly by the municipal planning monopoly in Finland, setting the municipal civil servants to the core of the planning process. However, based on the individual interviews, the networked structures were affected also by the organizational and actor-relational factors. Overall, the SNA and interview findings together indicate that planning is not done only by an individual expert, but evolves through a network of actors - with considerably varying intensities, as is shown in Figure A5.3 (in Appendix 5). Based on, for example, findings of the degree centrality dynamics (Figure 23) and betweenness centrality dynamics (Figure 26), which indicate the networked structures, when weighted with various measures, the network structure resembles a balanced communicative structure only rarely. More regularly, the network features the comprehensive-rationalist structure, centered around one or two individuals. Consequently, SNA may also support the study of the various planning paradigms by revealing the networked structures of the actual planning processes. Based on the findings from the individual and focus group interviews, by illustrating the networked structures, also their possible effects on the planning practice (e.g., on process memory development) can be better discussed.

A limitation of SNA is its inability of offering thorough explanations of the reasons behind the varying networked structures. Based on the individual interviews, the networked structures were affected by dynamics on individual, actor-relational, organizational, and even higher levels, affecting the direction of the process. For example, organizational traditions and challenges in social relations were named in the individual interviews as reasons for some of the dynamics in the networked structures. Thus, the network evolved as a multilevel system during the process. Due to its relational nature, SNA has potential in studying such relational perspectives in planning processes. SNA offers various measures (e.g., density, betweenness centrality, and modularity) for understanding the relational structures of planning processes, and supports the understanding of planning as an interactive practice. Moreover, when combined with other methods, such as individual interviews, the reasoning behind the dynamics can be explored more thoroughly, as well.

6.1.2 The visual-analytical strengths of SNA can be supported with more explanatory methods

SNA, as a visual-analytical method, supports the understanding of the dynamic structures with the help of various standardized structural analyses. As has been
pointed out already by previous research (e.g., Wasserman & Faust 1994; Gibson et al. 2013), one specific strength of SNA is its ability to utilize graph visualizations. The findings of the individual interviews support the suggestion, as many of the interviewees pointed out the descriptive character of the visualizations. Based on the individual interviews, many interviewees were able to read the network graphs without former experience of such visualizations. In addition, some of the interviewees were able to identify certain persons or activities in the graphs, and utilize the graphs as a way of reconstructing the forgotten memories. Moreover, the network graphs were understandable also for the participants in the focus group discussions, who had not participated in the specific process. Based on the findings, the SNA findings supported the interviewees in identifying the possible benefits and challenges of various networked structures and their potential effects, suggesting that the analyses should be discussed with other planning-related actor groups (e.g., the elected officials) as well for revealing the internal complexities and institutional restrictions affecting the processes.

For allowing the statistical analyses, SNA requires a standardized set of data with identifiable nodes and their relations. Longitudinal time-series based SNA, as a method, is very data-dependent. The study of the networked dynamics over time in a wide and long-lasting process requires a vast amount of detailed and standardized data to be applicable. The descriptions of the utilized data and methods have to be detailed enough for supporting the understanding of the analysis. In addition, the context-specific factors have to be described for enabling the understanding and comparison of the findings. In this research, the data was specifically collected and processed to be applicable for SNA. Based on the individual interviews, it can be concluded that the studied process was documented exceptionally well to be analyzed, which also made it an interesting example to study. Further suggested by the individual interviews and focus groups, the current planning processes are documented through a variety of ways ranging from personal notes on paper to specific information systems. However, the stored information usually lacks the specific context for being applicable also afterwards, as was described in the focus group discussions. In addition, the documentation is typically not systematic or standardized. Thus, at the moment the utilization of process related data afterwards is still challenging, and requires much manual work to be applicable for SNA. As the amount and diversity of raw data behind the data utilized in SNA shows, process research is highly data-intensive and depends strongly on the quality of the data available. Moreover, the access to the process data is dependent on the functioning collaboration and building of trust between the research and practice.
6.1.3 Validation of the SNA data and findings

The SNA in this research was based on the time-series data of organized meetings. As the processes are not systematically documented, systematic datasets of interactions during the processes are not widely available afterwards. Thus, as the data contained only one means of interaction during the processes, also the data selection was validated in the individual interviews. According to the findings of the individual interviews, organized meetings are the most important means of interaction for setting a direction for a planning process, and the most important decisions of the process are made in the organized meetings, at least in the context of the analyzed process. Consequently, in this case the meeting-based data can be considered to portray a picture of the most important type of interaction happening during the process, concerning the setting of a direction for the process, and the memories of it.

SNA has not been applied previously to process analysis purposes with longitudinal time-series data in a planning context. Lyles (2015) has pointed out the need for utilizing SNA and quantitative data for understanding the procedural dynamics, but so far, there are no established practices for assessing or interpreting the SNA findings in a planning context. Consequently, in this research the findings were validated through individual interviews. For the validation, a series of individual interviews was organized with actors, who had most intensively participated in the analyzed process. The interview protocol was designed to allow the comparison of the memory-based and the SNA-based descriptions. The assumption behind the choice was that these actors would be best able to analyze, whether the findings of the SNA were right or not, considering the specific process.

All of the interviewees pointed out similar aspects. Generally, their view of the process was very similar, even as their participation in the process varied much. Based on the findings of the individual interviews, there were generally no contradictions in the SNA findings when compared with the memory-based descriptions of the interviewees. In addition, no contradictions were obvious, when the interview answers of the parts one (process memory) and two (validation of findings) were compared. However, due to the scarcity of memories of the interviewees, there were many moments of surprise during the way. By comparing the findings of the social network analysis and the individual interviews, one can conclude that the SNA findings describe the dynamics of the specific process as they happened. Further, some interviewees in the individual and focus group interviews pointed out that the findings are partly applicable to other planning processes on the same level. However, that would require comparisons of multiple processes, and is acknowledged as a future research need.
6.2 Process memory development requires support

The importance of memory for organizational learning has been acknowledged (e.g., Lehner & Maier 2000), and descriptive concepts for memory in organizations have been suggested (e.g., Wegner 1987; Walsh & Ungson 1991; Spender 1996; Olivera 2000; Soda et al. 2004; Innes & Booher 2010). The characteristics and measurability of process memory development, reaching beyond organizational boundaries in networked planning processes, are not yet understood well. Learning, memory and knowledge are inseparable (e.g., Spender 1996), and influenced by networked structures enabling or restraining knowledge transfer practices (e.g., Burt 2000; Rowley et al. 2000; Perry-Smith & Shalley 2003; Reagans & McEvily 2003; Wong 2008; Laurent et al. 2015). For answering to the identified research needs, the networked process dynamics were elaborated further from the viewpoint of process memory development with methodological triangulation. In the individual interviews and the focus group interviews, the process memory and its relation to networked structures through SNA findings was discussed. This section focuses first on the meaning of process memory in municipal planning organizations, thereafter discusses SNA as a method for studying process memory, and finally explores the possibilities of revealing the relationship of networked structures and process memory development capabilities through SNA.

6.2.1 Process memory in planning processes is scarce and strongly centralized

Based on the SNA findings, a strategic spatial planning process is a dynamic, continuously changing system. Memories of such a system serve as a basis for learning, and consequently, for process development practices. Based on the findings of the individual and focus group interviews, at least two types of memories develop during a statutory strategic spatial planning process: content-related memories, and procedural memories. The content-related memories concern the rationalization and justification of the plan solution (i.e., the decision chains behind the plan), and were brought up specifically when the thematic dynamics (in Figures 28–31) were discussed in the individual interviews. Based on the individual interviews, the content-related memories were context-dependent and spatially-bound, and applicable primarily between the various planning levels in a certain spatial development process (e.g., from a strategic spatial plan to a detailed plan). Based on the process memories, the importance of content-related memories is emphasized in the communication between the various actor groups and organizations (such as elected officials, landowners,
residents) in justifying the made solutions, and answering to the questions like what and why.

Based on the individual and focus group interviews, procedural memory is more structural in orientation (i.e., working and non-working practices, process structures, and sequential process descriptions). Findings from the individual and focus group interviews imply that the procedural memories can be utilized both between the different processes within one level of planning (e.g., repetitive structures and understanding of the effects of the various structures from one strategic spatial plan to another), and among the various levels of planning (e.g., memory of the network of actors to be utilized throughout the planning and implementation process). Based on the findings of the thematic dynamics (in Figures 28–31, and in Appendix 8) and the individual interviews, the importance of procedural memory is more critical in the intra-organizational process development, answering to questions like how, why, who, and when.

Findings from the individual interviews, when related to findings from the focus group interviews, imply that the memories of strategic spatial planning processes are prone to unexpected and voluntary forgetting, affected by the actor-relational dynamics of the processes. Over time, the process memories are affected also by the post-rationalization of the dynamics, influenced by the role of the actor within the process. The findings from the individual interviews suggest that process memories are saved typically as patterns of typical activities within a process, detached from time, distinguishing the process from other processes, and giving character to the dynamics in the specific process. When comparing the findings from the SNA and the individual interviews, one can conclude that the less an actor has involved in the process, the more random and general the patterned memories of the process are. When the memory-based descriptions of the individual interviews are contrasted with the SNA dynamics, the difference in the level of detail in the process descriptions can be recognized. On the contrary, suggested by the memory-based descriptions of the individual interviews, the more an actor has attended in the process, the more exact the memories tend to be, including also the causal explanations of the interaction on the actor-relational level, and between the process and its environment. Differences in the process memory among the process participants are considerable, and memories are related typically to one’s own position in the network, and the thematic responsibilities. The findings from the individual and focus group interviews suggest that this is partly because the knowledge transfer for supporting the holistic understanding of planning processes is insufficient, and the interdependencies between the various themes are typically understood by few. Based on the thematic SNA findings, and further confirmed by the individual interviews, there are structural disconnects in the process memory between the
various sectors, but also among the various scales of planning. The transfer of memory from one sectoral theme to another is not supported enough by the networked structures, nor is it supported between the various scales of planning.

Process memory is an essential factor for a municipal planning organization to learn. Moreover, suggested by the findings of the individual and focus group interviews, process understanding, supported by process memories, is essential for a planning organization’s ability to develop its processes. According to the interview findings, planning processes have generalizable and repetitive procedural structures that go beyond the unique nature of processes. Learning from the past experiences may, consequently, support the organization in developing its practices. Memories are not always valued in planning, but the organizations may suffer from a “clean desk / clear deck” syndrome (Abbott and Adler 1989). As the findings from the focus group discussions suggest, destroying old documentation is, indeed, common. However, the reasoning was that the utilization of person-related documentation, which cannot be connected easily to its context, is challenging to utilize when no memory of its procedural context remains. Thus, the continuation of specifically the substance-related process memories is dependent on the ability to set the memories to a specific context. If the context is lost, also the information may become valueless.

In addition to the accidental forgetting of process memories, the comparison of findings from SNA and the individual interviews suggests that post-rationalization was evident in some of the individual interviews. Post-rationalization is a typical challenge in interview-based process research, as pointed out by for example Corsaro and Snehota (2012), and Morçöl (2012). The methodological triangulation in the research design of this research allowed the easier identification of the rationalization. For example, in some of the individual interviews, the process was described to having moved on smoothly without any surprises or challenges along the way. When the SNA findings were shown, and partly suggesting the opposite, there were instant rationalizations of why the process structures had to be exactly as they were in the SNA findings. When comparing the findings of the SNA and the individual interviews, it seems that process memory is not only related to one’s intensity of participation in the process, but is also dependent on one’s role in the process. The greater stake a person has considering the process, the wider the rationalization of the answers may be. In addition to the post-rationalizations, based on the findings of the individual interviews, some interviewees were able to recollect certain points in the process, based on the SNA findings, even if they had not referred to those aspects in the memory-based part of the interviews. However, there was a clear difference between the post-rationalizations and the SNA-based recollections.
based recollections, the actors were able to memorize and describe certain moments in the process, based on the network graphs, whereas the post-rationalization-based answers were not referring to any actual activities during the process, but to more general level rationalizations of the visualized structures.

The findings of the individual and the focus group interviews suggest that the experiences in the municipal planning processes may sometimes be demanding, and actors may even aim for intentional amnesia when trying to forget the challenges in order to move on. This can also have influences on the process memory. Consequently, some aspects of the processes may be remembered, but there may still be unwillingness to discuss the issues for one reason or another. As an example, in this research, two of the invited interviewees answered that they would rather not go back to those days in their memories, and declined the invitation. Thus, processes affect the actors in a variety of ways. As is typical for human interaction, some experiences are difficult and challenging, and are not discussed usually during or after the processes. Instead, the actor-related issues, as described in some of the individual interviews, may be allowed to escalate. According to the findings of the individual interviews, the planning organizations and the planning education do not generally give tools for the ability to cope with the issues of human interaction, and its possible effects and challenges. Instead, the discussion of planning is strongly institution-centered, and detached from the thorough understanding of the human interaction.

6.2.2 Process memories are related to the networked structures

Based of the findings of this research, the utilization of the longitudinal time-series data allows the analysis of evolving phenomena, such as process memory. Moreover, SNA as a method for analyzing relational structures, supports the research of process memory development, which is influenced by the various networked structures enabling or restricting the knowledge flows in the processes. Currently the related factors, such as organizational memory or experience (e.g., Wegner 1987; Walsh & Ungson 1991; Spender 1996; Olivera 2000; Soda et al. 2004; Innes & Booher 2010), are mainly utilized as descriptive concepts without encouraging their measurement and comparison. The SNA findings, when compared with the interview findings, suggest that SNA has capacity for generating statistical measurement criteria for such concepts, as well. When comparing the findings from the individual interviews with, for example, the dynamics of betweenness centrality and thematics (in Figures 23, and 28–31), the memories seem to be related strongly to the networked structures, and their knowledge transfer capabilities in the process. A more thorough analysis of the measurement crite-
ria concerning process memory development would require comparisons between various processes for better understanding of the effects of the process related biases, and of the scales of the statistical measures between the processes. This has been identified as a research need for future. As this research was based on data from a single process, and as such, comparisons are not yet available of planning processes, the statistics in this research were analyzed only in relation to the specific process through comparing them with the internal process dynamics over time.

When findings from the individual interviews are compared with the findings from the focus group interviews, SNA of planning processes seems to have possibilities for supporting the understanding, evaluation and development of planning processes, for example from the perspective of process memory development. Based on the focus group findings, SNA may support the identification of structures, which may cause siloing, or support the possibilities for enhancing the interaction and collaboration within the processes. The findings suggest, for example, that the density (in Figure A6.2 in Appendix 6), which may increase the likelihood of shared expectations across a network (Rowley 1997) did not reach high scores during the process, apart from the beginning phases when the actors from various roles discussed the goals and visions together. In addition, the findings from the individual interviews suggest that the process structures did not support the generation of an overall understanding of the process or its goals for all actors. As suggested in the findings of the individual interviews, some of the interviewees felt they had good awareness of what was happening in the process. On the contrary, some interviewees were not aware of what was happening, but that had not disturbed their work. Finally, some interviewees were not aware, and thus, were not able to work efficiently. Moreover, the findings of the individual interviews suggest that the amount of informing was dependent on an actor’s own activity in requesting information, but that sometimes there was so much hurry with other processes that they did not have time to go around asking for information if it was not an active phase for themselves in the specific process. Moreover, during the process the subnetworks typically contained only one or two roles simultaneously (described in Figure A5.2 in Appendix 5), hindering the efficient knowledge transfer and process memory development between the various roles. When combined with the findings that the actor level differences concerning betweenness centrality were typically high (described in Figure 25), and the various themes were connected only through very few actors (described in Figures 28–31, and in Table 4), the findings imply that the networked structures of knowledge transfer and process memory development in the process were considerably vulnerable. This was confirmed further by the findings of the individual interviews. Consequently, by illustrating
the importance of process memory development, the generation of new understanding of the networked process structures and their possible effects may be encouraged.

6.2.3 Highly centralized structures may risk process memory development

Various structures influence the knowledge transfer, information diffusion and learning capabilities in networked settings (e.g., Burt 2000; Rowley et al. 2000; Perry-Smith & Shalley 2003; Reagans & McEvily 2003; Wong 2008; Laurent et al. 2015). Further, suggested by Mäntysalo and Saglie (2010), planners have control over information over other process participants. Based on the findings of the betweenness centrality the thematics (in Figures 23, and 28–31), one can see that knowledge and memory in the analyzed planning process were strongly concentrated on very few individual actors. Moreover, the findings of the individual interviews suggested that the centrally located actors were trusted as sources of information, acting as knowledge brokers in a way described by Rydin et al. (2007). Moreover, the findings of the individual interviews suggest that the previously established networks were utilized primarily for information acquisition and the actors turned more easily to someone whose expertise they already knew in advance. In addition to the challenges related to knowledge control and transfer, pointed out in the individual and focus group interviews, the strongly centralized process structures were identified as a challenge to a municipal planning organization in case of personnel turnover.

The SNA findings supported the identification of the core team actors, and their relations with other relevant actors, later confirmed by the individual interviews. Based on the findings of SNA and the individual interviews, memory of the analyzed process was developed also elsewhere than in the unit, which was officially responsible for the planning process. Although the memories of the process were generally scarce, multiple participants visited the process for varying periods, carrying parts of the process knowledge forward to their own organizations. Consequently, memory in the process was not only located in the specific unit, but was dispersed more widely through the network. Moreover, through collaboration and personnel turnover, the memories may flow to new locations. When the findings from the individual and focus group interviews are compared, one can conclude that currently process documentation typically lacks context, and the process memories consequently depend on the individual experiences. In the case of high personnel turnover, holistic memory held only by one or two individuals is not a resilient strategy, and is prone to actor-level changes.
The importance of weak ties in offering access to new and diverse knowledge has been pointed out already previously (e.g., Granovetter 1973; Perry-Smith & Shalley 2003; Perry-Smith 2006; Hansen & Villadsen 2017). Further, the findings of the focus group interviews suggested that in addition to revealing the central actors within one planning process, SNA might support the identification of the key actors participating in various processes, carrying the memories from one process to another. Suggested by the focus group findings, these actors are not necessarily the most central or strongly tied to the individual processes, but may be more peripheral, holding diverse horizontal knowledge and memories of various processes. Those actors can work as the links between the various processes for being able to transfer process memories. Even though one actor may forget the process memory, pieces of it may remain in other locations, as was suggested by the findings of the focus group interviews. Thus, the existence of process memory should be acknowledged also between various processes and organizations, and not only within one single process.

Based on the findings of the focus group interviews, in case of personnel turnover, the actors typically change at once in the context of municipal planning processes. Mentoring between the previous and the subsequent actor in a same position is not common, due to institutional reasons. Instead, other actors in the particular unit, who may not have been involved in the specific processes intensively, or at all, do the possible mentoring. The position of the actors holding the same formal position in the process was tested through SNA for comparing whether the actor’s general position in the network was determined by the official position of the actor, or whether it was more dependent on other factors. The findings, based on individual actors’ positions (weighted by degree and betweenness centrality in Figures 23 and 26) suggested that the relational position of the actors was not completely dependent on the formal positions. Actors holding a same formal position after each other were situated in various positions in the overall network structure. Whereas the previous actor might have been in the center, and closely connected to certain actors, the subsequent actor may have been less central, and connected to a slightly different set of actors with a different set of ties in the process.

Previous research has identified that the inner core of a network typically consists of ties providing support over time, whereas the outer core represents the ties, which assist at particular points in time (Cummings & Higgins 2006). When compared with the findings of degree centrality dynamics (in Figure 23), this seems to be the case also in the analyzed process. The more centrally located nodes were the ones enduring over time, whereas the more peripheral nodes typically changed from one phase to another. Taken together with the social capital related ideas of Oh et al. (2004), two types of ties in the complex settings can
be thought to exist. The more peripheral ties with access to diverse social capital, are adjusted for ad hoc support in the process at certain points of time, and offer access to other ongoing processes, transferring process memory from one process to another. The core ties that offer more homogeneous social capital and constant support have a more fluent knowledge transfer due to the strength of ties. When one compares these, for example, with the findings of the betweenness centrality dynamics (in Figure 26), showing the relative position of various actors, and the findings of the individual interviews, one can conclude that the central actors were most intensively exchanging information with each other, and were also the most trusted as information sources for the more peripheral actors in the process. In addition, taken together with the actor-specific roles, some of which are shown in the network graphs in Appendix 10, one can see that the diversity of the roles in the network typically increases in the more peripheral parts of the network. The core network typically consisted of municipal civil servants, most of whom were from the unit, which was responsible for the process.

When comparing the SNA and individual interview findings, one can conclude that the actors had generally very scarce active memories of the process. However, during the interviews, the SNA findings enabled them to describe the process, and the causes of the networked structures in more detail through opening up access to the more unconscious memories, as well. Further, the comparison of the findings from the SNA and the individual interviews suggested that the process memories were related mainly to the specific activities in which an actor had participated, and did not spread beyond the immediate responsibilities of the specific actor. As was mentioned already earlier in the discussion, the networked structures partly affected the process memory-related challenges, intensified by knowledge transfer practices. Moreover, the findings of the individual interviews suggested that the actors were challenged also by allocating their resources among the various simultaneously ongoing processes, decreasing their capability of concentrating on the memorizing of the specific process. Based on the findings of the individual and focus group interviews, when multiple processes are going on simultaneously, the ability to form a holistic understanding of an individual process beyond one’s own sector-specific expertise is reduced. Due to the multiplicity of ongoing processes, there is not enough time for the holistic consideration and information acquisition that would be needed in individual processes. In addition, the findings suggested that sectoral themes are considered traditionally too late in the planning processes, which may further reduce the possibility of reaching systemic solutions. Moreover, the actor-
relational factors also influence the knowledge transfer and process memory development practices, as was suggested by the findings of the individual interviews.

Based on the findings of the thematic dynamics, there were actors attached to multiple themes during the process, and actors attached to only one or two themes. When process memory is concerned, few connections between the themes may suggest that the knowledge transfer between them is vulnerable to memory loss, as was further confirmed by the findings of the individual interviews. When comparing phased thematic dynamics (in Figures 28–31), one can conclude that in many phases, all active themes were connected to each other through only one actor, even if some individual themes might have been tied more strongly to each other. Moreover, in some phases there was no link between all themes, suggesting that there may have been challenges in the thematic knowledge transfer and process memory during the process. These findings were confirmed further by the findings of the individual interviews. Based on the thematic findings, the intensity of the ties between the different themes varied considerably during the process, and some themes were connected considerably more weakly to each other. When this is compared with the findings of the individual interviews, the SNA-findings indicate that the process memory covered usually only some of the themes in the process, due to the strongly centralized knowledge flows within the process. Furthermore, the findings of the SNA and the individual interviews suggest that the knowledge between the various sectoral themes was not flowing fluently, further decreasing the ability of holistic understanding and resilient memory of the process. This may affect the organization’s capacity of process memory development and, consequently, learning in the long range. Innes and Booher (1999) have suggested that the complex adaptive systems are dependent on the ability of the informed people to work as empowered actors in the planning processes. Based on the findings of the SNA and the individual interviews, this was not always the case in the analyzed process, but the actors were sometimes unaware of what was happening due to the various structural, relational and intentional reasons. Further described by the findings of the focus group interviews, certain networked structures are considerably more vulnerable to these challenges. In particular, the smaller the number of the core actors is, the more vulnerable the process may be to the various knowledge and memory related challenges.
6.3 Applicability and relevance for process development purposes

A frequently occurring gap between planning research and practice has been identified, typically challenging the utilization of the research findings in the process development practices of planning organizations (e.g., Friedman 1967; Isett et al. 2011; Rydin 2013; Newman 2014; Head 2015). Thorough analyses of planning processes over time have been scarce, even though the processes have been discussed by many (e.g., Banfield 1959; Lindblom 1959; Dror 1963; Altshuler 1965; McLoughlin 1969; Faludi 1973b; Chadwick 1978; Forester 1999; Innes & Booher 2010; de Roo 2012). Moreover, Rydin (2013) has pointed out that the suggestions concerning planning practice development have remained on a too general or abstract level to be utilized by planning practice. The generalized descriptions ignore the often invisible actor-relational complexities within the processes (e.g., Schipper & Spekkink 2015; Siciliano 2016), challenging the thorough understanding of the complexities influencing processes over time. For answering to the identified needs for more collaboration between planning research and practice, the applicability of the SNA findings was elaborated further in a series of individual and focus group interviews.

6.3.1 Shifting focus from ad hoc to long term interaction and network development

Based on the findings of the individual and focus group interviews, process thinking was challenging for many of the participants in this research. Moreover, based on the memory-based process descriptions of the individual interviews, it seems that some actors have a more intrinsic ability to understand and describe processes. Those interviewees were generally better able to describe some of the process-related aspects, and point out relevant factors directing the process forward than the other as intensively participated actors. Many interviewees also explicitly suggested that their process understanding is weak. In the findings of the individual and focus group interviews, the SNA findings were identified as a means for supporting process understanding in municipal planning organizations, for example, by enabling the understanding of networked process structures and their potential effects. In addition, the findings of the individual and focus group interviews suggest that the discussion of the networked processes is advantageous in general for raising the awareness of processes and networks in planning organizations.

When relating the idea of a process ecosystem (Figure A5.1 in Appendix 5) with the individual interview findings, one can conclude that as a complex adaptive system, a networked planning process does not operate in isolation, but is interconnected to a multiplicity of other simultaneously ongoing processes on
various levels of the surrounding environment. In the individual interviews, the analyzed planning process was described commonly through comparing it with other processes, and by pointing out the existence of parallel self-organizing networks, which are simultaneously aiming at reaching their objectives in the parallel processes, encountering the municipal process only infrequently. By identifying the other simultaneously ongoing processes within the ecosystem, the most relevant parallel processes (e.g., other level planning, development, and implementation processes) can be identified, and links to them can be established. In addition, the most relevant disconnected subnetworks and their actors may be identified through such analyses during the processes, and they can be rejoined with the networks. Moreover, based on the SNA findings, the planning process did not remain stable, but evolved continuously over time. Based on the individual interviews, there was not a clear preconception of the process in advance. The regulatory process was designed on a general scale as the process began, and as the participation and assessment plan was initiated. However, as the SNA and individual interview findings suggest, the process evolved to multiple directions during the way, as the uncertainties and disruptions modified the course of the process, and were reflected also in the network dynamics. According to the findings of the initial process analysis (in Appendix 5), and the individual interviews, there was not a clear process plan, but rather a regulation-based time frame to follow, allowing the maximum amount of adaptation during the process. In addition, there were no commonly agreed policies concerning knowledge transfer in the process.

Some common network structures and their possible effects have been described previously, for example, by Scott (1991), Wasserman and Faust (1994), Rowley (1997), McCubbins et al. (2009), and Cummings and Cross (2003). Based on the focus group findings, not one of the network structures during the process is optimal for a whole strategic spatial planning process. Instead, various structures may be optimal for different processes and phases depending on the set objectives. Based on the findings, all of the structures have their own potentials and challenges, which come up in different settings. Thus, there is no optimal structure to fit all planning processes, but the feasibility of the structural choices should be left for meeting the context-specific requirements of the various processes, as was suggested by the findings of the focus group interviews. However, awareness of the possible effects of the different structures is valuable for process development purposes in municipal planning organizations. The focus group findings further propose that a resilient process should include various structures and phases, which are in line with the objectives of the specific process, allowing also variation between the phases, processes and organiza-
tions. If the most memory-resilient structure equals multiple people, participating in meetings just in case, as in the complete structure, it might still not be resource efficient for the planning organization, when other processes are considered as well. Moreover, the findings indicate that certain types of networked structures may be beneficial at certain points during a planning process.

Based on the findings of the focus group interviews, in addition to the network-level dynamics, SNA may support the identification of the actor-relational dynamics. When comparing the findings of degree centrality dynamics (in Figure 23) and the individual interviews, one can conclude that there were challenges in the patterns of participation of certain actor groups (e.g., detailed planners, landowners), which should have been better integrated to the process along the way. When comparing these with the findings of the focus group interviews, SNA may support the identification of the key actors along the processes, allowing the interaction and participation at right times. For example, a strategic spatial plan is intended to regulate the work of detailed planners, and they should be offered the ability to understand the rationalizations behind the plan solution, as was suggested in the findings of the individual and focus group interviews. Afterwards, adopting the reasoning of the plan is slower, and knowledge gaps between the strategic spatial planning process and the subsequent processes may evolve.

As was suggested by the focus group interviews, SNA may support planning organizations in recognizing the meaning of networking and collaboration in their processes. Taken together with the findings of the individual interviews, SNA, as a visual analytical method, offers easily understandable relational graphs of the positioning of the various actors within the processes, for example, for the planning organization to identify the need for key expertises in the process. For example, based on the degree centrality dynamics (in Figure 22), ties to the subsequent levels of planning were established already in the beginning of the process, but the central actors of the subsequent planning phases moved from the central core team to the fringes of the network during the process. However, their participation in the process was persistent. On the contrary, based on the individual interviews the external experts (not part of the municipal planning organization), who would be needed also in the subsequent planning processes, participated in the process only in an ad hoc manner. As has been recognized in previous research, network closure seems to be long-lasting, once a link has been established (Soda et al. 2004, 903). This was confirmed further in the individual interviews of this research. However, the meetings with the external experts missed continuously the representatives of the subsequent planning processes (e.g., detailed planners) who would have been responsible for maintaining the link in the upcoming processes, as well. Instead of working
as a knowledge broker and linking people together for the benefit of the whole urban development process chain (exceeding the immediate boundaries of the strategic spatial planning process), the network formation concentrated more on the ad hoc needs within the process itself. Thus, based on the findings from the individual and focus group interviews, SNA may support a planning organization in analyzing its own network structures and developing its own network strategies further after the possible challenges of current structures have been identified, and their causes have been reflected on.

When findings of the initial process analysis (in Appendix 5) are compared with the findings of the individual interviews, one can conclude that a considerable amount of time is spent on various organized meetings during a strategic spatial planning process. Moreover, the municipal planning organization may be unaware of the total resources utilized in the meetings. Consequently, it is not indifferent how the meetings are organized, and what is accomplished in the meetings. Traditionally, the role of the meetings has been important for ensuring equal information transfer, as the findings of the individual interviews suggested. The findings of individual and focus group interviews, when taken together, imply that some of the organized meetings should be replaced with other means of communication. For example, part of the informing and check-up meetings could be replaced, and the generation of an overall understanding of the process situation could be supported by more integrated means of communication than by having separate meetings with all actor groups. Furthermore, interaction that is more informal should be encouraged for bonding. In addition, faster sprint-like meetings could be applied for applicable themes in the process in order to test ideas more rapidly before entering long-span subprocesses. Moreover, when meetings are organized, there should be a clear agenda and objectives, and the main outcomes should be well summarized and distributed to all relevant actors.

SNA may also support the planning organization in identifying the possible disruptions within the processes by visualizing the network dynamics. As the findings from the degree centrality dynamics (in Figure 23) suggest, the process dynamics were influenced by some distortions over time, affecting the network structure and its various variables, together with the resources tied to the process. Consequently, the findings of the focus group interviews indicate that it would be important to understand the different aspects of the networked dynamics in order to assist the planning organization in identifying the moments when the processes are being disrupted by externalities (e.g., resource-dependency and network effects of investigating themes belonging to a different level of planning), as well as estimating the possible influence of the disruptions. Even originally small inputs may lead into accumulating network structures,
which reserve resources from other streams of activities (e.g., from other simultaneously ongoing processes), or influence the duration of the process. This finding is in line with the previous research, stating that the specific events in the processes may affect the subsequent network structures and activities in unexpected ways (e.g., Chou and Zolkiiewski 2012). Consequently, the analysis of the network dynamics may support the comparison of whether the process responds to the set objectives, as was suggested in the individual interviews. In addition to the possible disruptions, what happens during a process may differ from the original objectives, as also the processes may be carried out as usually, even if the objectives would have requested something else.

6.3.2 Focus should be put on the scalar and sectoral integration of the networks

Institutions and networks should not be seen as substitutes, but as co-existing in organizations (e.g., Lubell et al. 2012). This is in line with the findings of the individual interviews, which suggested that the networked structures did not go across all scales of the process, but were restricted partly, for example, by the organizational hierarchies. As the findings from the individual interviews suggest, the networked structure was merely a way of working, affecting for example the knowledge transfer and to some extent the daily decision-making in the processes. However, the networks in the process were scale-bound, and for most parts were not expected to transfer to the other levels of the process, or to other processes. Instead, the general organizational form was still hierarchical, defining for example the formal decision-making structures in the process. Thus, the networked way of working did not directly interfere with the institutional arrangements, such as decision-making hierarchies. Instead, both of them co-existed simultaneously, affecting the actor-relational behavior on the intra- and inter-organizational scales. When the SNA and individual interview findings are compared, one can conclude that the network and the actors were only empowered to act within the boundaries of the institutional arrangements, which for example defined the interaction patterns to some extent.

Previous research has identified three approaches to public administration, ranging from traditional public administration to new public management and governance networks (Koppenjan & Klijn 2016). The SNA and the individual interview findings suggest that the analyzed process had a networked way of working. However, there were various challenges in the networked practices, partly influenced by the institutional lock-ins concerning, for example, the knowledge transfer, and process memory development in the network. Based on the individual interviews, the networked practice took place within a frame, which still held features of the traditional public administration view. Thus, the network
perspective did not go across all system scales. In addition to the scalar considerations, also the continuum between the various sectoral themes should be considered. In addition, the traditional hierarchies and the institutional control practices were guiding the process forward, which, according to the findings of the individual interviews, were kept also separate from the more detailed and implementation related scales of development. Still, the process also had multiple features of the network perspective, based on the comparison between the ideas of Koppenjan & Klijn (2016) (in Table 1) and the findings of SNA and individual interviews. For example, the goals were negotiated and developed in an interactive process, and various actors were invited to join the process over time. However, as the process was not working in a genuinely networked environment, but followed more the line of traditional public administration, the knowledge transfer (and its effect on process memory development and learning capabilities) was more ad hoc than long span focused. The content was not explored in networked settings, but only a few actors were responsible for integrating all themes into a plan solution, and the network meetings of the plan solution were merely informative rather than co-creational, based on the individual interviews.

Based on the findings of the focus group and individual interviews, network generation takes time, as does the creation of shared trust and understanding. Building up a network is a lengthy process. Thus, an aware network strategy may be resource efficient for a planning organization, as networks should not be built only for ad hoc needs, but for long time collaboration to be utilized in other processes as well. Based on the findings of the individual interviews, there were disconnections in the networks between various scales. When the strategic spatial planning processes and the more detailed levels of planning are seen as a continuum, the networks can be managed in a more holistic manner. They do not have to be formed again for every process, but can follow the planning processes from the strategic to the more detailed levels, supporting the actors to carry the process memory through the whole development process. The various actors should not be separated strictly into different phases of the long development processes, but should be seen as an intrinsic part of the whole process, with varying intensities from phase to phase. With a more holistic and continuous network strategy, also the process memory development may become more resilient, as the actors receive information of the process more continuously, and do not have to be familiarized with the process every time they participate in it. Instead of the various separate scales of planning, the process should be seen as a more integrated urban development process, containing various scales of planning at various times.
As was identified in the background section, the discussion of the rational-comprehensive and disjointed-incrementalist models of planning has been long. Based on the findings, the analyzed process in the research contained features of both. The process was described often through the separation of themes and expertise, offering only a restricted view of the process for many of the participating actors. Based on the findings, the municipal planning organization was separated to various thematic and scalar parts, and the discussions in the processes were carried out usually only with one sector at a time. When the findings of the thematic dynamics are compared with the findings of the individual interviews, one can conclude that the substance-related complexities were dealt with decomposition and specialization instead of opening them up for discussion in order to find the possible interdependencies between the various themes. As the findings of SNA and the individual interviews suggest together, the themes were handled mainly with the core team and the assigned experts, and the various themes were kept separate from each other.

Based on the individual interviews, due to these reasons, the overall picture of the process remained very fragmented for many of the participants, and many actors did not have the ability to frame their own expertise as a part of the whole. Some of the original goals of the plan still suggested more systemic and holistic aims for a more rational-comprehensive model of planning. However, in general, there was a duality between the incremental practices and the comprehensive aims of the process, influencing also the ability of coping with the complex interdependencies, as was suggested in the individual interviews. The findings suggest that the sectoral themes were handled separately, and many actors did not have a holistic awareness of all themes simultaneously. Considering the systemic interconnections between the various themes, they should be considered together in the process.

Considering the cumulative thematic dynamics (in Figure 27), one can see that the actors, who were dealing with the decision-making theme, were typically only linked to that specific theme, and not to any other themes. Moreover, the findings of the SNA and the individual interviews suggest that the encounters of the political and municipal processes were infrequent, and did not form a strong continuum. Previous research has recognized that the less the political actors have been involved in socially constructing the shared understandings over time in the planning processes, the more vulnerable the processes are for uninformed decisions and unacknowledgement of the prepared expert information (Innes 1998). Thus, SNA may support the consideration of how the different network structures can constrain or enable the goals set for the processes, and assist the discussion on the possible development needs. Moreover, SNA may support a planning organization in identifying certain structures, which may cause a risk,
for example, for process memory development. By understanding the risks of the various networked structures for the process memory development, a planning organization can generate better support structures for such situations. For example, if an organization is aiming for more resilient structures concerning process memory development, the identification of the structures, which prevent the generation of more holistic memory of the process, may reveal the possible needs for structural re-evaluation. In addition, a better identification of the actors involved in the processes may assist the organization in recognizing that the most relevant actors are involved in the process at right times.

A more holistic network approach does not happen by itself, but is restricted by the various existing institutional boundaries, which were identified in the findings of the individual interviews. Based on previous research, fragmentation and knowledge disaggregation may challenge an organization’s ability to address problems (e.g., Christensen 2012). When comparing the findings of the SNA and the individual interviews, one can conclude that the organizational units had strong boundaries and a sense of unitary coherence, restricting some boundary crossing activities. Consequently, as was suggested in the focus group interviews, teams should be understood in a different way as traditionally, serving more as a mentoring structure for the planners and their various partially overlapping subnetworks, and enabling the more fluent knowledge transfer and learning between the processes. As process memory is not located in only one organization or unit, it is essential for the organizations to memorize also their networks in order to know where the memories reside. When the processes are based more on shared expertise than on the rigid unitary or sectoral boundaries, the amount of available knowledge may be higher. Thus, shared expertise may enable the integration of the multiple knowledges into the process, giving the actors a possibility of focusing as well on developing their own expertise, and sharing it with each other through the networks. Complex problems cannot be understood from one perspective only, nor can they be divided into partial fixes to the system, but require the transdisciplinary expertise to be understood and elaborated, setting requirements for the networks, as well.

6.4 Limitations of the research

Although this research has many contributions for planning practice and research, those have to be considered in the context of the possible limitations of the study. Planning processes are described as context-dependent and unique, and should be considered in their institutional, political and socio-spatial settings. The process related findings of this study are directly applicable only to
the specific process in question, although the individual and focus group inter-
views suggested that part of the findings are also generalizable to other pro-
cesses. However, the findings show encouraging possibilities for utilizing SNA
more widely in comparative studies for understanding planning process dynam-
ics from a similar perspective. Despite these limitations, the findings have also
implications for planning practice and process development by offering tools for
understanding the inherent complexities and dynamics of the networked plan-
ning processes, and their possible effects over time. For planning research, the
findings encourage diverse utilization of SNA for widening the discussion of
planning processes with new perspectives.

The findings of SNA are typically strongly dependent on the data utilized in
the analyses. Longitudinal time-series data, to be utilized in SNA, should be
standardized and systematically documented. Based on the findings of the indi-
vidual and focus group interviews, typically planning processes are not sdocu-
mented systemati
cally at the moment, challenging the generation of applicable
datasets for SNA. This research focused on one type of interactive activities
(metings organized by the responsible planning unit) during one municipal
strategic spatial planning process for acquiring an applicable data set. As by
Finnish regulation, a municipality is responsible of planning activities within its
borders, the municipal planning organization and its unit (responsible for the
specific scale of planning) were set in the focus of entangling the networked ac-
tivities. Furthermore, the organized meetings are a typical way of arranging the
interactive activities with various actors in the planning processes, deciding on
the directions of the planning processes, as was validated through the individual
interviews. Thus, the focus was put on analyzing the meetings organized by the
responsible planner(s) during one strategic spatial planning process, limiting
out other forms of interaction (e.g., phone calls, emails, hallway discussions), as
they were not systematically documented during the process. In addition, the
possible parallel, and partly identified self-organizing networks in the area were
limited out of the scope of this research, as they depended on other forms of ac-
tivities than on the official planning process (e.g., research projects). Further,
SNA requires that the nodes and edges in the data are uniquely identified. In
this research, the residents could not be individualized, as they were not identi-
fied personally in the planning documentation, which is typically the case in the
Finnish planning processes. For example, the participants of the resident meet-
ings were documented only by their amount, instead of any actor-specific infor-
mination. Consequently, the resident data was not applicable for SNA, and was
limited out of the research, partly affecting the analysis of the networked dy-
namics within the process.
For protecting the privacy of the actors, who were involved in the process, the 
process was anonymized completely so that it could not be identified intention-
ally. The anonymization of the process set some limits to the analyses applicable 
in this research. For example, ANT was limited out, as it would have required 
the identification of some of the non-human actors for being understandable, 
compromising the anonymity of the process. The potentials of ANT as a com-
plementary means of analysis have been identified, and the possibilities of test-
ing its capabilities in similar analyses have been pointed out in the future re-
search directions. Due to the anonymization of the process, also the thematic 
analyses remained on a general level, not pointing out the possibly identifiable 
more detailed themes, which partly affected the network dynamics. This, as 
well, has been recognized as a potential for future research. Despite of the anon-
ymization-related limitations, the findings of this research suggest that SNA 
does have potential in generating new understanding of the networked planning 
process dynamics, for example in the context of process memory development. 

Empirical applications of SNA in planning process context (Lyles 2015), spe-
cifically from the perspective of process memory development, are scarce. 
Moreover, comparisons of SNA from various planning processes are not yet 
available. In this research, the statistics were analyzed consequently only in re-
lation to the specific process through comparing them within the process over 
time. This has affected the capability of explicitly contrasting the various 
measures on a wider scale, as comparable material is not available. This, as well, 
has been pointed out as a future research need. Despite the lack of comparable 
material, the research still revealed the potential of generating new understand-
ing of the process dynamics through statistical analyses, and of measuring the 
previously descriptive concepts, such as process memory.

Moreover, the researcher’s own experience constitutes the epistemological 
framework for the comprehension of the research problem (Naess & Saglie 2000). 
Consequently, understanding the researcher’s own experiences as a possible op-
portunity for bias in the research is important. In this research, it is obvious that 
the background has inevitably affected the understanding of and interest in the 
topic of the research. General experience in planning practice, together with the 
educational background in management and organization studies, and urban 
planning, have influenced the scope of the research. The researcher’s own expe-
riences in coping with the challenges of process memory lack in the knowledge-
tensive organizations, which are dealing with personnel turnover, have lead 
to the curiosity of improving the understanding of the relational structures en-
abling - or preventing - the knowledge transfer practices, and the development 
of process memory. And, as a prerequisite, to the curiosity of finding methods
for supporting the understanding of the existing procedural structures, and their possible consequences.

The professional field of municipal planning practice in Finland, and in the Helsinki Capital Region, is considerably limited concerning the number of actors. Thus, it is inevitable that people typically know each other at least some way. Consequently, in this research, the researcher-researched relationship was partly pre-established already before the research process began. Some (e.g., Agar 1980) have considered this problematic in contrast to the more detached forms. However, an established network of key actors regarding the studied topic may also allow a more thorough understanding of the organizational practices and processes (Tietze 2013, p. 56). In this research, the simultaneous work as a practicing strategic spatial planner may have offered a rich in-depth understanding of the practical context of the research on a general level. On the other hand, it may have also limited the possibility for a step back from the practice for enabling a more superficial review of the research problem. It is evident that the background has affected the formulation of the research design, and opened up possibilities for the continuous iteration between research and practice during the research process. Experience in planning research projects already before the practical planning experience has enabled an analytical and development oriented view on planning practice right from the beginning. The observation of the system first from the outside, and then from the inside, has enabled the continuous learning and reflection of the reasoning behind the practical challenges mentioned in the academic literature. In this research, it is also a determining factor that the researcher’s thinking is deeply rooted in the Finnish planning practice. For these reasons, the findings were tested and validated with a series of focus group and individual interviews.

### 6.5 Implications for planning practice

The findings of this research pointed out various implications for planning practice, as shown in Table 5. First, there is a need for supporting process and network thinking in planning. As the findings of the individual and focus group interviews suggest, process thinking in planning organizations is not common. Procedural issues, such as the networked structures and their possible effects, are not discussed typically during planning processes. However, the importance of a better understanding of processes, networks and their possible effects on planning and process memory development was pointed out both in the individual interviews and in the focus group interviews. Consequently, wider discussion of the networked structures of planning processes should be initiated.
also in planning practice, and the strengths and weaknesses of the certain struc-
tures should be explored further. Process awareness through the understanding 
of the networked dynamics may as well support the planning organization in 
evaluating its own practices, for example, the established meeting traditions. 

Second, there is a need for process-planning. Based on the findings of the in-
dividual and focus group interviews, planning processes are typically not 
planned consciously in the beginning of the processes. General schedules point-
out the regulatory steps of the process are done, but more thorough evalua-
tion of, for example, what kind of expertise is needed in which phases, is not 
done. The findings suggest that process-planning in the beginning of the process 
could support the steering of the process direction over time, and allow also the 
actors to plan their own work well in advance, when they know when they are 
needed in the various processes. Consequently, process-planning, which identi-
fies the relevant phases of the process, and leaves room for inputs during the 
process, is needed.

Third, there is a need for supporting more holistic understanding of the plan-
ning process instead of strictly sectoral or scalar collaboration. The findings of 
the SNA and the individual interviews suggest that memories of the process are 
scarce and largely sector-specific, not covering the holistic understanding of, for 
example, the plan solutions, and the reasonings behind them. In addition, the 
understanding is not supported over sectoral or scalar boundaries. For reaching 
systemic solutions, in which the interrelations between the various subsectors 
are understood and estimated, planning organizations should enable the dis-
cussion between the various sectoral themes during the processes. This would 
also support the development of the sector-specific themes by allowing their un-
derstanding as a part of the whole, instead of as separate themes.

Fourth, there is a need for a more continuous network strategy for supporting 
knowledge flows and process memory development. Based on the findings of 
this research, process memory development in the urban development pro-
cesses is challenged by various discontinuities. For example, network formation 
in planning processes is focused more on the ad hoc needs than on enduring 
collaboration structures. Consequently, continuous network strategy could sup-
port the memory flow from one scale to another during the whole development 
process, ensuring that there are no discontinuities in the networks between the 
various levels of planning and implementation.

Fifth, there is a need for revising some of the resource intensive meeting prac-
tices, for example, for partly replacing the resource-intensive check-up meet-
ings. Based on the findings, the organized meetings in the planning processes 
are typically resource intensive and taking resources from other simultaneously 
going processes. As was suggested in the findings of the individual and focus
group interviews, the meeting practices in municipal planning organizations should be re-evaluated. Consequently, supporting informal interaction, developing more effective meeting practices, and utilization of information systems could reduce the need for the resource intensive check-up meetings during the processes. In addition, the municipal planning organizations could benefit from having a method for sharing the summarized up-to-date information of the most important, intensive, complex and long-lasting processes for the actors to keep aware of what is happening. This would also support the actors’ ability of planning their own schedules, and actively offering their support when they see it could be needed in the process. Even if it is not possible, or feasible, for all actors to have equal knowledge during the whole process, there are specific times when shared awareness of the situation could be applicable (for example close to decisions).

Sixth, there is a need for developing the process documentation practices for allowing the generation of new knowledge of the process structures and their possible effects through comparable analyses. The findings suggest that SNA has potential in generating new understanding of the networked process dynamics, and their effects on process memory development both for planning research and for practice. Currently, the possibilities of utilizing SNA in the context of planning processes are limited due to the scarce and unsystematic documentation of planning processes, as was suggested both in the background, and in the findings of this study. Consequently, for the future process development and research purposes, process documentation is a theme, which needs to be developed further for allowing the comparable analyses of planning processes, and their effects. Comparisons between processes in the future would also allow the generation of measurement criteria and performance measures concerning, for example, process memory development.

Finally, there is a need for more systematic and context-specific documentation of memories in planning processes. Based on the focus group findings, the documented memories of planning processes typically lack a context, and thus, are not utilizable for others afterwards. Consequently, for being utilizable in also subsequent phases and processes, the context of the memories needs to be documented, generating needs for the documentation practices of the municipal planning organizations. Planning organizations should enable the systematic gathering of the content related and procedural memories, which may support various needs in the subsequent phases and processes, allowing organizational learning to happen.
Table 5. Implications for planning practice.

| Support process and network thinking | • Wider discussion of networked structures enhances understanding of their possible effects.  
• Improved process awareness supports planning organization in evaluating its own practices (e.g., meeting traditions). |
| Support process planning and documentation | • Network thinking and process memory support the steering of processes over time allowing the participants to plan their own work.  
• Identifying relevant phases and expertise needs in processes supports in resource planning.  
• Systematic and context-specific process documentation supports knowledge-intensive processes, process memory development, and organizational learning. |
| Support holistic understanding | • Currently process memories are scarce and sector-specific, not covering holistic understanding or reasoning of plan solutions.  
• Enabling discussion between sectoral themes and planning scales during the process supports the understanding of the planning issues as a whole. |
| Support continuous network strategy | • Supporting knowledge flows and process memory development from one scale to another diminishes discontinuities between planning scales.  
• Network formation that focuses on enduring collaboration structures rather than ad hoc needs supports process memory. |
| Renew resource intensive meeting practices | • Resource-intensive meeting practices take resources from other processes.  
• Supporting informal interaction, developing more effective meeting practices, encouraging the utilization of information systems. |
| Support shared expertise | • Sharing expertise enables organizational learning and holistic understanding within and between processes.  
• Dependency on undocumented knowledge and individual actors increases the risk for process memory loss. |

6.6 Recommendations for potential research directions

Digging into the internal complexities of the planning processes with SNA has opened up a world of interesting perspectives to be investigated more thoroughly in the future, as is shown in Table 6. SNA provides a wide array of possibilities for future research considering, for example, process comparisons, knowledge evolution in processes, roles and power, and ANT. For example, SNA may add understanding of the actor-relational dynamics to the traditional discourse-based in-depth descriptions of planning practice. The findings of this research have illustrated the usability of SNA in planning research by utilizing some of the simplest measures. However, the possibilities of the more advanced analytical methods, which have been utilized for example in sociology and political science, remain to be discovered.

First, as was suggested by the findings of the individual and focus group interviews, specifically the substance-related process memory is strongly context-dependent. The former paper-based practice has not strongly supported the context-related documentation of planning processes. However, the digitalizing practice offers multiple possibilities for generating standards for process data collection in a way that it can also be utilized afterwards for process memory recollection and process development purposes, providing access to the digital and standardized sets of time-series data along the processes. This kind of data could also support the planning practice by providing a supply of standardized
data for process steering, resource allocation, and process assessment purposes, supporting the planning organizations in developing more efficient and resilient process structures. Moreover, the application of SNA with longitudinal time-series data requires the utilization of a standardized and systematically collected dataset. Currently, the amount of saved process data is high, but abilities to utilize if afterwards are reduced due to its unsystematic nature. Consequently, there is a need for generating standards for process data collection in the future. In addition to the document-based analyses, also action-based research within the planning practice could open up new understanding of planning processes.

Second, based on the findings of the individual and focus group interviews, the actors working merely outside the actual strategic spatial planning processes were more easily able to see the general structures of the processes, as they were not blinded by the details. However, the understanding of the specific effects influencing the networked structures came from the inside. In the individual interviews, it was pointed out multiple times that the strategic spatial planning processes are always unique. On the contrary, the findings of the individual and focus group interviews suggest that the structures, which were revealed in the SNA findings, are partly generally applicable to other processes, as well. Process comparisons could generate new understanding of the claimed uniqueness of planning processes, and of the possible repetitive structures between various processes. A comparison of various processes through SNA, could enable the categorization and pattern identification, based on aspects such as location, type of development (e.g., infill, brownfield), and culture on various levels (e.g., organizational, planning, societal). Process comparisons could also allow more thorough understanding of the effect of organizational culture and traditions on the process structures. Consequently, there is a need for process comparisons revealing the inherent uniqueness, and the possible repetitive structures of planning processes.

Third, the SNA findings suggest that the analysis of process memory development over time opens up interesting research opportunities also for comparable studies. With comparisons, the analysis of process memory development could become measurable, as the statistics would have a comparable context, going beyond the process-internal comparisons, and the possible process-related biases. Through creating statistical measurement criteria, the minimum level of understanding, required for carrying out processes, could be defined better. In addition, the maximum level, after which the understanding may turn counter-productive, affecting for example the probability of demoralization, or challenges considering learning and development, could be defined. Consequently, there is a need for generating comparable measures concerning process memory.
development. The process comparisons could also serve for validating the use of SNA in process memory research more generally.

Fourth, based on the findings, the interaction dynamics in planning processes are diverse, and some of the structures may contain challenges considering the knowledge transfer and the process memory development. In this research, the research data and anonymization of the specific planning process did not allow the follow-up of the information use and knowledge evolution over time. Based on the findings, a more thorough analysis focusing on the knowledge evolution in the networked structures could open up new understanding of the interdependencies between the networked structures and knowledge evolution. A more thorough analysis would require more in-depth data of the discussed contents during the process for following the evolution of the knowledge and reasoning. In addition, the role of the different types of knowledges in the interactive planning processes should be studied further for analyzing how the collective process memory development is affected by the multiple knowledges. In addition, analyzing how the different types of knowledge flow between the actors in the interactive planning processes, and how the various actors process different knowledges, could open up interesting views of the knowledge use and storage mechanisms in the planning processes. Consequently, there is a need for analyzing knowledge evolution processes with more detailed process data.

Fifth, ANT was limited out of the scope of this research mainly due to the anonymization of the process. However, in the future, ANT could improve the understanding of planning processes by offering a complementary perspective to the topic, offering various possibilities for adapted investigations of the networked dynamics. Based on the findings of the individual interviews, the physical settings of the planning organization may affect, for example, the interaction between the actors. Strictly unit-based organizational structures that are separated possibly to various floors, or even buildings, may unconsciously induce the generation of ties, and retain the generation of ties through the diminishing possibilities for spontaneous interaction. Through the application of ANT and SNA in various planning processes simultaneously, the effects of the various phenomena, for example, in relation to the planned area (e.g., contaminated land, cultural historical elements), or the organizational premises (e.g., physical settings of the planning office), and their respective effects for the process structures, could be better understood and anticipated already when the processes and their resourcing are planned. Consequently, there is a need for utilizing actor-network theory for revealing the effect of the various non-human actors in the processes.
Sixth, planning education has a responsibility of educating new generations of planners with a set of skills for facing the complex dynamics of planning processes. When comparing the findings of the individual and focus group interviews, the actors working with strategic spatial planning processes lack skills of understanding processes, networks and complexity. In addition, the general awareness of the human-relational factors affecting the processes is scarce. A more process and network centered view of planning practice invokes also a question of the role of the planner in the future. Holistically coordinating a growing network of actors over the procedural boundaries, and ensuring that multiple knowledges are utilized, while simultaneously proactively developing practices to form a learning process, asks for a varied set of skills. This asks for a practice of shared expertise, where a team of experts with a diverse set of skills works together, supported by a diverse network of actors. However, process and systems thinking, and understanding of complexity are also dependent on a mindset of acknowledging the existence of the plurality of the actors in the networks, and the effect of the networked structures on the processes and their outcomes. Consequently, process and systems understanding set new needs for the skills and role of the planner, which should be investigated further.

Seventh, power is generally a widely debated topic in planning research. The findings of this research suggest that SNA may generate new understanding of the relational power structures in processes, besides the formal power hierarchies. For example, based on the findings, betweenness centrality, as a simple measure, may reveal the actors holding relational power considering knowledge transfer in the processes. Deepening the understanding of the variance of interactions during the processes can open up new understanding of the networked dynamics. In addition, based on the findings, the actors have roles, which extend beyond the classification utilized in this research. The selected classification of roles in this research was based on the official roles of the actors in the process, commonly utilized by the municipal planning organizations. Other role-based classifications may be able to open up other perspectives to the relational dynamics within processes, providing an interesting direction for future research. The relational and hierarchical positions, as well as the associated activities, would require comparisons between planning processes to be understood better. Consequently, new understanding of the formal and relational power structures in planning processes may be generated through SNA.

Finally, the perspective of the individual actor, the human, taking part in the various socially networked planning processes, and contributing to the formation of process memory should be studied further, opening up understanding of the actor-level phenomena. For example, from the perspective of the im-
Importance of individual actors in forming wider networked structures, concentration on the individual level microdynamics is an interesting theme for further consideration. In addition, the findings of this research suggest that the actors have varying values, emotions and personalities, which influence also the actor-relational dynamics. Thus, for example, the ego network analysis (in Appendix 9) together with individual interviews could serve as an interesting possibility for further research in order to understand the formation of process memories. Consequently, the actor-level microdynamics, and their effect on the actor-relational dynamics, and the planning processes, should be understood better.

Table 6. Potential future research directions.

<table>
<thead>
<tr>
<th>Research Direction</th>
<th>Description</th>
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<tbody>
<tr>
<td>Developing planning process documentation</td>
<td>- Generating standards for process data collection.</td>
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<td></td>
<td>- Digital, systematic, and standardized process data would support learning and reflection within and between processes.</td>
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<tr>
<td>Developing comparable studies of process structures</td>
<td>- Generating new understanding of the repetitive and unique structures for allowing learning between processes.</td>
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<td></td>
<td>- Enabling the categorization and pattern identification of procedural structures.</td>
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<tr>
<td>Developing comparable measures for process memory development</td>
<td>- Creating statistical measurement criteria for process memory development.</td>
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<td>- Validating the use of SNA in process memory research more generally.</td>
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<tr>
<td>Generating understanding of the knowledge evolution processes</td>
<td>- Analyzing the interdependencies between knowledge evolution and network structures through more detailed thematic data.</td>
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<td>- Analyzing how process memory development is affected by multiple knowledges.</td>
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<tr>
<td>Developing understanding of the non-human actors, and their effects on the network dynamics</td>
<td>- Generating understanding of the effects of various phenomena (e.g., planned area, organizational premises) on process structures.</td>
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<td>- Simultaneous utilization of ANT and SNA in a same process to offer complementary perspectives.</td>
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<tr>
<td>Investigating the required skills and roles for facing the complex dynamics</td>
<td>- Generating understanding of the knowledge needs concerning processes, networks, and complexity.</td>
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<td>- Supporting the practitioners in acquiring skills and knowledge to deal with the complexities.</td>
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<tr>
<td>Developing understanding of the formal and relational power structures</td>
<td>- Generating understanding of co-existing power structures in planning processes.</td>
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<td></td>
<td>- Generating understanding of relational and hierarchical positions, and the associated activities through process comparisons.</td>
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<tr>
<td>Generating understanding of the actor-level microdynamics</td>
<td>- Developing understanding of the everyday planning practice.</td>
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<td></td>
<td>- Developing understanding of how actor-related factors influence process memory development and knowledge use.</td>
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7. Conclusions

The research acts as a discussion opener for planning practice and research. Both, research and practice, are needed for understanding planning, but neither of them is sufficient on its own. Separately, they can explain planning to a certain point, but by combining their strengths, they may reach even further. In planning practice, as in the collaboration between research and practice, sharing expertise may support more holistic understanding of a theme, and help in identifying the systemic underpinnings beneath the surface. Systems cannot be understood only from outside by dividing them into various subsystems, and analyzing them separately. Instead, they should be understood as a whole, and the comprehension of the system from the inside should be improved. Moreover, the practice should be better integrated horizontally (thematic integration), vertically (scalar integration), and over time, supporting a change in the way of thinking from separate projects (e.g., a strategic spatial plan and a detailed plan) with separate subprojects (e.g., a nature investigation and a mobility investigation) towards more integrated urban development processes, in which learning between the various themes, scales, and over time is allowed.

In addition, the better integration of research and practice does not happen by itself, but requires the commitment of the both of these to thrive. In order to nurture the commitment, the potential benefits of the collaboration should be mutual. Research should gain new insights from the practice side, and practice should get new understanding from the research side. The more open and deliberate the collaboration between these parties is, the more applicable the results can be expected to be for the planning research to reclaim better its touch with the reality of the planning practice. Ultimately, mutual exchange is needed for the development of both planning research and practice. As Hurley et al. (2016, p. 451) have stated, “a genuine bridging of research and practice requires collaboration between researchers and practitioners”. Hurley et al. (2016, p. 451) have suggested that, among other issues, the defect of the “idealistic view of research vs. constraints in practice” is a challenge, which should be better addressed.
Planning processes are complex, and should be researched as such. The aim of this research was to explore the practice related complexities through revealing the potentials of social network analysis in generating new understanding of planning process dynamics regarding process memory development. The analysis focused on the perspective of process memory development, process understanding, and process development by utilizing methodological triangulation. The findings from the SNA, revealing the networked dynamics of a planning process over time, were validated through a series of individual interviews, and their applicability for planning process development was examined in a series of focus group interviews. By an in-depth analysis of one strategic spatial planning process, and the testing of the findings, the research aimed at answering three research questions. First, what SNA can contribute to the understanding of the emergent properties of networked process dynamics with the utilization of longitudinal time-series data (process understanding). Second, what effects the networked dynamics of planning processes can have on the development of process memory in municipal planning organizations (process memory). Third, can the selectively increased understanding of the networked process dynamics through SNA be utilized in the process development practices of municipal planning organizations (process development). Based on the research, SNA provides a wide set of possibilities for deepening the understanding of planning processes, especially when supported with the more commonly utilized methods.

7.1 Social network analysis in urban planning

Based on the research, SNA has potential for understanding the long-term organizational learning processes, which unfold through the networked dynamics, and are highly contextualized and conditioned on memory. Planning processes are multi-minded systems, coping with the external and internal dynamics on various scales. As has been said (Innes & Booher 2010), the complexity exceeds the capabilities of human understanding. However, it has been suggested already earlier that the networked planning processes, which function as complex adaptive systems, should be better understood (Innes 1998; 2005; Innes & Booher 2010), recognizing also the applicability of SNA for such purposes (Dempwolf & Lyles 2012; Lyles 2015). Traditionally, the thorough and in-depth analyses of planning processes over time have been scarce, and the descriptions concerning the development of planning practice have remained on a too general or abstract level (Rydin 2013) for making a change. Thus, by applying iterative discussion between the research and the practice, this research has aimed at learning from the real practical complexities, and supporting their analysis and understanding.
with an analytical framework. For analyzing the possibilities of SNA as a method, meeting-based network data was applied to a set of research questions considering process memory, process understanding and process development. The SNA findings were then validated through a series of individual interviews, and their applicability was tested in a series of focus group interviews. Based on the results, SNA has a potential of revealing new understanding of the previously invisible structures of planning processes.

The findings suggest that SNA with meeting-based time-series data may support the generation of new understanding of the various process related themes for planning practice and research. Currently, the documentation of planning processes is planner-related and varies. The creation of standards for process data collection could support the planning practice and research in offering standardized time-series data sets for process analysis and development purposes. The visual-analytical method increases the scope of insights into the internal complexities of the networked planning processes, ranging from the actor and actor-relational levels onwards. Processes are dependent on actor-related factors, but also prone to various actor-relational dynamics, affecting the direction of the processes. The research has utilized detailed time-series data of one strategic spatial planning process in one of the municipalities in the Helsinki Capital Region (Finland), utilizing various statistical and visual means for revealing the dynamics in relation to process memory development over time. As municipal planning organizations are traditionally based on project-like working, and challenged by personnel turnover, generating understanding of the mechanisms affecting their process memory development is essential. Based on the results, various actor-dependent factors (e.g., background, interests, values, personalities), together with actor-relational (e.g., personal relations, past experiences), organizational (e.g., resources, routines, traditions), planning domain related (e.g., planning culture, established professional practices), and societal (e.g., legislation) affect the networked process structures, and consequently, the way in which the knowledge is transferred within the processes. The networked structures and knowledge transfer influence the development of process memory, and the organization’s ability of understanding the effects of its own procedural practices, and their reflection for enabling organizational learning.

Based on the findings, three aspects can be concluded. First, for improving the capabilities of process memory development and knowledge transfer, planning should be considered more as a continuous and consciously memorizing process leading to implementation, instead of separate projects on various spatial scales. Second, the process and systems related capabilities should be high-
lighted already during education for allowing a better understanding of the networked processes, and their possible effects, as there is a clear lack of these skills within the practice. Third, a better understanding of the inherent complexities, in relation to process memory development and knowledge transfer, should be enabled.

### 7.2 Planning as a continuous and memorizable process

A process within a planning system is a whole, not to be reduced to independent components if aimed at being understood properly. The nature of a system is dependent on the emergent properties of the interdependencies between its parts. These properties cannot be understood through the separate understanding of the various parts. Moreover, some emergent properties, and internal complexities cannot always be properly understood from outside, but may require diving into the system for sensing the complexities and the underlying mechanisms as they are, and simultaneously retaining the ability to observe the structures and patterns without being overwhelmed by the details, and the inherent uniqueness of the processes. Planning and urban development processes have been discussed, for example, through the complexities driven by the resident collaboration and the self-organizing networks in the areas. However, the findings of the research have shown that municipal statutory strategic spatial planning processes are affected also by a set of internal complexities, interactive nonlinear dynamics over time, which are not yet understood well.

Systems understanding allows an endless journey into the world of the planning processes. Planning process, as a system, is always a part of the variety of larger systems from the planning organization to the society. In addition, a process contains various internal systems of its own. All of these systems form an eternal circuit of causes and effects, which cannot be understood as the individual characteristics of the separate components on the various levels. In addition, the systems dynamics of planning processes occur in the networks, in the contents, and in the interaction of these two. That is, a social network in the planning process cannot be understood only by the consideration of the separate characteristics of the individual actors in the process, nor can the contents of the process be understood through the characteristics of each sectoral theme and scale separately. Instead, the holistic understanding of the contents requires the identification of the interrelations and emergent properties between the various sectoral themes, and scales. Moreover, the understanding of the network requires the identification of the interaction and the relations of the actors.
Consequently, planning processes can be understood only through the understanding of the interrelations between the network, the contents, and the environment, all affecting each other.

Planning processes evolve in and around various networks. The findings indicate that the networked structures support the organizations in process memory development and retaining. The findings suggest that the networked dynamics are vulnerable to conscious and unconscious memory loss. Through the networked collaboration, process memory is transferred to the different parts of the organization (also outside the organization) making the process structure more resilient. Even as the strategic spatial planning processes may be unique, they do still contain replicable structures. Understanding the replicable structures may support the process development purposes of the municipal planning organizations. Usually, organizations wake up to the importance of process memory only when it has already been lost for some reason. This happens, for example, when the organization faces high personnel turnover, or loses a central individual, who has coordinated multiple processes, and the knowledge exchange between them. A more aware recollection of process memory may support the organization to learn from its experiences and develop its processes further.

A planning process does not end to the ratification of the plan. Instead, the plan is only a temporal outcome of one stage of a longer process, the aim of which is to finally lead to implementation, and serve as a setting for the everyday life for its users. Thus, planners need a variety of other actors ranging from property owners, developers, and citizens to elected officials and others for the plan not to remain only as an intentional document. The actions taken during a process are only minor steps in the whole development process, as is the generally recognized final output of a statutory strategic spatial planning process (the plan). After that, the development process will continue, and new relational actions will emerge - part of which may not be in line with the outputs of the previous processes. Thus, an urban development process, when understood as a continuum of phases (one of which is the statutory strategic spatial planning process), is continuously evolving, and new valuations and objectives may emerge in the interactive relations over time. A resilient process structure ought to allow the connections between the actors, and support sustaining interaction, instead of ad hoc based interaction, which does not support the generation of a resilient network structure, or process memory development.

Strategic spatial planning processes consume a considerable amount of resources, deeply affecting the emotions and values of the participants. In addition, the processes finally affect the living environment around us all. Thus, how the processes are carried out, matters. As Olsson (2009, p. 267) has pointed out,
planning organizations typically require a tangible output (a plan) of a process. Even as it may sometimes be challenging to acknowledge, the planning process is actually more than its outcome (the plan, and the related documentation). The plan is the official and regulated outcome of a planning process, but the effects of the process are much wider. If the process is reduced to the plan, all of the interaction, social capital, networking, learning, rationalization, decision-making, memories, new routines, values, and discussions towards generating shared understanding remain unacknowledged, to name a few. However, for the functioning of a planning organization - or a planning system - these are the essential factors. Allowing organizational learning could enhance the capabilities of carrying out subsequent processes. During a process, the whole social-relational context of the process has been affected somehow. Understanding these effects, and the reasoning behind them, is important for the actors and the organizations for planning their work in the future, and for understanding the influences of the decisions, which are made during the processes. Based on the findings, better understanding of the processes and their networked dynamics is requested also by the municipal planning organizations. Thus, the call should be answered through a deeper scrutiny of the process structures, and their possible effects.

7.3 Generating process understanding from the education onwards

Education is considered as a major factor in shaping one’s framework of understanding. Planning education was not a main focus in this research. However, based on the interviews, network and process thinking, and systemic awareness are not typical to practicing planners. Accordingly, the importance of process-aware planning, and the generation of a continuous learning process are not acknowledged typically by practicing planners. However, in the interviews, the importance of understanding the process structures and their effects was considered critical. Thus, there is an inherent mismatch in the perceived needs and capabilities of planners, considering process understanding and systems thinking. The education of these aspects should be increased in order to equip the practicing planners with the needed skills. Process understanding should be improved already in planning education. Holistic process understanding is not currently an intrinsic part of planning education in Finland. The importance of process-planning, the effects of the various process structures, and their applicability for various needs, and the holistic awareness of systemic interconnections between the traditional sectoral themes should be pointed out to allow their improvement. Professional education has been suggested as an answer to
the planners’ competence needs, which are not fulfilled during the basic university studies (e.g., Kangasoja et al. 2010). In the practice, this thinking is challenging due to the restricted resources available for practicing planners to attend professional education. Thus, some of the needs ought to be addressed already during the basic university education, for every planner to have the foundations of the knowledge.

For coping with the internal and external complexities of the planning processes, process understanding and systems thinking should be supported already during education. Instead of focusing on the details and the separation of the subsystems, the wider structures, planning policies, and systemic interconnections should be understood also. The municipal planning organizations are divided typically into various thematic sectors instead of encouraging more integrated or multi-scalar expertise. The structures strengthening the generation of unitary boundaries within the organizations, and leading to knowledge disaggregation and rigid professional identities challenge the use of shared expertise within a more integrated planning practice. In addition, planning education should encourage boundary crossing for enabling shared understanding between various expertises. In the end, a plan should be able to integrate all subsystems and scales to a coherent whole, so understanding of the systemic interdependencies is essential. A plan cannot be a sum of the separately discussed sectoral themes, but an understanding of them as a whole. If the education is focused on details and on the separation of subsystems, no more should be expected from the practice. The holistic understanding and interrelatedness of the larger systemic wholes should be supported, as well as the envisioning of the possible futures instead of forecasting of the traditional way of doing things into the future.

As Lapintie (2015, p. 33) has pointed out, various planning professionals are equipped with education-specific skills. Architects, engineers, and geographers all have their distinct professional capabilities. However, the professionals are not enough supported to bring their expertise to the table, for understanding the strengths and challenges in the expertises of each other, and most importantly, for finding the possibilities of sharing their expertise to generate new understanding. In the education, professional boundaries are strong. Unfortunately, this is very often the situation in planning organizations, as well. The findings of this research suggest that professional boundaries are strong, challenging genuine collaboration in the planning processes. Instead of generating shared understanding within an integrated planning practice, the professional boundaries are nurtured. Thus, even as the professionals have distinct professional identities, they should still be able to collaborate among the same challenges and contexts. Instead of accelerating the knowledge disaggregation, the
practice of shared expertise should be encouraged already during the education for allowing the recognition of the various expertises within the same framework, and for ensuring the maximum potential of the knowledges available in the planning processes.

The education should also provide the future experts with some skills to understand the human interaction, and its possible effects on planning processes concerning, for example, process memory development and process understanding. The efficient use of shared expertise requires that the actors, who are sharing expertise, can understand each other. The disciplinarily siloed educational system has not supported the ability of transdisciplinary knowledge creation in the changing teams of various experts. Thus, letting go of the rigid professional boundaries and recognizing one another as experts with specialized skills would support the creation of a more holistic understanding over the sectoral boundaries. The actors should not be invited to the table only individually as the representatives of a certain sectoral theme, but together as the representatives of specialized knowledge with high interrelation with other kinds of specialized knowledges. Consequently, a more integrated planning practice should be aimed for in order to support the comprehension of the systemic interrelations. The external and internal complexities should be described as they are, for preparing the students for the reality, and for supporting them in identifying the various systemic interconnections.

7.4 Planners are humans

Diving into the planning theoretical considerations of planners as the embodiments of mystery and mastery has its own challenges for explaining the complexities in and around the planning processes. The institution-centricity of planning research underestimates the internal complexities of planning processes, caused by the interaction of the human beings. Learning directly from the practice for the research is essential for the demystification of the planning profession. There is no such thing as a planner in general. Instead, there is a wide array of diverse people with their emotions, values, strengths and limitations, devoting their lives for trying to work out the complexities in and around the planning processes for creating a framework for everyday life to take over. In the end, the planning solutions are not done by institutions. They are done by human beings, who are carrying various professional, formal and relational positions within the planning processes, and trying to cope with solving the complexities in and around planning processes. Thus, planning practice not only needs the identification of the challenges in the profession, but also the
identification of the complexities within the processes, and implications and knowledge of how to deal with the challenges and complexities.

In the end, the processes cannot be reduced to technocratic and mechanical sequences of actions, but are always unfolding through interaction over time. Actor-relational dynamics have various effects on the process, and on the knowledge transfer and process memory development within the processes. Thus, the human perspective of processes should be acknowledged more strongly. Actors participating in the planning processes are feeling and thinking humans, just like everyone else. Even though the requirements for the planners are manifold and extensive, the planners themselves are driven by emotions and inherent limitations just like all others. Based on the individual and focus group interviews, there is a need to discuss the experiences of the various planning processes. The experiences are not always smooth and fluent, but also contradictions and challenges may come out. Thus, it would be important to discuss openly the challenges during and after the processes, so that they will not start to weigh down the planning organization and the subsequent processes. As the findings suggest, if the contradictions grow too large, they may start to affect also the subsequent processes. Strategic spatial planning, as all planning, is, in the end, work that is being done in the interaction of individuals. Consequently, understanding of the human behavior and interaction are needed.

The interviews arose various feelings during the research. Some interviewees’ expressions were ranging from surprise and interest to annoyance, or upset of not being able to give thorough and "correct" answers in the first part of the individual interviews. In addition, many felt surprised when they saw the process reflected in the analyses, as they had not been aware of the full complexities. And some were not feeling pleasant after understanding how little they had known of what had been going on during the process. The interviews were a repertory of the diversity of feelings attached to planning processes in general. Human interaction, and being induced by the various formal and relational power structures clearly arises feelings. Thus, the findings indicate that the behavior in the networks is based partly on past experiences, possible conflicts and a variety of actor-relational factors. This is also in line with Marsh and Smith’s (2000) claim that the networks reflect past conflicts, culture, and values.

Various roles and expectations are cast on the practicing planners. However, the planners are not a generalizable profession, but consist of professionals of many kinds, all holding a different set of knowledge and skills in addition to their emotions, values and other influencing factors. Thus, what is often missing from the discussion is that, after all, planners are humans, and processes are affected by their interaction. There may not be such a thing as “planners”, gen-
eralizable to all actors working in the field of “planning”. Instead, there are experts with various interdependent specializations, motivated by various factors, and working with processes on a variety of scales.

A planning process is a journey of multiple actors over a long time. The process is a multi-minded system, evoking various feelings, contradictions, and tensions between the various actors. Contradictions should not be nurtured and incubated, but open communication, respect, and appreciation should be supported. Feedback should be valued already during the processes, and the process should be directed to the direction that is needed, not only to what has traditionally been acceptable. Interaction of the human actors is an essential factor in directing a strategic spatial planning process forward through working out the contrasting values in the optimization processes. During the long-lasting processes, networks are utilized for various purposes: informing actors of the situation of the plan, learning from aspects related to the plan, deciding on the direction in which to proceed with the plan, bonding with colleagues for generating a good atmosphere for working and knowledge transferring, and for acquiring memory of the process in case of personnel turnover. Thus, for understanding planning processes, the understanding of the networks and their actors is essential.

A strategic spatial plan describes a frame for a story to evolve. The plan is not a strict manuscript, defining each step and move. Rather, it lays the foundation for the frames of a stage in which the steps and moves can then find their places, emerge and evolve over time, leaving traces of their existence, or fade away. Creating the most fine-tuned and diverse story of all times, and calling for others to join the dance.
Planning is a dance of various actors with a changing rhythm. The dance of planning practice is thus about working with actants (social and material) in a variety of small ways, using intermediaries to bring actants into relationships with each other\textsuperscript{5}. Restless. Tranquil. Constantly changing. A magical weft of strings seducing the actors to hold fast in the darkness, persuading them for coexistence in shared spaces\textsuperscript{6}. Music evoking strong feelings. Contrasting, diverse, overwhelming reactions. Encouraging a variance in choreographies, new improvisations in other arenas. Some not hearing the music at all. Staying aside. Intentionally or unintentionally. Unable to understand what is happening.

Behind the curtains, the stir before the première is tangible. Dancers refining their practices, aiming at perfection, afraid of side steps. Breathing in the enthusiasm. Fragrances of excitement. Calling in others to join. Fragile, sensitive, vulnerable moments between uncertainty and confidence. Spiritual passion for the so far unseen. Excitement of what is yet to come. Impatient vivacity, expressions of incessant anticipations. Expectations of dignified symmetry. Ethereal grace. Effortless harmony. Dancing individuals. Pairs. Groups. Partially aware of each other. Effortlessly floating. Gracefully flowing. Some looking down at their feet. Unsure of the choreography. Without a clear manuscript to follow. Not sure of the direction. Almost unable to hear the music. Trying to stay on the side not to step on anyone’s toes. Not to be pointed out. Getting relegated to the “back stage” of attention\textsuperscript{7}.


\textsuperscript{5} Rydin 2013, 77
\textsuperscript{6} Healey 1997, 3
\textsuperscript{7} Healey 2009, 451
When the dance ends, music quiets down; the dance has touched the participants, forming an expansive, pluralistic, holistic imagination\(^8\) of what happened. Fleeting moments fading away. Visible only for a passing moment. Feelings dwindling. Stillness. Many will have their opinions. Some will remain unknown. It is time for judgements. Of an imprecise portrait of the story. A printed description of the ending position will remain as the engraved truth of it all.


Deep beneath, the dance continues. Mingling to the dance of the urban spaces. An intricate ballet in which the individual dancers and ensembles all have distinctive parts which miraculously reinforce each other and compose an orderly whole\(^9\). Until someday again, someone starts the music, turns down the lights, calling for the dancers to join. New choreography. New music. New actors. Only the stage has remained. The only reminiscence of the past. Ready to invite new choreographies.

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\(^8\) Healey 2009, 449

Anonymous quotations from the individual interviews of this research.

\(^9\) Jacobs 1961, 50


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Susa Eräranta: Memorize the Dance in the Shadows?


References
Appendix 1: Glossary

**Action**
Actions (e.g., decisions, investigations) are outcomes of the activities conducted by actors, setting up directions for the course of the process.

**Activity**
Activities (e.g., meetings) are conducted by an actor or a set of actors in order to attain certain actions in the process.

**Actor**
Actors are individuals participating in the planning process, and in the knowledge transfer practices within the network of actors. Actors bring their own professional expertise and framework, knowledge, memories and experiences into the process, influencing the amount and quality of knowledge given for the other actors through filtration and selection.

**Network**
Networks consist of actors, connected to each other by ties. The network of actors, activities and actions is not stable, but evolves over time, influencing the set of memories an actor can have from the process.

**Planning ecosystem**
Planning ecosystem is the entity of separate, fragmented, multi-scalar and overlapping strategy, planning and implementation processes, initiated by a number of actors.

**Planning process**
Planning process is the sequence of activities over time coordinated by a planning organization in reference to one statutory planning process. The process as a system contains the networks of actors, activities, and actions over time. In this research, the process begins from the first recorded meeting organized by the municipal planning organization, and ends when the plan is approved by the City Council.

**Process memory**
Process memory is procedural and structural in orientation (i.e., working and non-working practices, process structures, sequential process descriptions). Memory of the process varies between actors depending on their intensity of involvement in the process over time. Memories may be
documented, or saved in actor's individual memories, transferred through interaction.

**System**

A system consists of four basic elements: boundary, functions, structural relationships, and dynamics. The system boundary of a planning process is seen as the activities and structures directly linked to a specific process. The process affects and is affected by the system outside: by the planning organization, planning ecosystem, planning practice, and the society.
Appendix 2: Example of a network matrix from phase $G_5$ with 50 first nodes presented.

Figure A2.1. Example of a network matrix from phase $G_5$. Only 50 first nodes are represented.
Appendix 3: Individual interview protocol

- General introduction of the research with the studied process specified, and the scope of the research (process memory) described.

**Process memory part** (no analysis material shown at this point)

- If you consider a planning process over time, what do you think are aspects of process dynamics (activities and changes over time)? What is their importance? How would you order the various means of interaction (informal networks, phone calls, emails, hallway discussions, organized meetings), based on their relevance for setting the direction for the planning process?
- Please, describe the process over time shortly as you remember it (as you would describe it to someone who has not participated the process)? What were the key actions, and their durations, or actors affecting the course of the process?

1.a How would you describe the network structure in the process? Were all actors equally involved in the process? Were there some kind of subgroups? If yes, what kind of?
2.a Please estimate the number of actors attending the process over time. To your understanding, was there variation over time (how much)?
3.a Were there certain actors caring for information transfer in the process? Were everybody equally informed of what was going on?
4.a How were the sectoral themes (such as mobility, nature and recreation, public services...) linked in the process? Were the sectoral themes handled with similar intensity throughout the process? Was there an overall understanding of all themes during the process?

**Process understanding part** (analysis material shown at this point, drawing/writing on the material is allowed)
1.b Network dynamics (degree centrality): does this analysis represent the process as you remember it? If not, what may be the reason? (SNA findings shown)
2.b Network size: does this analysis represent the process as you remember it? If not, what may be the reason? (SNA findings shown)
3.b Betweenness centrality: does this analysis represent the process as you remember it? If not, what may be the reason? (SNA findings shown)
4.b Intensity of ties between themes and thematic in-degree: does this analysis represent the process as you remember it? If not, what may be the reason? (SNA findings shown)

- Do these factors you have seen help in understanding the dynamics of planning processes? In what way? What is the usability of analysis? Did you learn something new of the process based on these analyses?
- Is a process important for planning practice to understand and consider? Why (yes/no)?
- Anything else you would like to add?
Appendix 4: Focus group interview protocol

1. Short presentation of the agenda and the participants.

2. Should networked processes be studied? (Why? Why not?) (max 10 min)

3. Should process-related things be saved during a planning process for development purposes? (How? What?) (max 10 min)

4. How do the different network structures (single-core, dual-core, group-core, multicore) affect process memory accumulation over time? (What are their pros & cons? How do the various network structures affect planning processes?) (1 h, 15 min/structure)

5. Usability of the analyses. Can this kind of analyses be used as a part of process development in planning? (How? Is there some perspective missing, what else should be taken into account?) (max 25 min)

6. Closing (max 5 min)
Appendix 5: Initial process description

The analyzed process is embedded in an ecosystem of multiple ongoing and spatially overlapping or parallel planning and implementation processes. Figure A5.1 presents a metaphorical representation of a variety of processes, which were mentioned in the plan documentation, or in the time-series data. The scales of the processes range from the regional, metropolitan, municipal, and neighborhood to plot level and infrastructure processes. In addition, the process is guided by a variety of, for example, regulations, which are not presented in the graph. There is a wide range of processes unfolding on the various levels of the planning and implementation phases. Moreover, the figure shows that there is a multiplicity of processes competing for the same scarce resources within the organization, affecting each other. In addition to the ongoing planning and implementation processes, the analyzed process is also embedded deeply within the socio-political, cultural, and institutional framework, shaping and being shaped by the context. Thus, for example the wider social, political, and economic processes set a framework for the analyzed process.

Recent changes in the local context and the urban dynamics had created pressure for beginning a new strategic spatial planning process, to allow the more detailed levels of planning in the changed situation. Thus, a decision to prepare a new strategic spatial plan was made by the elected officials, and the preparation of the plan was commenced. The process lasted approximately four years, evolving through the phases of goal-setting, drafting, proposal preparation, and ratification. In total, approximately 400 actors participated in the process, and approximately 400 meetings were held, approximately 40 of them in relation to the other ongoing processes in the area. Only 8% of the meetings were documented with a memo to be found afterwards. Cumulatively, over 3,700 hours were spent in the meetings during the process. Of this, the municipal civil servants spent over 2,800 hours.

The meetings included typically participants representing one (municipal civil servant) or two (municipal civil servant and some other role) roles out of the possible six roles. Generally, less than ten actors participated in one meeting, as is shown in Figure A5.2. Over the whole process, the involvement intensity of the actors varied considerably based on the number of meetings involved and
the duration of involvement in the process, as shown in Figure A5.3. There was one considerably intensively-involved actor (participating in approximately 95% of the meetings), and few moderately intensively-involved actors (participating in approximately 35–45% of the meetings). Typically, the actors participated in less than ten meetings during the process. All of the more intensively involving actors were municipal civil servants.

From an approximately two-year phase of the process, the meeting notes and memos were analyzed more thoroughly to reveal the various themes discussed in the meetings. Typically, several different detailed themes were discussed during a meeting. The prevalence of the themes in the process varied considerably. Some themes were discussed more regularly (e.g., planning process and activity related themes), whereas some were discussed more infrequently (e.g., actor related themes considering the participation of the various actor groups along the process). A more detailed analysis of the thematic discussions within the process was not feasible, as only 8% of the meetings were documented with a memo. Most of the memos handled decision-making, resident, or consultant meetings. The intra-municipal meetings were not documented typically with meeting memos.
Figure A5.1. Metaphorical representation of the process ecosystem of the analyzed process during a 10-year period.
Figure A5.2. Number of actors and roles per meeting. Majority of the meetings included less than 20 actors, and one or two actor roles.

Figure A5.3. Involvement intensity of the actors in the meetings, showing high variance in the intensity, when ranked by the number of meetings involved and the total duration of involvement in the process. One actor stands out with considerably higher intensity, followed by two actors with approximately half of the intensity. Low intensity was typical for the majority of the actors.
Appendix 6: Other network and node level measures of SNA

Network level

Table A6.1 presents the network level statistics of the process in the various phases. In the table, the rows represent the phases of the process (G₁...R₆), whereas the columns represent the various measures utilized in the SNA.

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<th></th>
<th>Entry</th>
<th>Exit</th>
<th>Active</th>
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<th>Cum. Modularity</th>
<th>Nr. of comm.</th>
<th>Graph density</th>
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Dynamics of the network modularity and the number of communities

The modularity and the number of communities in the network changed continuously during the process, as is shown in Figure A6.1. The network in each phase was structured typically by communities of denser ties, and with fewer ties between the communities. In Gᵢ and Pᵢ, the modularity and the number of communities were the lowest, but peaked a multiplicity of times during the pro-
cess. The modularity score was lowest (0) in G1 and P1, when the network structure was balanced. The modularity peaked in G8, D3, and R2. The number of communities was low in G1 and P1, and peaked in G8, P2 and P6.

In G1, the modularity and the number of communities stayed at zero, as all actors were connected equally to each other, and there were no subnetworks. In G8, the modularity was comparatively high (0.48), and there were four communities in the network consisting of, for example, the elected officials of the City Board (the unconnected subnetwork), and the participants of a public authority meeting. In P2, the modularity score was near the average level (0.25). However, the number of communities peaked to four, although the network structure seemed balanced. In P7, the network was disconnected clearly, and there was no link between the two main networks. Modularity (0.38) and the number of communities (3) were relatively high, but did not peak considerably. In R2, the network structure seemed balanced, but the modularity score peaked to 0.47. The number of communities stayed at two. In R6, the modularity was relatively low (0.12), but the number of communities was three, due to the various decision-making meetings during the phase.

Figure A6.1. Variation of the network modularity and number of communities during the process, with examples of the network structure weighted with nodal degree.

In undirected networks, as in this analysis, the number of weakly connected components can be detected. In this data, the number of weakly connected components correlated with the peaks in the modularity. In G4, G6, G8, P7, and R2, the number of weakly connected components peaked suggesting that there is considerable variation between the connectedness of the various actors within the network.

In the identification of the central actors, the acknowledgement of the possibly overlapping communities is important. The overlapping network communities were connected more densely than the parts where the communities did not overlap with each other. When comparing the structure of the communities, it
can be noticed that the nodes are not connected only through the roles, but through the themes. Actors of multiple roles in the process formed communities based on certain themes. In addition, there were actors belonging to multiple thematic communities simultaneously. Typically, these nodes were connected more densely than the individual communities, in which they belonged to. Thus, rather than forming cliques, the communities formed overlapping structures, which allowed the flow of information through the certain densely connected actors. Although the communities were not perfectly connected, they were connected usually through a set of densely connected ties.

**Dynamics of the network density**

The density varied during the process, as is shown in Figure A6.2. The density scored one in G₁, when the network structure was complete, and all actors were connected with one another. The network density remained high in G₂, but dropped after that, as the peripheral actors and the various subnetworks began to emerge in the network structure. The density peaked again in P₁, due to the scarcity of the actors involved in the phase.

![Figure A6.2. Variation of the network density during the process, with examples of the network structure weighted with nodal degree.](image)

**Node level**

Table A6.2 presents the node level statistics in the various phases during the process. In the table, the rows represent the phases of the process (G₁...R₆), whereas the columns represent the various measures utilized in the SNA.
Table A6.2. Node level statistics of the process.

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<th></th>
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<th>Std. dev.</th>
<th>Min</th>
<th>Max</th>
<th>Avg. betw. centr.</th>
<th>Std. dev.</th>
<th>Min</th>
<th>Max</th>
<th>Avg. clos. centr.</th>
<th>Std. dev.</th>
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Dynamics of the nodal degree

The dynamics of the nodal degree were considerable during the process, both because of the varying number of the active actors in the process, and due to the variation between the actors. The average nodal degree varied from 3.20 to 70.09 during the process, as shown in Figure A6.3. In addition, the standard deviation varied considerably, and increased especially in P8...P9, and R6. In G7, P1, P4, and R3...R4, the nodal degree and the standard deviation stayed low. In G6, the average nodal degree was 24 (min = 24; max = 24), and the standard deviation was zero. Thus, the network was fully connected. In G4, the nodal degree was 49.06 (min = 1; max = 65), and the standard deviation was 18.03. As can be seen from the network graph, there was considerable variation in the positions between the actors. In G8, the nodal degree was 31.44 (min = 1; max = 67), and the standard deviation was 13.71. In P1, the network was very small, and the average nodal degree was only 3.2 (min = 2; max = 4). The standard deviation was 0.98. In P9, the average degree was 53.83 (min = 2; max = 106), and the standard deviation was 28.10. There was considerable variance in the nodal degrees among the actors with a few central actors scoring high. In R6, the nodal degree was 70.09 (min = 1; max = 89), and the standard deviation was 28.62. The network had a high variance of nodal degrees.
Dynamics of the closeness centrality

The average closeness centrality fluctuated considerably during the process with the highest scores being typically at the beginning of each consecutive phase (goal phase, proposal phase, ratification phase) of the process. However, in the draft phase (D1...D4), the dynamics were smaller than in the other phases. The average closeness centrality varied from 0.52 to one during the process, as shown in Figure A6.4. The standard deviation remained on a more or less similar level between zero and 0.17 during the process. In D3, P8 and P9, the closeness centrality reached its lowest levels, whereas in G1, P1 and R2, it peaked. The minimum and maximum values obeyed similar patterns with the peaks and the drops in the standard deviation in the same phases.

In G1, the average closeness centrality was one (min = 1; max = 1), and the standard deviation was zero. The network was perfectly connected. In G6, the closeness centrality was 0.67 (min = 0.44; max = 1), and the standard deviation was 0.11. There was considerable variation among the various actors, and the difference between the minimum and the maximum values was at its largest, although there cannot be seen any considerable differences in the network graph. In D3, the closeness centrality was 0.55 (min = 0.44; max = 0.78), and the standard deviation was 0.08. In P1, the network was very small and there was variance in the nodal degrees with two actors scoring high. The closeness centrality was 0.87 (min = 0.67; max = 1), and the standard deviation was 0.16. In P8, the network was unbalanced, and the closeness centrality was at its lowest point in 0.52 (min = 0.31; max = 0.73). The standard deviation was 0.09. In R6, the closeness centrality was 0.62 (min = 0.30; max = 0.77), and the standard deviation was 0.15.
Figure A6.4. Variation of the actors’ average closeness centrality during the process, with examples of the network structure, weighted with nodal degree.
Appendix 7: Intensity of the ties between the various themes

Figure A7.1. Intensity of the ties between the various themes in the goal-setting phase (G1...G8).
Figure A7.2. Intensity of the ties between the various themes in the draft phase (D1...D4).

Figure A7.3. Intensity of the ties between the various themes in the proposal phase (P5...P9).
Figure A7.4: Intensity of the ties between the various themes in the ratification phase (R1...R6).
Appendix 8: Theme level dynamics of the process

Phase-level dynamics
During the whole process, the cumulative in-degree of the various themes varied considerably (min = 26 for economics, max = 1074 for decision-making related), as can be seen in Table A8.1.

Table A8.1. In-degree values of the various meeting agenda themes during the process, showing variation between themes and phases. For example, the decision-making related theme scored high in-degree values, as the groups of elected officials participating in the process were comparatively large.

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Procedural themes

Decision-making related
The decision-making related theme was active in ten phases during the process, as shown in Figure A8.2. The cumulative in-degree of the decision-making related theme was altogether 1074. The in-degree value scored zero in 17 phases, usually rising in the end of each consecutive phase of the process (goal, draft, proposal, ratification), when the formal decisions concerning the subsequent phases were made. The in-degree values of the active phases varied from 15 (in R2) to 295 (in P9) according to which decision-making bodies participated in the phase. The actors attending the theme were mostly the elected officials (the amount of the unique in-degree ties varied from eleven in G6 to 86 in P9), and municipal civil servants (the amount of the unique in-degree ties varied from two in R2 to 19 in P9). In addition, the consultants participated the theme in two phases: G6 (one unique in-degree tie) and P9 (two unique in-degree ties).
Cumulatively, the decision-making related theme was most strongly tied with the other official documentation (26 ties), as shown in Figure A8.1. The theme was also comparatively well connected with the plan situation (21 ties), mobility (eleven ties), and plan documentation (twelve ties) themes. To the other themes, the number of ties varied between two and seven.

Figure A8.1. The intensity of the ties between the decision-making related theme and the other themes during the process.

Figure A8.2. The cumulative in-degree and the role-based number of the unique in-degree ties connected to the decision-making related theme during the process.
Plan situation

The plan situation theme was active in 21 phases during the process, as shown in Figure A8.4. The cumulative in-degree of the plan situation theme was 579 with the in-degree value scoring zero in six phases along the process. The plan situation theme was the most commonly occurring theme in the various phases, scoring its highest values in the draft and the proposal phases, when the plan preparation was at its most active phase. The in-degree values of the active phases varied from two (in G4) to 65 (in G8). All actor roles were represented at some point in the plan situation related meetings during the process. The actors participating in the theme-related meetings were mostly municipal civil servants (the amount of the unique in-degree ties varied from two in G4, P1 and P4 to 32 in G8). One elected official participated in the theme in two phases (G2 and R1). The landowners attended in 10 phases (the amount of the unique in-degree ties varied from one in G5, D3 and P5 to 18 in G2). The developers participated in eight phases (the amount of the unique in-degree ties varied from one in G6, G8, D2, and P8 to two in G1, G5, D1, and P3). The consultants participated in nine phases (the number of the unique in-degree ties varied from one in G1 and D3 to five in G8...D2). In addition, the public authorities participated in four phases (the number of the unique in-degree ties varied from two in D4 and P3 to eleven in G8).

Comparatively, the plan situation theme was cumulatively the most strongly connected with the other themes in the process, as shown in Figure A8.3. The theme was the most strongly connected with the mobility (66 ties), alternatives and modelling (58 ties), plan documentation (54 ties), and commerce and business (51 ties) themes. The plan situation theme was also comparatively well connected with the other official documentation (40 ties), nature and recreation (38 ties), and municipal engineering (37 ties) themes. In addition, the theme was connected with all of the other themes through 11–25 ties.

![Figure A8.3. The intensity of the ties between the plan situation theme and the other themes during the process. The plan situation theme, as an example of the procedural themes, was connected comparatively well with the other themes.](image)
Plan documentation

The plan documentation theme was active in 15 phases during the process, as shown in Figure A8.6. The theme was most active in the proposal phase. The cumulative in-degree of the plan documentation theme was 284 during the process. The in-degree value scored zero in twelve phases during the process. The plan documentation theme scored its highest values in the proposal phase, when the final plan documentation was under preparation. The in-degree values of the active phases varied from four (in R₆) to 56 (in P₆). Mainly municipal civil servants participated in the plan documentation related meetings, and their amount varied from two in R₆ to 29 in P₆. In addition, two public authorities participated the process in R₄.

The plan documentation theme was connected comparatively well to some of the other themes, as is shown in Figure A8.5. The theme was most strongly connected with the plan situation (54 ties), municipal engineering (36 ties), and
nature and recreation (34 ties) themes. In addition, the theme was comparatively well connected with the mobility (31 ties), and commerce and business (28 ties) themes. To the other themes, plan documentation was connected with 5–23 ties.

Figure A8.5. The intensity of the ties between the plan documentation theme and the other themes during the process.

Figure A8.6. The cumulative in-degree and the role-based number of unique in-degree ties connected to the plan documentation theme during the process.
The alternatives and modelling theme was active in nine phases during the goal-setting, draft, and proposal phases of the process, as is shown in Figure A8.8. The theme was most active in the end of the goal-setting phase, and in the beginning of the draft phase. The cumulative in-degree of the alternatives and modelling theme was 197. The in-degree values scored zero in 18 phases during the process. The highest values were in the draft and proposal phases, when the alternatives for possible solutions were thought over. The in-degree values of the active phases varied from five (in P2) to 42 (in D4). The municipal civil servants, landowners, developers and consultants participated in the alternatives and modelling theme during the process. The participants were mostly municipal civil servants (the number of the unique in-degree ties varied from three in P2 to 16 in G8). Three roles were represented in only one phase during the process. 14 elected officials participated the theme in D3, three landowners in G8, and two developers in G8. In addition, consultants participated in five phases (the amount of the unique in-degree ties varied from one in D4 to eleven in G8).

The alternatives and modelling theme was comparatively well connected to only few other themes, as is shown in Figure A8.7. The theme was most strongly connected to the plan situation (58 ties), and mobility (43 ties) themes. In addition, it was comparatively well connected to the site visit (25 ties), and plan documentation (23 ties) themes. To other themes, it was connected through 4–19 ties.

![Figure A8.7. The intensity of the ties between the alternatives and modelling theme and the other themes during the process.](image-url)
Figure A8.8. The cumulative in-degree and the role-based number of the unique in-degree ties connected to the alternatives and modelling theme during the process.

Goals
The goals theme was active in four phases during the goal-setting phase of the process, as shown in Figure A8.10. The cumulative in-degree of the goals theme was 170, with the values scoring zero in 23 phases during the process. Goals were the most rarely occurring theme during the process, scoring values only during the goal-setting phase in the beginning of the process. The in-degree values of the active phases varied from 16 (in G6) to 89 (in G4). All other roles than the public authorities participated the goals theme at some point during the process. The municipal civil servants participated the theme in four phases (the amount of the unique in-degree ties varied from eight in G3 to 21 in G4). One elected official participated in G6. The landowners participated in four phases (the number of the unique in-degree ties varied from one in G6 to 28 in G4). The developers participated in three phases (the number of the unique in-degree ties varied from one in G3 to four in G4). In addition, the consultants participated the process in four phases (the amount of the unique in-degree ties varied from one in G6 to ten in G4).
The goals theme was connected comparatively weakly to most of the other themes, as is shown in Figure A8.9. The theme was comparatively well connected to the plan situation (18 ties), mobility (14 ties), and other official documentation (14 ties) themes. To the other themes, it was related through one to five ties, and to six themes, there were no ties at all.

Figure A8.9. The intensity of the ties between the goals theme and the other themes during the process. The goals theme was connected comparatively weakly with the other themes.

Figure A8.10. The cumulative in-degree and the role-based number of unique in-degree ties connected to the goals theme during the process. The goal theme covered only four phases in the beginning of the process, but attracted a variety of actor roles.
Detailed plans

The detailed plans theme was active in ten phases during the process, in all other than the draft phase, as shown in Figure A8.12. The theme was most active in the proposal phase. The cumulative in-degree of the detailed plans theme was 184 during the process. The in-degree value scored zero in 17 phases during the process with its highest values in the end of the proposal phase, and in the ratification phase, when the more detailed plans were in their beginning stages. The in-degree values of the active phases varied from four (in P8) to 52 (in P5). Only two roles participated the detailed plans related theme during the process. The municipal civil servants participated the process in ten phases (the number of the unique in-degree ties varied from four in P8 to 16 in R5). In addition, the consultants participated in three phases (the amount of the unique in-degree ties varied from two in R5 to five in R5...R6).

The detailed plans theme was connected moderately with most of the other themes, as shown in Figure A8.11. The theme was most strongly connected with the mobility (29 ties), plan situation (25 ties), and plan documentation (20 ties) themes. In addition, it was moderately connected with the other official documentation (19 ties), public services (19 ties), municipal engineering (14 ties), and commerce and business (14 ties) themes. To the other themes, it was connected through three to eleven ties.

![Figure A8.11. The intensity of the ties between the detailed plans theme and the other themes during the process.](image)
Other official documentation

The other official documentation theme was active in 15 phases during the process, as shown in Figure A8.14. The cumulative in-degree of the other official documentation theme was 179, with the values scoring zero in twelve phases during the process. The theme scored values in all of the consecutive phases (goal-setting, draft, proposal, ratification) during the whole process. The in-degree values of the active phases varied from two (in P₈ and R₁) to 26 (in R₅). Two roles of actors participated in the other official documentation related meetings. The municipal civil servants participated the process in 15 phases (the amount of the unique in-degree ties varied from two in P₈ and R₁ to twelve in D₄ and P₉). In addition, one consultant participated the theme in P₉.

The other official documentation theme was connected moderately with most of the other themes, as shown in Figure A8.13. The theme was most strongly connected with the plan situation (40 ties), decision-making related (26 ties), and mobility (23 ties) themes. In addition, it was comparatively well connected with the plan documentation (20 ties), alternatives and modelling (19 ties), and
detailed plans (19 ties) themes. To the other themes, it was connected through 3–14 ties.

Figure A8.13. The intensity of the ties between the other official documentation theme and the other themes during the process.

Figure A8.14. The cumulative in-degree and the role-based number of unique in-degree ties connected to the other official documentation theme during the process.
Site visits

The site visits theme was active in eleven phases during the consecutive phases (goal-setting, draft, proposal, ratification) of the process, as shown in Figure A8.16. The cumulative in-degree of the site visits theme was 35 during the whole process. The values scored zero in 16 phases during the process with most activity in the goal-setting and the draft phases, when the plan alternatives were sketched. The in-degree values of the active phases varied from one (in multiple phases) to 19 (in G8). Three roles participated in the site visits theme, two of them only in one phase. The municipal civil servants participated in ten phases (the number of the unique in-degree ties varied from one in G6...G7, D2, P2 and R1 to eight in G8). In addition, one landowner and ten consultants participated in the theme in G8.

The site visit theme was connected moderately with some themes, but comparatively weakly connected with most of the other themes, as shown in Figure A8.15. The theme was most strongly connected with the plan situation (25 ties), alternatives and modelling (25 ties), and mobility (23 ties) themes. To other themes, it was connected weakly with one to eleven ties.

Figure A8.15. The intensity of the ties between the site visits theme and the other themes during the process.
Figure A8.16. The cumulative in-degree and the role-based number of the unique in-degree ties connected to the site visits theme during the process.

Sectoral themes

Mobility

The mobility theme was active in 17 phases during the process, as shown in Figure A8.18. The cumulative in-degree of the mobility theme was 263. The in-degree value scored zero in ten phases during the process. Mobility scored its highest values in the goal-setting, draft, and proposal phases when the plan solution was actively under preparation. The in-degree values of the active phases varied from five (in D₄) to 39 (in P₅). All other actor roles than the elected officials participated in the mobility theme at some point during the process. Mostly the actors participating in the theme were municipal civil servants (the amount of the unique in-degree ties varied from three in D₄ to 13 in R₁). The landowners participated in only one phase (2 unique in-degree ties in G₈). The developers were represented in two phases (one unique in-degree tie in P₉, and two unique in-degree ties in G₉). The consultants participated in eleven phases (the amount of the unique in-degree ties varied from one in G₄, P₉ and R₁ to seven in D₃). In
addition, the public authorities participated in five phases (the number of the unique in-degree ties varied from one in P7 and R1 to three in P3).

The mobility theme was connected comparatively well to the other themes, when compared with the other sectoral themes, as shown in Figure A8.17. The theme was most strongly connected with the plan situation (68 ties), and the alternatives and modelling (43 ties) themes. Mobility was also comparatively well connected with the plan documentation (31 ties), municipal engineering (29 ties), detailed plans (29 ties), and commerce and business (28 ties) themes. To the other themes, it was connected by 9–23 ties.

![Figure A8.17. The intensity of the ties between the mobility theme and the other themes during the process. When compared with the other sectoral themes, the mobility theme was connected well with the other themes in the process.](image-url)
Municipal engineering

The municipal engineering theme was active in nine phases during the draft and the proposal phases of the process, as shown in Figure A8.20. The theme was most active in the proposal phase. The cumulative in-degree of the municipal engineering theme was 219, with the values scoring zero in 18 phases during the process. The municipal engineering theme scored its highest values in the proposal phase, when the final plan solution was prepared. The in-degree values of the active phases varied from three (in P1...P2) to 78 (in P3). The municipal civil servants, landowners, consultants and public authorities participated in the municipal engineering related meetings during the process. The participants were mainly municipal civil servants (the amount of the unique in-degree ties varied from three in P1...P2 to 15 in P3). Two landowners participated in the process in P6. The consultants were represented in five phases (the number of the unique in-degree ties varied from one in P5...P6 to five in P6). In addition, the public
authorities participated in three phases (one unique in-degree tie in P₅ and P₇...P₈).

The municipal engineering theme was connected comparatively well to some of the more procedural themes, as is shown in Figure A8.19. The theme was most strongly connected with the plan situation (37 ties), plan documentation (36 ties), mobility (29 ties), and nature and recreation (27 ties) themes. In addition, it was connected to the other themes through 5–20 ties.

Figure A8.19. The intensity of the ties between the municipal engineering theme and the other themes during the process.

Figure A8.20. The cumulative in-degree and the role-based number of unique in-degree ties connected to the municipal engineering theme during the process.
The commerce and business theme was active in twelve phases during the process, as is shown in Figure A8.22. The theme was most active in the proposal phase. The cumulative in-degree of the commerce and business theme was 208 during the process, with the values scoring zero in 15 phases during the process. The commerce and business theme scored its highest values in the preparation phase, when the final plan was under preparation. The in-degree values of the active phases varied from two (in P₂...P₃) to 74 (in P₅). All of the other roles than the elected officials were represented in the commerce and business related meetings during the process. However, many of the roles participated only in one to three phases. The municipal civil servants participated the theme most actively; in twelve phases (the number of the unique in-degree ties varied from two in P₂...P₃ to twelve in P₈). 16 landowners and one developer participated in G₂. The consultants were represented in three phases (the number of the unique in-degree ties varied from four in P₅ and R₃ to five in G₂). In addition, the public authorities participated in two phases (one unique in-degree tie in R₄ and three unique in-degree ties in P₈).

The commerce and business theme was connected moderately to the other themes, as is shown in Figure A8.21. The theme was comparatively strongly connected with the plan situation (51 ties), mobility (28 ties), and plan documentation (28 ties) themes. There were also moderate connections with the municipal engineering (20 ties), nature and recreation (18 ties), alternatives and modelling (16 ties), and public services (16 ties) themes. In addition, it was connected to the other themes through 4–14 ties. To goals, there was no connection at all.

Figure A8.21. The intensity of the ties between the commerce and business theme and the other themes during the process.
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Figure A8.22. The cumulative in-degree and the role-based number of unique in-degree ties connected to the commerce and business theme during the process.

Nature and recreation

The nature and recreation theme was active in 14 phases during the process, and most active in the draft and the proposal phases, as is shown in Figure A8.24. The cumulative in-degree of the nature and recreation theme was 151 during the process. The values scored zero in 13 phases during the process. The theme scored values in all of the consecutive phases (goal-setting, draft, proposal, and ratification) during the whole process. The in-degree values of the active phases varied from two (in G3, G7, and D2) to 24 (in P2). Two roles participated in the nature and recreation theme during the process. The municipal civil servants participated in the process in 14 phases (the amount of the unique in-degree ties varied from two in G3, G7, and D2 to ten in P2 and P6). In addition, four consultants participated in the process in two phases (D3 and P2).

The nature and recreation theme was connected moderately to the other themes, as shown in Figure A8.23. The theme was most strongly connected with the plan situation (38 ties), plan documentation (34 ties), and municipal engineering (27 ties) themes. In addition, it was comparatively well connected to the
mobility (22 ties), public services (20 ties), and commerce and business (18 ties) themes. To the other themes, it was connected through 1–17 ties.

**Figure A8.23.** The intensity of the ties between the nature and recreation theme and the other themes during the process.

**Figure A8.24.** The cumulative in-degree and the role-based number of the unique in-degree ties connected to the nature and recreation theme during the process.
Public services

The public services theme was active in nine phases during the process, in all other than the goal-setting phase, as is shown in Figure A8.26. The theme was the most active in the proposal phase. The cumulative in-degree of the public services theme was 105 during the whole process. The values scored zero in 18 phases during the process, with the highest values from the end of the draft phase onwards. The in-degree values of the active phases varied from two (in D4) to 28 (in P6). Two roles participated in the public services theme during the process. The municipal civil servants participated in nine phases (the number of the unique in-degree ties varied from two in D4 to 15 in P6). In addition, three landowners participated in P8.

The public services theme was connected moderately with the other themes, as shown in Figure A8.25. The theme was most strongly connected with the plan situation (24 ties), mobility (22 ties), and plan documentation (21 ties) themes. In addition, it was moderately connected with the nature and recreation (20 ties), detailed plans (19 ties), and alternatives and modelling (17 ties) themes. To the other themes, it was connected through 3–15 ties. To goals, there was no straight tie at all.

Figure A8.25. The intensity of the ties between the public services theme and the other themes during the process.
Cultural heritage

The cultural heritage theme was active in seven phases during the process, as shown in Figure A8.28. The theme was active in all of the other than the ratification phase, and the most active in the beginning of the proposal phase. The cumulative in-degree of the cultural heritage theme was 52 during the process. The in-degree value scored zero in 20 phases during the process. The cultural heritage theme scored its highest values in the proposal phase, when the final plan was under preparation. The in-degree values of the active phases varied from three (in G6 and P6) to 15 (in P2). Two roles participated in the cultural heritage related meetings. The municipal civil servants participated the theme in seven phases (the number of the unique in-degree ties varied from two in G8 to ten in P2). In addition, one consultant participated in two phases (G8 and D3).

The cultural heritage theme was connected comparatively weakly to most of the other themes, as is shown in Figure A8.27. The theme was moderately connected with the mobility (17 ties), plan situation (15 ties), and alternatives and
modelling (14 ties) themes. To the other themes, it was connected with two to ten ties.

![Figure A8.27. The intensity of the ties between the cultural heritage theme and the other themes during the process.](image1)

**Economics**

The economics theme was active in five phases during the proposal and the ratification phases at the end stage of the process, as is shown in Figure A8.30. The cumulative in-degree of the economics theme was 26. The in-degree value scored zero in 22 phases during the process with most activity in the proposal.
phase, when the final plan was under preparation. The in-degree values of the active phases varied from two (in P2) to eight (in P5 and R6). The municipal civil servants participated the theme in five phases (the number of the unique in-degree ties varied from two in P2 and R6 to five in P6). No other roles were represented.

The economics theme was connected comparatively weakly with all other themes, as is shown in Figure A8.29. The strongest connections were to the plan situation (eleven ties), and nature and recreation (eleven ties) themes. To the other themes, it was connected through one to ten ties. To goals, there was no connection at all.

Figure A8.29. The intensity of the ties between the economics theme and the other themes during the process. The economics theme was connected comparatively weakly with the other themes in the process.
Figure A8.30. The cumulative in-degree and the role-based number of the unique in-degree ties connected to the economics theme during the process. The economics theme covered only five phases in the process, attracting actors only from the municipal civil servant role. The cumulative in-degrees were comparatively low.
Appendix 9: Applications of the process dynamics analyses

The detailed time-series data allows various comparisons of the relational dynamics of the networked process. Consequently, some examples were made for testing the diversity of the possibilities available by using SNA. The comparisons integrate the various analyses simultaneously, allowing the comparison of the various measures with one another.

Comparison of the social network dynamics

Figure A9.1 shows the relational statistics (scaled with the maximum score of each statistic, max = 1.00) of the various phases during the process. Some of the measures have similar patterns over time. For example, the number of the active actors, the number of the actors with power, degree, and betweenness centrality change with a similar pattern over time. All of those measures peak in R8, R9, and R10, when the large numbers of the elected officials participated in the process, increasing the number of the actors with formal power. Consequently, the average degree increases significantly because of the increase in the number of the active actors. Betweenness centrality, however, is more complicated, as it does not necessarily directly follow the increase in the network size. However, the betweenness centrality increased as there were actors scoring high centralities, due to their position in binding the various subgroups of actors together.
Figure A9.1. The statistical dynamics of the process. Some of the measures have similar patterns over time, suggesting interesting possibilities for further research.
Thematic actor-activity-action dynamics

Figure A9.2 presents the dynamics on the actor, thematic activities and action levels simultaneously, supporting the comparison of these aspects with one another. As can be seen in the visualization, the thematic activities have different patterns of intensity, duration and change over time. The procedural themes typically become more intensive in the end of each phase. However, for some reason, this does not happen in the end of the draft phase. The sectoral themes became considerably more intensive in the proposal phase, when some investigations were still ongoing, and the draft was prepared through a series of various sectoral meetings. As can be seen in the figure, not all of the themes were active right from G1 onwards, but some activated later on during G2...D1. In addition, not all of the themes lasted until the end of the process.

When comparing the thematic activities with actions, one can see that their dynamics had similar patterns. In the phases with more intensity in the procedural themes, typically also the actions were made. Considering the actor network dynamics, the comparisons are not as straightforward. In P1, P4, R2...R4 and G7, when the network structure was scarce and simple, also the activities and actions were less intensive. Typically, as the elected officials joined the process, the intensity of the decision-making related theme increased, and actions, such as formal decisions, were made. When the network structure was complete or near to complete, as in G1...G2, only few themes were discussed.
Ego network analysis

Both of the actors (named as A and B) are situated centrally in the overall network structure. Actor A had participated in the meetings considerably more than actor B had. In the interviews, actor A was able to describe multiple patterns of various meetings, and name actors from various roles. The comparison of the different network structures of actor A is illustrated in Figure A9.3. The estimate of the total amount of the actors participating over the whole duration was from 50 to 100, which is well in line with the number of actors in the documented ego network (93) of actor A. The number of actors in the memorized network of actor A was 75. However, in the documented ego network, and in the memorized network, only 27 actors were the same. Thus, 48 actors were identified in an other way than being in a same meeting with actor A. Based on the answers of the interview, all of the 48 actors had participated somehow in the
documented subprocesses during the overall process. For example, by preparing an investigation, or by involving in the political decision-making. Consequently, none of these 48 actors was pointed out by name in the interview, but all were referred to as a group.

In the interview, actor B had considerably less memories of the process than actor A did. All of the memories were experience-based, and relating only to the meetings, in which the actor B had participated. The comparison of the different network structures of actor B is illustrated in Figure A9.4. The estimate of the whole number of the actors during the process was 20. This is in line with the number of actors in the documented ego network (28) of actor B. However, the memorized network of actor B was considerably smaller, with only five actors. All of the five actors were represented also in the documented ego network. Thus, for both actors (A and B), the memorized network was significantly smaller than the documented cumulative network.
Appendix 10: Network structures

Single-core structure (R₃)

In R₃, the network structure seemed balanced, but strongly centralized, as is shown in Figure A10.1. There was not much activity in the phase, as only some minor alterations were made on the plan. There were altogether 17 active actors in the phase of the total number of 115 actors in the phase. All of the participating actors represented the municipal civil servant role, five of them holding formal power in the process. No actors joined or exited the process. The modularity (0.29) and the number of communities (2) were on an average level, when compared with the whole process. The network density was comparatively high (0.57), but still not close to a complete structure (1). The average nodal degree was 9.35 (min = 1; max = 16), and the standard deviation was 3.89. The nodal degree and the standard deviation stayed low in comparison to the whole process. The average betweenness centrality was comparatively low, 6.94 (min = 0; max = 59), and the standard deviation was 13.88. There was one actor holding a central position in relation to the others, and the range between the central actor and the others was high. The closeness centrality was 0.73 (min = 0.52; max = 1), and the standard deviation was 0.12. In R₃, there was a central actor binding the network together. The network was comparatively small, and all but the one central actor were in positions that are more peripheral. Half of the nodes scored zero in the betweenness centrality, and the rest 0.2–70.97. Thus, the score for the central actor (359.67) further confirmed its central role in the knowledge transfer, or control, position within the network.
Figure A10.1. Typical example of a single-core network structure (R3). Upper row: betweenness centrality, lower row: nodal degree, actor roles, actor power.
Dual-core structure ($P_2$)

In $P_2$, one investigation was finalized, and the consultant group exited the process. In addition, a resident meeting of the plan draft was arranged (not shown in the graphs). The network structure seemed balanced, and a core team of two persons began to show up for the first time, as is shown in Figure A10.2. There were altogether 43 active actors in this phase of the cumulative 106 actors. 70% of the actors represented the municipal civil servant role, eight of them holding formal power in the process. 14% were consultants, 12% public authorities, 2% developers, and 2% elected officials. Nine new actors joined, and 13 actors exited the process. The modularity (0.25) was close to the average level of the process. The number of communities peaked to four, although the network structure seemed quite balanced. The amount of weakly connected components was one. In addition, the network density was comparatively low (0.34). The average nodal degree was 15.07 (min = 2; max = 42), and the standard deviation was 8.89. The nodal degree and the standard deviation were on an average level, when compared with the whole process. The average betweenness centrality was on an average level, 18.10 (min = 0; max = 184.37), and the standard deviation was 40.13. There were two actors holding a considerably more central position in relation to the others. The closeness centrality was 0.63 (min = 0.51; max = 1), and the standard deviation was 0.10. There was a pair of central actors binding the rest of the network together. The two core actors had a very strong tie, and strong supporting ties to four other actors within the network. In addition, there was a peripheral, but balanced, network of other actors. Actors holding formal power in the process were situated in the periphery.
Figure A10.2. Typical example of a dual-core network structure ($P_2$). Upper row: betweenness centrality, lower row: nodal degree, actor roles, actor power.
Complete structure ($G_1$)

In $G_1$, the municipal civil servants in the process were mostly representing the more detailed planning levels than strategic spatial planning. There were no strategic spatial planners involved, but the representatives of the landowners and their consultants were participating. The network structure was complete, as every actor was connected to each other, as is shown in Figure A10.3. The amount of actors with formal decision power was low, and the network structure seemed balanced. There were altogether 25 active actors in this phase of the total 25 actors, as $G_1$ was the beginning phase of the process. Large part (44%) of the actors represented the municipal civil servant role, three of them holding formal power in the process. Another large part (44%) were landowners, 8% developers, and 4% consultants. 25 new actors joined, and no actors exited the process. The modularity and the number of communities stayed at zero, as all actors were connected equally to each other, and there were not any subgroups. Network density was considerably high (1), as the network represented a complete structure, and all of the nodes were connected equally with each other. The average weighted nodal degree was 24 (min = 24; max = 24), and the standard deviation was zero. The average closeness centrality was one (min = 1; max = 1), and the standard deviation was zero.
Figure A10.3. Example of a complete network structure (G). Upper row: betweenness centrality, lower row: nodal degree, actor roles, actor power.
Multi-core structure ($G_6$)

In $G_6$, the elected officials of the City Planning Committee joined the process to decide on the goals of the plan. In addition, a resident meeting was arranged, but it is not presented in the network graph. There was a core team of multiple actors with not very strong connection to each other, as is shown in Figure A10.4. There was a scattered multi-core structure, in which the central actors connected the various subgroups. The network was dispersed and there were not strong connections among any of the actors. There were altogether 44 active actors in this phase of the cumulative number of 63 actors. 50% of the active actors represented the municipal civil servant role, 25% elected officials, 13% consultants, 10% landowners, and 2% developers. 18 of them were holding formal power in the process. 17 new actors joined, and two actors exited the process in this phase. The modularity (0.35) and the number of communities (3) were relatively high, when compared with the whole process. The density of the network (0.41) was on an average level. The average nodal degree was 18.09 (min = 1; max = 37), and the standard deviation was 7.72. The nodal degree and the standard deviation stayed on an average level compared with the whole process. Average betweenness centrality was relatively low, 13.27 (min = 0; max = 97.96), and the standard deviation was 22.72. There were six actors holding a central position in relation to the others. The closeness centrality was 0.67 (min = 0.44; max = 1), and the standard deviation was 0.11. There was considerable variation among the various actors, and the difference between the minimum and the maximum values was at its largest, although there cannot be seen considerable differences in the network graph.
Figure A10.4. Typical example of a multi-core network structure (G₆). Upper row: betweenness centrality, lower row: nodal degree, actor roles, actor power.
Disconnected structure ($P_7$)

In $P_7$, a plan-related initiative was made by the elected officials, causing an unexpected disturbance in the process. The initiative was discussed by two groups of elected officials, seen as a dense but separate subgroup with its own core team in the graph, as is shown in Figure A10.5. In addition, one investigation was finalized. The structure of the other network remained similar to the previous two phases of the process. There were altogether 70 active actors in this phase of the cumulative 120 actors. 57% of them represented the municipal civil servant role, 30% elected officials, 10% consultants, and 3% public authorities. 35 of the actors in this phase held formal power in the process. 23 new actors joined, and eleven actors exited the process. The network was clearly disconnected, and there was no link between the two main networks. The modularity (0.38) and the number of communities (3) were relatively high, but did not peak considerably. The density of the network was low (0.28), when compared with the whole process. The average nodal degree was 19.14 (min = 2; max = 36), and the standard deviation was 10.31. The nodal degree and its standard deviation stayed on an average level, when compared with the process. The average betweenness centrality was low, 10.29 (min = 0; max = 197.93), and the standard deviation was 24.83. In the other network there was one actor, and in the other one ten actors, holding a central position in relation to the others. The closeness centrality was 0.72 (min = 0.52; max = 1), and the standard deviation was 0.15.
Figure A10.5. Typical example of a disconnected network structure (P7). Upper row: betweenness centrality, lower row: nodal degree, actor roles, actor power.
Strategic spatial planning requires the synergy of multiple knowledges, as well as organizational capability of learning. Current theoretical views suggest that planning is constructed through social processes, increasing the importance of understanding their relational structures. As complex systems, the multi-actor processes are typically dynamic and often unsystematically documented, challenging organizational learning over time. To generate understanding of the procedural dynamics and their potential effects over time, this dissertation focuses on the concept of process memory development. The networked complexities are approached with social network analysis of longitudinal time-series data from organized interactions during one statutory strategic spatial planning process. The results of the visual-analytical method are validated, and their relevance for planning research and practice are discussed through methodological triangulation. Unveiling the networked dynamics is a promising direction for understanding the complexities of planning practice.